

# How Has CEO Turnover Changed?

by

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## **Abstract**

We study CEO turnover – both internal (board driven) and external (through takeover and bankruptcy) – from 1992 to 2005 for a sample of large U.S. companies. Annual CEO turnover is higher than that estimated in previous studies over earlier periods. Turnover is 15.6% from 1992 to 2005, implying an average tenure as CEO of less than seven years. In the more recent period since 1998, total CEO turnover increases to 17.4%, implying an average tenure of less than six years. Internal turnover is significantly related to three components of firm stock performance – performance relative to industry, industry performance relative to the overall market, and the performance of the overall stock market. The relations are stronger in the more recent period since 1998. We find similar patterns for both forced and unforced turnover, suggesting that some turnover labeled as unforced is actually not voluntary. There is some evidence that the increases in turnover and turnover-performance sensitivity are related to increases in block shareholder ownership, board independence, and Sarbanes-Oxley. The increases in turnover are not related to shareholder rights or corporate fraud. External turnover is not significantly related to any of the measures of stock performance over the entire sample period, or over the two sub-periods.

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## **I. Introduction**

In the last several years, corporate governance in the United States has come under great scrutiny, if not attack. The corporate governance scandals early in this decade led to the Sarbanes Oxley legislation. Since the legislation, the criticism of corporate governance has continued. CEOs are routinely criticized for being overpaid. Boards of directors are routinely criticized as cronies of those overpaid CEOs. Jensen, Murphy and Wruck (2004) document the increase in CEO pay since the 1970s. Bebchuk and Fried (2003) and Bebchuk and Grinstein (2005) document a substantial increase in CEO pay accelerated after 1995. All three papers criticize boards of directors for the increases in CEO pay and for not doing a good job monitoring the pay practices and CEOs.

While a great deal of work has focused on changes in CEO pay, recent changes in CEO turnover and board behavior have received little attention. Earlier work and casual empiricism suggest that the CEO's job has become riskier over time. Khurana (2003) reports that CEO turnover increased in the 1990s relative to the 1970s and 1980s. Murphy and Zbonjick (2004) and Jensen et al. (2004) also report that turnover has increased in the 1990s, although the magnitude they report is quite small – from 10% per year in the 1970s and 1980s to 11% in the 1990s. The samples in these papers do not go beyond the year 2000 so they are unable to consider the period in which corporate governance and CEO performance and pay have been subject to intense scrutiny.

In this paper, we study CEO turnover from 1992 to 2005 for a sample of large U.S. companies. We consider turnover that occurs through takeover and bankruptcy as well as turnover in ongoing companies. When takeovers and bankruptcies are taken into consideration, the job of CEO in large U.S. companies appears more precarious than before, particularly after

1997. Annual CEO turnover is 15.6% from 1992 to 2005, implying an average tenure as CEO of less than seven years. In the more recent period since 1998, total CEO turnover increases to 17.4%, implying an average CEO turnover of just under six years. Internal or board driven turnover also rises substantially, increasing from 10.2% in the first part of the sample to 12.6% in the latter part of the sample. Looked at another way, only 36% of CEOs in place in 1992 remained CEO in 1997, while only 25% of CEOs in place in 1998 remained CEO in 2003.

We then look at how turnover varies with firm performance. Previous work suggests a modest relation between internal (board initiated) turnover and firm stock performance. (See Murphy (1999) and Jensen et al. (2004)). We find a stronger and significant relation between internal turnover and firm stock performance. Internal turnover is related to three different components of total firm stock performance. I.e., turnover is sensitive to the stock performance of the firm relative to the industry, the stock performance of the industry relative to the stock market (under certain specifications), and the performance of the overall stock market. (Jenter and Kanaan (forthcoming) obtain similar results for forced turnover which we discuss below.) The sensitivity to one standard deviation differences in each of these measures is economically meaningful. We find similar results for both forced and unforced turnover.

Further, internal turnover after 1997 is more strongly related to all three measures of stock performance. In fact, the sensitivity to stock performance appears to be greater than that in any of the periods between 1970 and 1995 studied in Murphy (1999). Ironically, it appears that during the period in which boards have been criticized, boards have become increasingly sensitive to firm stock performance.

We next consider five possible explanations for or factors that drive the changes in turnover and turnover-performance sensitivity. There is some evidence that the increases in

turnover and turnover-performance sensitivity are related to increases in blockholdings, board independence, and Sarbanes-Oxley, but not to the Gompers, Ishii and Metrick (2003) governance index or to corporate fraud.

External turnover – turnover primarily related to acquisitions – is only significantly related to industry performance relative to the market. This result is economically small and driven by the later sub-period.

As we discuss in more detail in the conclusion, our results suggest a number of implications. First, the results indicate that CEO tenures have declined, suggesting the job is more precarious than in the past. When external takeovers are included, the average tenure of a CEO has declined to less than six years for the recent 1998 to 2005 period. The recent tenures are substantially shorter than those reported in previous work for the 1970s, 1980s, and 1990s. For individual CEOs, the shorter expected tenure likely offsets some of the benefit of the increase in CEO pay over this period.

Second, our similar results for the turnover-performance sensitivities of forced and unforced turnover suggest that a number of turnovers labeled as unforced are, in fact, not voluntary.

Third, the results suggest an evolving role for boards. In a sample from the 1980s, Morck, Shleifer and Vishny (1989) find that internal turnover is related to industry-adjusted performance while external turnover from hostile takeovers is related to industry performance. They interpret this as indicating boards respond well to poor performance relative to the industry, but do not respond well to poor industry performance. The external takeover market becomes active in reaction to poor industry performance and a need for restructuring.

Our results suggest that boards respond not only to poor performance relative to the industry, but also to poor industry performance and to poor market performance. One interpretation of these results is that boards (perhaps in concert with shareholders) perform both the role they performed in the 1980s and the role that hostile takeovers played then. The increased turnover associated with blockholdings, board independence, and Sarbanes-Oxley is consistent with this interpretation.

Fourth, the shorter expected CEO tenures and sensitivity of those tenures to stock performance have implications for the measurement of CEO pay. The shorter expected tenures suggest that the estimates of CEO pay used in most compensation studies are overstated.

Finally, shorter CEO tenures, the greater sensitivity to stock performance, as well as higher CEO pay may have created a greater incentive for CEOs to engage in earnings management or manipulation.

This paper was written contemporaneously with Jenter and Kanaan (forthcoming) who study related issues in a sample of CEO turnover from 1993 to 2001. They focus on forced CEO turnover, rather than all CEO turnover. Forced turnovers represent somewhere between 15% and 25% of total internal turnovers. As we do for forced and unforced turnover, they find that forced CEO turnover is significantly related to industry-adjusted, industry, and market returns. They focus most of their paper on verifying this effect for forced turnover and explaining why boards might behave this way. They also study a larger sample of firms, but over a shorter time period. Unlike us, they do not focus on the level of total turnover, the annual variation in that turnover, and do not consider external turnovers. Given their shorter sample, they also do not consider how turnover behavior changes over time.

Our paper also is related to that of Mikkelson and Partch (1997) who compare complete management turnover in US companies in two five-year periods – the active takeover market of 1984 - 1988 and the less active market of 1989-1993. In the active takeover period, they find that 39% of firms experience CEO turnover and 23% of firms experience complete management turnover; in the less active period, 34% of firms experience CEO turnover while 16% of firms experience complete management turnover. They find that the decline in turnover frequency is more pronounced among poorly performing firms. They argue that the activity of the external takeover market affects the “intensity of management discipline.” Our results suggest that the intensity of management discipline has increased since the end of their sample period, and likely exceeds the intensity of the active takeover period. Huson, Parrino, and Starks (2001) also examine CEO turnover across sub-periods to see if the relation between performance and turnover has changed over time. Using four six-year sub-periods between 1971 to 1994, they document that while CEO turnover is negatively related to accounting performance and industry-adjusted stock returns, the relations did not change significantly over time. Our analysis begins at the end of their sample period and shows that, at least, during the 1992 to 2005 period the relation between turnover and performance has changed.

The paper proceeds as follows. Section II describes our sample. Section III presents the results for turnover levels. Section IV presents the turnover-performance regressions. Section V summarizes the results and discusses their implications in more detail.

## **II. Sample and Data**

The sample of firms includes all Fortune 500 firms with data on both the Center for Research in Security Prices (CRSP) tapes and Compustat files (research and current files). The

sample runs from fiscal-year end 1991 to fiscal-year-end 2005. We construct the sample using the annual Fortune 500 lists from 1992 to 2006. Each year, Fortune ranks firms based on sales at fiscal-year end and publishes the list in an April or May issue of the following year. For example, fiscal-year end 1991 rankings are published in an April or May 1992 issue.

We follow the sample firms from the first year they appear on a Fortune list until the end of the sample period or until the firm exits the sample because of a merger, acquisition or delisting from a major stock exchange. We identify CEO turnovers using the Fortune 500 and Fortune 1000 lists, 10-K filings, proxy statements, Dun and Bradstreet's Million Dollar Directory, the Wall Street Journal and Lexis/Nexis business news searches.

### **III. Turnover Levels**

Turnover in a given fiscal year,  $T$ , means that the CEO in the spring of year  $T$  is no longer the CEO by the following spring of year  $T+1$ . We measure turnover, therefore in the years 1992 to 2005.

We consider two types of turnover. Standard or internal turnover is turnover that is associated with a company's board of directors. For standard turnover, a company remains publicly-listed over the course of the year, but the CEO in the spring is no longer the CEO the following spring. This is the turnover that is generally measured in studies of turnover. For example, see Huson et al. (2001). Non-standard or external turnover is turnover due to a merger or bankruptcy / delisting. We also consider the CEO to have been turned over if his or her company is taken over by another company and he or she is not CEO of the combined company. We view this as an instance of turnover because in many mergers the former CEO leaves the combined company. In those instances in which the CEO former remains, the former CEO

generally experiences a reduction in pay and power. Total turnover is the sum of internal and external turnover.

Table 1 presents the level of CEO turnover by year. Panel A reports turnover statistics for all firms in our sample. Panels B1 and B2 report turnover statistics based on whether the sample firm is in the Fortune 500 in a given year or not. Panels C1 and C2 report turnover statistics based on whether the sample firm is in the S&P 500 in a given year or not.

For total turnover and standard turnover we use two definitions of turnover. Definition (1) defines a turnover occurrence if a new CEO is selected. Definition (2) defines a turnover occurrence in which the CEO dies as a non-turnover event. Figure 1 presents total and standard turnover for all firms according to definition (1) graphically.

There are three noteworthy patterns across the panels. First, total turnover levels are substantially higher than those typically reported. Overall, total turnover in Panel A under definition (1) is 15.6% over the entire sample period implying an average CEO tenure of 6.4 years. This is substantially higher than that reported in Jensen, Murphy and Wruck (2004) and Murphy and Zabojnik (2004) who study a different sample of large firms (from the Forbes lists) over three decades from 1970 to 2000. They report turnover of 10.2% in the 1970s, 10.0% in the 1980s, and 11.3% in the 1990s. All of these measures, however, are for standard or internal turnover. For our sample period of 1992 to 2005, we obtain a standard turnover of 11.6%, similar to their results for the 1990s. At 11.6%, the estimated average CEO tenure is 8.6 years, roughly two years greater than the actual average tenure (that includes external takeover).

The second noteworthy pattern in table 1 is the time series variation in the levels of both total and internal turnover. For example, in Panel A and using definition (1) total turnover is as low as 6.9% in 2003 (and only 9.2% in 1994), and as high as 26% in 2000 (and 21.2% in 1999).



Third, turnover increased significantly in the latter part of the sample. In the earlier period from 1992 to 1997, total CEO turnover using definition (1) in Panel A is 13.0% per year implying an average tenure of 7.7 years. In the more recent period from 1998 to 2005, total CEO turnover increases to 17.4%, implying an average CEO turnover of 5.8 years. Internal or board driven turnover also rises substantially, increasing from 10.2% in the first part of the sample to 12.6% in the latter part of the sample. The increase in turnover is driven by very high levels of turnover from 1998 to 2002 and in 2005.

It is natural to divide the sample period into pre-1998 and post-1997 because this break roughly coincides with the large increase in CEO pay described in Bebchuk and Grinstein (2005).<sup>1</sup> The period in which CEO pay increased substantially coincides with a period in which CEO tenure decreases substantially. It is worth adding that the increased level of turnover began well before 2002 (when the Enron and Worldcom scandals became apparent and Sarbanes-Oxley was passed).

It is possible that our results are affected by our sample selection criteria. We continue to follow a firm once it is included in the Fortune 500, even if it drops from the Fortune 500. This may make our results harder to compare with other studies that restrict themselves to firms in the Fortune 500, S&P 500 or Forbes lists. Accordingly panels B1 and B2 consider turnover separately for firms in the Fortune 500 and those not in the Fortune 500 in the particular year, while panels C1 and C2 do the analogous comparison for firms in and not in the S&P 500.

Panels B1 and B2 indicate that both total and standard turnover are higher for firms in the Fortune 500 than for firms not in the Fortune 500. Total and internal turnover over the sample

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<sup>1</sup> We used the same 1997-1998 breakpoint in the initial version of the paper. Because that version that did not include 2005 turnover, the breakpoint represented roughly half of the sample.

period are, respectively, 16.3% and 12.8% for Fortune 500 companies compared to 14.0% and 9.1% for the non-Fortune 500 companies.

The increase in turnover from the earlier part of the sample to the latter part of the sample is consistent across both Fortune 500 and non-Fortune 500 companies.

Panels C1 and C2 consider turnover separately for firms in and not in the S&P 500. Total turnover is similar for the two groups while internal turnover is greater for the companies in the S&P 500. Again, turnover increases from the earlier part of the sample to the latter part of the sample for both groups. The increase is somewhat greater for non-S&P 500 firms.

The results for the Fortune 500 and S&P 500 firms, therefore, indicate that the three patterns in our overall sample are not sensitive to our selection criteria.

Table 2 presents the results of probit regressions estimating the probability of CEO turnover. The regression includes only an indicator variable equal to one if the year is 1998 or later. This tests whether turnover in the later period (1998 to 2005) is statistically different from that in the earlier period. We report the results for all firms for total turnover and standard turnover using both definitions of turnover. The coefficient estimates on the indicator variable are positive and statistically significant in all four regressions, suggesting that turnover is significantly higher in the later period.<sup>2</sup>

Table 3 presents the turnover data in a different way. We compare the fraction of the CEOs in 1992 who are no longer CEOs in 1997 to the fraction of CEOs who are CEOs in 1998 and no longer CEOs in 2003. The table shows that 64% of CEOs in 1992 were no longer CEOs in 1997, while over 75% of CEOs in 1998 were no longer CEOs by 2003. Again, this result suggests that the job of CEO has become increasingly precarious over the sample period.

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<sup>2</sup> Our preliminary analysis of turnover in 2006 and 2007 indicates that turnover was roughly 17% in each of those years. This suggests that, out of sample, turnover continues at the high level of the post-1997 period.

The turnover also is substantially greater than that measured by Mikkelsen and Partch (1997) over two earlier five year periods. In the active takeover period from 1983 to 1988, they find that 39% of firms experience CEO turnover (and 23% of firms experience complete management turnover); in the less active period from 1989 to 1993, 34% of firms experience CEO turnover (while 16% of firms experience complete management turnover). Unfortunately, these results are not directly comparable because the sample in Mikkelsen and Partch consists of smaller firms.

#### **IV. The Relation of Turnover and Performance**

##### **A. Internal Turnover**

We estimate pooled annual probit regressions to examine the likelihood of internal CEO turnover. In all of the probit regressions, the dependent variable is equal to one if a CEO turns over and zero otherwise. Turnover is measured using definition (2) (i.e., deaths are coded as non-turnover events). The tables report the marginal changes in the probability of internal CEO turnover, implied by the probit coefficient estimates that result from a unit change in the explanatory variables. For indicator variables, the coefficient represents the change in the probability associated with moving the indicator from 0 to 1. These marginal sensitivities, labeled " $\Delta$ Prob," are economically equivalent to coefficient estimates from ordinary least squares estimation. In the discussion below, we focus on the significance of these marginal effects. Standard errors are robust.

In all of the probit regressions, three proxies are used to measure stock market performance. First, we measure market performance using the annual return on the S&P 500 index. Second, relative industry performance is measured at the two-digit SIC code level and

equals the difference between the return on the median firm in the industry and the return on the S&P 500 index. Third, relative firm performance is measured as the industry-adjusted firm stock return, which is equal to the firm stock return minus the return for the median firm in the same two-digit SIC code. The industry definition follows Huson et al. (2001). Returns are measured over the calendar year period. Lagged returns are measured over the previous calendar year. For example, for companies in Fortune's April 2006 issue, we measure stock returns for calendar year 2005 and lagged stock returns for calendar year 2004.

Table 4 reports the results for two sets of probit regressions. In the first set of regressions, we include measures of stock market performance and an indicator variable equal to one if lagged CEO age is greater than or equal to 60 (CEO age dummy). In the second set of regressions, we add the change in ROA as a measure of operating performance where ROA equals the ratio of operating income to assets. We use change in ROA because this measures the change in operating performance. For the two sets of regressions, we report the results for the full sample period and two sub-periods: 1992 to 1997 and 1998 to 2005.

Table 4 shows that all three components of stock performance are significantly related to internal CEO turnover. And all three sensitivities are significantly greater (more negative) in the 1998 to 2005 sub-period.

First, turnover increases with poor industry-adjusted stock performance over the entire sample period and, particularly, in the latter 1998 to 2005 period. For the 1998 to 2005 sub-period, a one-standard deviation (38%) decline in a firm's industry adjusted stock return is associated with an increase of 3.4% in the likelihood of CEO turnover. This sensitivity appears to be greater than the sensitivities reported in Murphy (1999) for various sub-periods between

1970 and 1995. This is particularly interesting given that Murphy (1999) finds that turnover is not related to industry-adjusted performance between 1990 and 1995.

Second, CEO turnover also is related to poor industry performance. Again, the negative relation for the full sample period appears to be driven by the second sub-period. For the 1998 to 2005 sub-period, a one-standard deviation (22.5%) decline in industry performance is associated with a 2.1% increase in the likelihood of CEO turnover.

Third, lower overall market performance, as measured by the return on the S&P 500 index, is also associated with a higher likelihood of internal CEO turnover for the full sample and the 1998 to 2005 sub-period. For the second sub-period a one-standard deviation (18%) decline in the S&P 500 index corresponds to an increase of 3.0% in CEO turnover likelihood.

Surprisingly, the relations between CEO turnover and overall market performance, and industry performance, respectively are positive and significant in the 1992 to 1997 sub-period. One possible interpretation for these positive marginal probabilities is that CEOs left office after good performance. This would be the case if they were voluntary turnovers. While forced turnovers increased from the 1992 to 1997 sub-period to the latter subperiod (from 12.4% to 17.9%), this explanation is implausible because the great majority of turnovers in both sub-periods are classified as voluntary.

Overall, the results in the first set of regressions indicate that the relation between internal CEO turnover and (poor) stock market performance appears to have intensified after 1997. All three sensitivities to stock performance – 3.4%, 2.1%, and 1.8%, respectively, for one standard deviation changes in industry-adjusted, industry, and market performance – are economically meaningful relative to average internal turnover of 12.6% from 1998 to 2005.

The second set of regressions in table 4 includes the change in return on assets (ROA) in addition to the stock return variables. The results are qualitatively unchanged. The change in ROA is significant during the full sample period from 1992 to 2005. While the estimate is statistically significant, a one standard deviation increase in the change in ROA is associated with only a 0.7 percent increase in the likelihood of CEO turnover. The coefficients are of similar magnitudes, but are not statistically significant in the sub-period regressions.

In table 5, we add one year of lagged stock performance variables to the regressions. The first set of regressions include only the stock market performance measures while the second set adds the change in ROA and lagged change in ROA.

Consistent with the results in table 4, the first three regressions in table 5 suggest that boards are sensitive to industry-adjusted stock performance and market stock performance over the entire sample period and all three measures of stock performance during the 1998 to 2005 period. For the entire period, internal CEO turnover is significantly negatively related to industry-adjusted and overall market stock performance in the current year. Turnover also is significantly negatively related to industry-adjusted and industry performance stock performance in the previous year. Strangely, turnover is significantly positively related to the lagged return on the S&P 500 (although the positive coefficient on the lagged return is smaller in magnitude than the negative coefficient on the contemporaneous return).

As in the previous results, the regressions in table 5 indicate that the turnover-performance relations are driven by the later sub-period. During the later sub-period, internal CEO turnover is significantly negatively related to industry-adjusted stock performance in the current year and previous year, and significantly negatively related to industry stock performance in the current year. Turnover is negatively related to the overall stock market return in the

current year and positively related in the previous year. The current-year sensitivities for all three types of stock performance are significantly greater (more negative) in the 1998 to 2005 sub-period.

In separate tests, we test whether the sum of the marginal probabilities for the current and lagged year are statistically different from zero. For the full sample period, the tests indicate that the sum of the marginal probabilities for each type of performance is significantly negative. The marginal probabilities in the first set of regressions imply that a one-standard deviation decline in industry-adjusted stock performance increases the likelihood of turnover by 4.5% and 5.2%, respectively, over the entire sample period and in the 1998 to 2005 sub-period (where we have added the current year and lagged year coefficients). A one-standard deviation decline in the firms' industry stock return also increases the likelihood of turnover by a total of 1.6% over the entire sample period and by 1.8% in the 1998 to 2005 sub-period. Finally, a one-standard deviation decline in the S&P 500 increases the likelihood of turnover by a total of 1.1% in the entire sample period and by 1.1% in the 1998 to 2005 sub-period. Again, the sensitivity to industry-adjusted performance for the 1998 to 2005 period appears to be greater than any of the sensitivities reported in Murphy (1999).

When we consider the current and lagged performance measures for the earlier sub-period, 1992 to 1997 the relations are less negative or not statistically different from zero. As table 5 reports, the marginal probabilities on contemporaneous industry and market stock performance are significantly positive while lagged market and industry stock performance are negatively but not significantly related to CEO turnover. However, in contrast to the full sample and 1998 to 2005 sub-period, the sums of these marginal probabilities (current and lagged) are not statistically different from zero. The sum of the coefficients (lagged and contemporaneous)

for industry –adjusted stock performance is less negative in the earlier period than in the later period.

The regressions that include current and lagged change in ROA indicate that boards are sensitive to current changes in operating performance in the full period and later sub-periods. However, a one standard deviation change in the change in ROA is associated with a smaller increase in CEO turnover than a one standard deviation change in the stock market performance. The differences in responsiveness to stock performance over the two sub-periods remain with the exception that current industry performance is not significantly related to CEO turnover in the 1998 to 2005 sub-period.

Overall, the results in tables 4 and 5 suggest that since 1997, boards have been more sensitive to poor stock performance. It is also worth noting that the economic magnitudes of the effect are large. For the 1998 to 2005 period, the first set of regressions imply that a CEO whose firm performs one standard deviation better than the industry has a cumulative 5.2% lower likelihood of turnover while a CEO whose firm performs one standard deviation worse than the industry has a cumulative 5.2% increase in the likelihood of turnover. From a base turnover level of 12.6%, these imply likelihoods of 7.4% for the strong performer versus 17.8% for the poor performer. These are economically meaningful differences with 7.4% implying a tenure of 13.5 years and 17.8% implying a tenure of 5.6 years.

In table 6, we report probit regressions of CEO turnover on two-year measures of performance. In panel A, performance is measured over two calendar years (current and lagged). In panel B, performance is measured as the average of current and lagged values. Using these two-year measures are consistent with stock performance measures in Huson, Parrino and Starks (2001). As in tables 4 and 5, the results in table 6 show that CEO turnover is



more sensitive to stock performance in the latter sub-period. During the 1998 to 2005 period, the marginal probabilities on industry-adjusted, industry, and market stock performance are negative and statistically different from zero. In contrast, industry and market performance are not statistically related to CEO turnover during the 1992 to 1997 sub-period. During this period, CEO turnover is only related to industry-adjusted performance.

Table 7 repeats the table 5 probit regressions dividing the sample into two sets of firms: firms in the S&P500 index and all other Fortune 500 firms. We do this for two reasons. First, many papers on executive compensation and corporate governance use the ExecuComp data set that includes only firms in various S&P indices. It is possible there is a selection bias in these firms. Second, investors may be more likely to pay attention to firms in the S&P 500 index, and, if so, these firms would be more likely to be monitored by the press and institutional investors. Thus, the effect of stock market performance might be different for these firms (Bertrand and Mullanianathan, 2001).

The coefficient patterns in table 7 are qualitatively similar for the two sets of firms. Turnover in both sets of firms is significantly related to industry-adjusted and market stock performance over the entire sample period. As in the sample overall, the relations are stronger in the more recent 1998 to 2005 period.

## **B. Internal Turnover and Governance Variables**

The previous sections document an increase in CEO turnover and turnover-performance sensitivity for large public companies in the U.S. In this section we consider five possible sources of those increases – corporate governance (or shareholder rights), shareholder blockholdings, board independence, the Sarbanes-Oxley (SOX) legislation, and fraud.

Recent work has suggested that differences in corporate governance and shareholder rights may have real effects. Gompers, Ishii and Metrick (2003) find that differences in corporate governance and shareholder rights are related to stock returns. Masulis, Wang, and Xie (2005) find that those differences in corporate governance are related to acquisition behavior. In both papers, greater shareholder rights are associated with higher stock returns.

In this section, we examine the relation between turnover, stock performance and governance. To do so, we use the GIM index developed by Gompers et al. (2003). They categorize 24 charter provisions, bylaw provisions, and other firm-level rules associated with corporate governance into five types: (1) Tactics for delaying hostile bidders, (2) voting rights, (3) director/officer protection, (4) other takeover defenses, and (5) state laws. Their overall index and the five component indices generally score one point for each provision that restricts shareholder rights or increases managerial power. Thus, a higher index score represents greater managerial power (weaker shareholder rights).

We estimated turnover regressions that interact stock performance with the measure of governance. We used both a continuous measure of the GIM index as well as a dummy variable if the firm's GIM index was in the highest quintile. To the extent that the GIM index measures poor governance, the GIM index should have a negative effect on the level of turnover (i.e., poorly governed firms should have less turnover), while the interaction of the GIM index and stock performance should have a positive effect on turnover (i.e., turnover at poorly governed firms should be less sensitive to poor performance).

Table 8 presents our results for regressions using the dummy variable for the highest GIM index quintile. For the full sample period and the 1992 to 1997 sub-period, the marginal

probability associated with the GIM index is positive and marginally significant. I.e., a high GIM index (fewer shareholder rights) is associated with slightly higher CEO turnover, not less.

For the sample overall and for each sub-period, most of the interaction terms are not statistically different from zero. For two coefficients, the GIM index interaction is significantly negative. Turnover is significantly more sensitive to poor lagged industry-adjusted performance for the high GIM index firms during the overall sample period and in the 1998 to 2005 sub-period. These are the opposite signs one would expect if the GIM index measured poor governance. On the other hand, the GIM index interaction is significantly positive for current year industry-adjusted performance in the 1998 to 2005 period. When the current and lagged coefficients on industry-adjusted performance are added, in both the overall and 1998 to 2005 sub-periods, the net effect of the interaction terms for the two years is to be insignificantly negatively related to industry-adjusted performance.

Although not reported in a table, our results also are qualitatively similar when we interact stock performance with the continuous measure of the GIM index.

Overall, then, we interpret these results as finding that the GIM measures of governance or shareholder rights do not have an appreciable relation to or impact on CEO turnover. The most one can say is that the GIM measure is possibly associated with a somewhat faster response to poor industry-adjusted performance. Our results are consistent with a contemporaneous paper by Bhagat and Bolton (2006) who also fail to find a significant effect on turnover when they interact governance and performance.

Next we consider the effect of blockholder ownership. Institutional and blockholder ownership have increased over the sample period. We focus on blockholder ownership (where an institution owns at least 5% of a firm's outstanding shares) because blockholders have both

the incentive and the ability to monitor. Cremers and Nair (2005) find that blockholder ownership and governance affect corporate valuations in certain circumstances. In this section, we examine the relation between CEO turnover and block ownership.

We follow Cremers and Nair (2005) and use the percentage of shares held in each firm by the firm's largest institutional blockholder where blockholders are shareholders with greater than 5% ownership of the firm's outstanding shares. They construct their measure using data from CDA Spectrum that is based on quarterly SEC 13F filing by institutional shareholders. (We thank Martijn Cremers for making the data available to us.)

Table 9 reports the mean and median block ownership and the presence of a blockholder for our sample firms. The average holding of blockholders and fraction of firms with a blockholder present increase over the sample period. During the 1992 to 1997 sub-period, the average blockholder ownership is 10.9% while 67% of the firms have a blockholder present. During the 1998 to 2005 sub-period, blockholder ownership averages 14.5% while almost 77% of the firms have a blockholder present. The differences across sub-periods are statistically significant.

In table 10, we report the results of probit turnover regressions that include the percent of total blockholder ownership (at the end of the previous year). We report two probit regression specifications. In first specification, we include only the continuous measure. In the second specification, we also interact the continuous measures and our three stock performance measures.

In the first set of regressions, blockholder ownership is positively and significantly related to CEO turnover for the full sample and both sub-periods. A one standard deviation increase in blockholder ownership during the full period (0.1241) implies a 1.2% increase in

probability of CEO turnover. The coefficient is higher, but not significantly so, in the earlier sub-sample. The turnover-performance sensitivities are qualitatively similar to those in the earlier regressions. This result is consistent with a role for institutional blockholders, on average, in the increase in CEO turnover over the sample period.

In the second set of regressions in table 10, we also include interaction terms. When we do, the coefficient on block ownership is no longer statistically significant. The interaction terms tend to be positive for industry stock return and market return, but negative for industry-adjusted stock returns. One interpretation of this result is that blockholders are particularly active in firms that underperform their industries.

The results for blockholders, therefore, are suggestive of blockholders playing a role in the increase in CEO turnover and, the increase in industry-adjusted turnover-performance sensitivity. These results are consistent with those in Brav et al. (forthcoming) who find an increase in CEO turnover associated with hedge fund activism and Del Guercio et al. (forthcoming) who find an increase in CEO turnover associated with institutional investor voting.

Third, we consider the role of independent directors. Weisbach (1988) finds that turnover-performance sensitivities are greater for firms with more independent boards. And over time, boards in the U.S. have become more independent. It is possible that this increased independence has played a role in the changes in turnover.

We obtain data on director independence from the IRRC Directors database on WRDS. We use the variable director type to classify directors as independent. The variable can take on three values, E for employee, L for linked (affiliated) or I for independent. The IRRC data are available only from 1996 to 2004.

Table 9 reports the percent of independent directors, and the fraction of firms that do not have a majority independent board. Similar to the rise in blockholders, the percent of independent directors on a firm's board increases over time. The percentage increases from 63% to almost 69% from the earlier period to the later period. Moreover, the fraction of firms without a majority independent board decreases from 26% during the 1992 to 1997 sub-period to 16% in the 1998 to 2005 sub-period.

In table 11, we report the results of probit turnover that account for board independence. We include a dummy variable that equals one if the firm does not have a majority independent board. (The baseline, therefore, is a firm that does have a majority independent board.) The results are qualitatively similar, but have a less natural interpretation when we use the percentage of independent directors. We also interact this indicator variable with the stock performance variables. We estimate the probit for the 1997 to 2005 period, the period over which we have lagged director data.

When we do not include interaction effects with performance, Table 11 indicates that the marginal probability associated with the no independent board indicator variable is insignificant.

When we include the interaction effects with performance in the second regression, there is a 3.8% lower probability of CEO turnover for a firm without an independent board. At the same time, five of the six interaction terms are positive suggesting that non-independent boards are also associated with less turnover-performance sensitivity. With the exception of the lagged stock market return, however, none of the interaction terms are statistically different from zero. Said another way, the results of the second regression suggest that more independent boards are associated with more turnover and (although less statistically reliably) more turnover sensitivity to poor performance.

In table 12, we examine whether the probability of CEO turnover is greater in the years under the Sarbannes-Oxley (SOX) legislation. We create an indicator variable equal to one for years 2003, 2004, and 2005 and zero otherwise. In the first regression, we include this indicator variable, current year measures of performance, and interactions between the indicator variable and performance variables. In the second regression we add the lagged performance measures and corresponding interaction terms. In the last column of the table, we repeat the second regression for the 1998 to 2005 period.

In the first regression, CEO turnover is significantly higher during years under the SOX legislation. The marginal positive marginal probability implies a 3.0% percent increase in turnover during these years. Additionally, the interaction term between the SOX indicator variable and market performance is significantly negative implying a decrease in market performance in associated with higher turnover during the years under the SOX legislation. When we add the lagged variables, the marginal probability associated with the SOX indicator variable is positive but only marginally statistically significant in the 1998 to 2005 sub-period. The interaction term with current market performance remains negative and significantly significant for the full sample but not the 1998 to 2005 sub-period sample. For the 1998 to 2005 sub-period, the interaction term between the indicator variable and lagged market performance is negative and significant but the sum of the lagged market performance and lagged interaction term is not statistically different from zero.

Overall, these results suggest some increase in turnover associated with the SOX legislation.

Finally, it is possible that our results are driven by firms involved in scandals. To examine whether this is the case, we exclude all firm-years classified as scandal firm years by

Dyck, Morse, and Zingales (2006a and 2006b). The results are qualitatively identical to our basic results. Accordingly, we do not report them separately in a table.

### **C. Forced Turnover**

Thus far, we have not distinguished between forced turnover and all other turnover. Jenter and Kanaan (2006) focus exclusively on forced turnover. As we do for all turnover, they find that forced turnover is related to the three different measures of performance. It is possible that our results are driven by the forced turnover in our sample. To examine whether this is the case and whether performance is related differently to forced turnover and standard internal turnover, we estimate multinomial logit (MNL) regressions.

We follow Huson, Parrino and Starks (2001) in classifying turnover as forced. (Jenter and Kanaan (2006) also use this classification scheme.) If an article in the business press indicates that the CEO was fired, forced, or left following a policy disagreement or some other equivalent, then turnover is defined as forced. For the remaining announcements, succession is classified as forced when the CEO is under 60 and the first article reporting the announcement does not report the reason for the departure as involving death, poor health or the acceptance of another position elsewhere.

Over the entire sample period, internal turnover is 11.60% per year. Forced turnover is 1.84% while unforced turnover is 9.70%.<sup>3</sup> Identifiably forced turnover, therefore, is infrequent relative to all internal turnover.

We present the regression results in table 13. The dependent variable categories in the MNL estimations are unforced turnover, forced turnover, or no turnover. The table reports the

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<sup>3</sup> The sum does not add to 11.6% because 12 turnovers could not be classified as forced or unforced based on available information.



marginal effect of each regressor and the associated probability value (p-value) of the test that the marginal probability is equal to zero based on asymptotic standard errors.

The probability of forced turnover is significantly negatively related to the three components of firm stock performance – firm performance relative to the industry, the industry relative to the market, and the overall market – in the current year and to industry-adjusted return in the previous year. The probability of unforced turnover is significantly negatively related to firm stock performance relative to the industry and the overall market in the current year, and to industry stock return and industry-adjusted stock return in the previous year. As in the previous results, both type of turnover are positively related to lagged market performance.

Overall, then, both forced turnover and unforced turnover are sensitive to all three types of poor stock performance. This suggests that a number of unforced turnovers are not voluntary.

#### **D. External Turnover**

As discussed earlier, in addition to internal turnover, we examine external turnover. Recall, non-standard or external turnover is turnover due to a merger or bankruptcy / delisting. We consider the CEO to have been turned over in a merger if his or her company is taken over by another company and he or she is not CEO of the combined company. We consider the CEO to have been turned over in a bankruptcy if he or she is no longer CEO of the bankrupt company. The incidence of external turnover is 4.5% per year over the sample period.

Table 14 reports probit regressions of the probability of external turnover as a function of stock market performance and accounting performance. As in tables 4 and 5, we report the results with and without the change in accounting performance. We do not include current year performance because firms are taken over or delisted in the current year.

Table 14 shows that external turnover is only related to industry stock performance over the entire sample period and for the 1998 to 2005 sub-period when we exclude the change in operating performance. When we include the change in operating performance, turnover is negatively related to industry stock performance relative to the market and positively related to the change in ROA. Even in this case, the marginal probabilities are economically small. For example, a one standard deviation decline in industry stock performance over the sample period (1992 to 2005) increases the probability of an external turnover by 0.2%.

The results for external turnover and performance suggest that, on average, takeovers during this period were not disciplinary in nature.

## **V. Summary and Implications**

In this paper, we examine the extent and determinants of internal and external CEO turnover for a sample of large U.S. companies from 1992 to 2005. Total turnover, the sum of internal and external turnover, is 15.6% from 1992 to 2005, implying an average CEO tenure of less than seven years. In the more recent period from 1998 to 2005, total CEO turnover increases to 17.4%, implying an average tenure of less than six years. Internal or board driven turnover also rises substantially in the latter part of the sample.

We then look at how turnover varies with firm stock performance. Previous work suggests a modest relation between internal (board initiated) turnover and firm stock performance. We find a stronger and significant relation between internal turnover and three different components of firm stock performance – performance relative to the industry, performance of the industry relative to the stock market, and the performance of the overall stock market. (Jenter and Kanaan (forthcoming) obtain similar results.) The sensitivities are

economically meaningful. Both types of internal turnover – forced and unforced are sensitive to all three types of poor stock performance.

Internal turnover after 1997 is more strongly related to all three measures of stock performance. In fact, the sensitivity to stock performance appears to be greater than that in any of the periods between 1970 and 1995 studied in Murphy (1999).

We next consider five possible explanations for or factors that drive the changes in turnover and turnover-performance sensitivity. There is some evidence that the increases in turnover and turnover-performance sensitivity are related to increases in blockholdings, board independence, and Sarbanes-Oxley. Turnover and turnover-performance sensitivity are not reliably related to the Gompers, Ishii and Metrick (2003) governance index or to corporate fraud.

External turnover – turnover primarily related to acquisitions – is only significantly related to industry performance relative to the market. This result is economically small and driven by the later sub-period.

Our results have several implications. First, they suggest that the CEO job is more precarious than in the past. When external takeovers are included, the average tenure of a CEO has declined to less than six years for the recent 1998 to 2005 period. The recent tenures are substantially shorter than those reported in previous work for the 1970s, 1980s, and 1990s. The shorter tenures appear to have continued out of sample. In preliminary work, we find that total CEO turnover in our sample firms is roughly 17% in 2006 and 2007.

For individual CEOs, the shorter expected tenure likely offsets some of the benefit of the increase in CEO pay since the mid-1990s. For example, the annual pay of S&P 500 CEOs roughly doubled in real terms from the 1992 – 1997 period to the 1998 – 2005 period. Our estimates suggest that the total pay of an individual CEO over his or her entire expected term

increased by less than this because the expected tenure at the higher pay declined by one-quarter to one-third.

This calculation would be inaccurate if severance agreements around internal turnover and takeovers are both large and have increased over time. If, instead, the severance agreements are small, then they do not have much of an effect on a CEO's total pay. Yermack (2006) and Hartzell et al. (2004) study severance agreements, respectively, around internal and external takeover events. In fact, the average and median magnitudes they report are modest. (They do not study whether these payments have changed over time.) Severance agreements, therefore, are unlikely to alter the conclusion that the job of CEO has become riskier and that the shorter expected tenures of CEOs partially offset increases in CEO pay.

Second, our similar results for the turnover-performance sensitivities of forced and unforced turnover suggest that a number of unforced turnovers are not voluntary.

Third, our results also suggest an evolving role for boards. In a sample from the 1980s, Morck, Shleifer and Vishny (1989) find that internal turnover is related to industry-adjusted performance while external turnover from hostile takeovers is related to industry performance. They interpret this as indicating boards respond well to poor performance relative to the industry, but do not respond well to poor industry performance. The external takeover market becomes active in reaction to poor industry performance and a need for restructuring.

Our results suggest that boards respond not only to poor performance relative to the industry, but also to poor industry performance and to poor market performance. To the extent that internal turnover has increased, boards also appear to monitor more frequently. One interpretation of these results is that boards – possibly encouraged by large shareholders – perform both the role they performed in the 1980s and the role that hostile takeovers played then.

The increased turnover associated with blockholdings, board independence, and Sarbanes-Oxley is consistent with this interpretation.

The result that boards do not index CEO turnover to the industry or the market is noteworthy in light of criticisms of boards for not indexing CEO pay to the industry or the market. Bebchuk and Fried (2003) interpret the lack of indexing of pay as a failure of governance. Our results on turnover in conjunction with those in Morck et al. (1989) for the earlier period provide an alternative explanation. When an industry or the overall economy performs poorly, it is sometimes efficient for the board to bring on a new CEO to respond to the new industry or market conditions. The recent (and out of sample) high turnover in the financial services industry is consistent with this.

Fourth, the shorter expected CEO tenures and sensitivity of those tenures to stock performance have implications for the measurement of CEO pay. The shorter expected tenures suggest that the estimates of CEO pay based Standard and Poor's ExecuComp data may be overstated. While option grants typically have a ten-year life, ExecuComp uses a seven-year life because "executives rarely wait until the expiration date to exercise their options." This adjustment assumes that CEOs will remain with the company for at least seven years. If a CEO has an expected initial tenure of six years, the ExecuComp assumption will tend to overstate the value of option grants every year of the CEO's tenure with the overstatement increasing each year. This assumes that CEOs forfeit unvested options and / or must exercise vested options when they leave the company. For internal turnover, Yermack (2006) finds that this tends to be the default policy for most companies and companies deviate from those policies in only 16% of the internal turnovers he studies. ExecuComp also values restricted stock grants as fully vested

when, in fact, they usually vest over a period of time. This also will tend to overstate executive compensation.

The sensitivity of turnover to performance implies that the vesting and effective life of stock options are not independent of performance. The options of CEOs of companies that perform poorly will both have a shorter effective life and will be worth less. The Black-Scholes methodology does not take these correlations into account. This, in turn, implies that a proper valuation of stock options – e.g., using a binomial tree approach – would incorporate these correlations.

Finally, shorter CEO tenures, the greater sensitivity to stock performance, as well as higher CEO pay may have created a greater incentive for CEOs to engage in earnings management or manipulation.

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**Table 1. CEO Turnover**

CEO turnovers in publicly traded *Fortune* 500 companies between 1992 and year-end 2005. Total turnover is all CEO turnover including turnover due to mergers and acquisitions and delistings from a major stock exchange. Standard (internal) turnover excludes turnover due to mergers and acquisitions and delistings from a major stock exchange. For total and standard turnover, turnover is measured in two ways: (1) and (2). (1) defines a turnover occurrence if a new CEO is selected. (2) defines occurrences where the CEO dies as a non-turnover event. Data are from annual *Fortune* 500 lists, 10-K filings, proxy statements, Dun and Bradstreet's *Million Dollar Directory* and the *Wall Street Journal*. Year denotes the fiscal year-end for the sales data on which *Fortune* ranks firms. (i.e., 1992 corresponds to the 1993 April/May *Fortune* list.)

**Panel A: All firms**

Year	Number of firms	Total Turnover				Standard (Internal) Turnover			
		(1)		(2)		(1)		(2)	
		N	%	N	%	N	%	N	%
1992	464	58	12.50%	58	12.50%	55	11.85%	55	11.85%
1993	488	58	11.89	58	11.89	50	10.25	50	10.25
1994	727	67	9.22	65	8.94	56	7.70	54	7.43
1995	740	113	15.27	113	15.27	92	12.43	92	12.43
1996	737	100	13.57	97	13.16	74	10.04	71	9.63
1997	734	111	15.12	109	14.85	70	9.54	68	9.26
1998	723	128	17.70	128	17.70	88	12.17	88	12.17
1999	718	152	21.17	152	21.17	101	14.07	101	14.07
2000	705	183	25.96	181	25.67	133	18.87	131	18.58
2001	687	96	13.97	96	13.97	61	8.88	61	8.88
2002	679	136	20.03	134	19.73	105	15.46	103	15.17
2003	666	46	6.91	46	6.91	34	5.11	34	5.11
2004	672	94	13.99	92	13.69	79	11.76	77	11.46
2005	681	126	18.50	125	18.36	95	13.95	94	13.80
Total	9,421	1,468	15.58%	1,454	15.43%	1,093	11.60%	1,079	11.45%
1992-1997	3,890	507	13.03	500	12.85	397	10.21	390	10.03
1998-2005	5,531	961	17.37	954	17.25	696	12.58	689	12.46

**Panel B1: Fortune 500 firms**

Year	No. firms	Total Turnover				Standard (Internal) Turnover			
		(1)		(2)		(1)		(2)	
		N	%	N	%	N	%	N	%
1992	443	58	13.09%	58	13.09%	55	12.42%	55	12.42%
1993	446	54	12.11	54	12.11	46	10.31	46	10.31
1994	447	60	13.42	58	12.98	51	11.41	49	10.96
1995	459	71	15.47	71	15.47	57	12.42	57	12.42
1996	464	55	11.85	53	11.42	44	9.48	42	9.05
1997	464	75	16.16	74	15.95	55	11.85	54	11.64
1998	464	91	19.61	91	19.61	68	14.66	68	14.66
1999	460	103	22.39	103	22.39	76	16.52	76	16.52
2000	466	134	28.76	132	28.33	98	21.03	96	20.60
2001	467	68	14.56	68	14.56	48	10.28	48	10.28
2002	474	102	21.52	100	21.10	82	17.30	80	16.88
2003	465	22	4.73	22	4.73	14	3.01	14	3.01
2004	463	74	15.98	73	15.77	64	13.82	63	13.61
2005	467	84	17.99	84	17.99	64	13.70	64	13.70
Total	6,449	1,051	16.30%	1,041	16.14%	822	12.75%	812	12.59%
1992-1997	2,723	373	13.70	368	13.51	308	11.31	303	11.13
1998-2005	3,726	678	18.20	673	18.06	514	13.79	509	13.66

**Panel B2: Not in Fortune 500 firms**

Year	No. firms	Total Turnover				Standard (Internal) Turnover			
		(1)		(2)		(1)		(2)	
		N	%	N	%	N	%	N	%
1992	21	0	0.00%	0	0.00%	0	0.00%	0	0.00%
1993	42	4	9.52	4	9.52	4	9.52	4	9.52
1994	280	7	2.50	7	2.50	5	1.79	5	1.79
1995	281	42	14.95	42	14.95	35	12.46	35	12.46
1996	273	45	16.48	44	16.12	30	10.99	29	10.62
1997	270	36	13.33	35	12.96	15	5.56	14	5.19
1998	259	37	14.29	37	14.29	20	7.72	20	7.72
1999	258	49	18.99	49	18.99	25	9.69	25	9.69
2000	239	49	20.50	49	20.50	35	14.64	35	14.64
2001	220	28	12.73	28	12.73	13	5.91	13	5.91
2002	205	34	16.59	34	16.59	23	11.22	23	11.22
2003	201	24	11.94	24	11.94	20	9.95	20	9.95
2004	209	20	9.57	19	9.09	15	7.18	14	6.70
2005	214	42	19.63	41	19.16	31	14.49	30	14.02
Total	2,972	417	14.03%	413	13.90%	271	9.12%	267	8.98%
1992-1997	1,167	134	11.48	132	11.31	89	7.63	87	7.46
1998-2005	1,805	283	15.68	281	15.57	182	10.08	180	9.97

**Panel C1: S&P 500 firms**

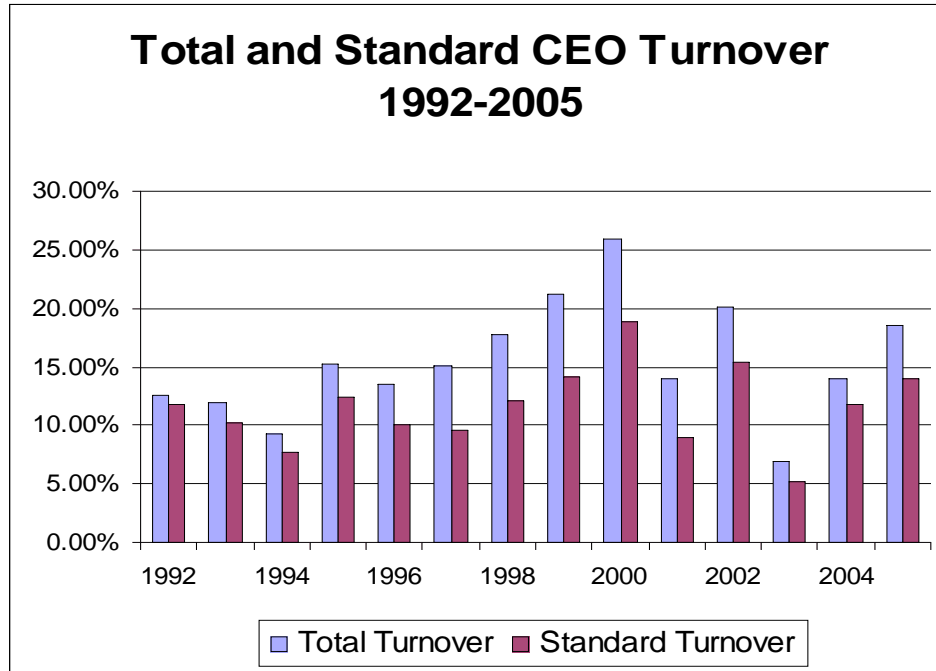
Year	No. firms	Total Turnover				Standard (Internal) Turnover			
		(1)		(2)		(1)		(2)	
		N	%	N	%	N	%	N	%
1992	247	37	14.98%	37	14.98%	37	14.98%	37	14.98%
1993	251	30	11.95	30	11.95	28	11.16	28	11.16
1994	409	38	9.29	37	9.05	35	8.56	34	8.31
1995	421	70	16.63	70	16.63	57	13.54	57	13.54
1996	426	49	11.50	47	11.03	42	9.86	40	9.39
1997	427	63	14.75	62	14.52	47	11.01	46	10.77
1998	418	70	16.75	70	16.75	48	11.48	48	11.48
1999	419	85	20.29	85	20.29	56	13.37	56	13.37
2000	420	114	27.14	114	27.14	90	21.43	90	21.43
2001	397	51	12.85	51	12.85	38	9.57	38	9.57
2002	390	75	19.23	73	18.72	67	17.18	65	16.67
2003	392	19	4.85	19	4.85	16	4.08	16	4.08
2004	392	62	15.82	61	15.56	55	14.03	54	13.78
2005	391	67	17.14	67	17.14	55	14.07	55	14.07
Total	5,400	830	15.37%	823	15.24%	671	12.43%	664	12.30%
1992-1997	2,181	287	13.16	283	12.98	246	11.28	242	11.10
1998-2005	3,219	543	16.87	540	16.78	425	13.20	422	13.11

**Panel C2: Non-S&P 500 firms**

Year	No. firms	Total Turnover				Standard (Internal) Turnover			
		(1)		(2)		(1)		(2)	
		N	%	N	%	N	%	N	%
1992	217	21	9.68%	21	9.68%	18	8.29%	18	8.29%
1993	237	28	11.81	28	11.81	22	9.28	22	9.28
1994	318	29	9.12	28	8.81	21	6.60	20	6.29
1995	319	43	13.48	43	13.48	35	10.97	35	10.97
1996	311	51	16.40	50	16.08	32	10.29	31	9.97
1997	307	48	15.64	47	15.31	23	7.49	22	7.17
1998	305	58	19.02	58	19.02	40	13.11	40	13.11
1999	299	67	22.41	67	22.41	45	15.05	45	15.05
2000	285	69	24.21	67	23.51	43	15.09	41	14.39
2001	290	45	15.52	45	15.52	23	7.93	23	7.93
2002	289	61	21.11	61	21.11	38	13.15	38	13.15
2003	274	27	9.85	27	9.85	18	6.57	18	6.57
2004	280	32	11.43	31	11.07	24	8.57	23	8.21
2005	290	59	20.34	58	20.00	40	13.79	39	13.45
Total	4,021	638	15.87%	631	15.69%	422	10.49%	415	10.32%
1992-1997	1,709	220	12.87	217	12.70	151	8.84	148	8.66
1998-2005	2,312	418	18.08	414	17.91	271	11.72	267	11.55

Figure 1

CEO turnovers in publicly traded *Fortune* 500 companies between 1992 and year-end 2005. Total turnover is all CEO turnover including turnover due to mergers and acquisitions and delistings from a major stock exchange. Standard (internal) turnover excludes turnover due to mergers and acquisitions and delistings from a major stock exchange. For total and standard turnover, turnover is measured using method (1), which defines turnover if a new CEO is selected.



**Table 2. Turnover across periods**

Probit regression estimates of the likelihood of CEO turnover during the period from 1992 to 2005 to test whether the probability of turnover is higher in the 1998 to 2005 period. Total turnover is all CEO turnover including turnover due to mergers and acquisitions and delistings from a major stock exchange. Standard (internal) turnover excludes turnover due to mergers and acquisitions and delistings from a major stock exchange. For total and standard turnover, turnover is measured in two ways: (1) and (2). (1) defines a turnover occurrence if a new CEO is selected. (2) defines occurrences where the CEO dies in office as a non-turnover event. The dependent variable equals one if the CEO turnovers and zero otherwise.  $\Delta\text{Prob}$  represents the change in the probability associated with moving the indicator from 0 to 1. Year 9805 indicator variable equals one if year is greater than or equal to 1998 and zero otherwise. Models are estimated with robust standard errors to control for heteroskedasticity. p-values are in parentheses. \*\*\* indicate significance at the 1% level.

Variable	Total Turnover		Standard (Internal) Turnover	
	(1) $\Delta\text{Prob}$ (p-value)	(2) $\Delta\text{Prob}$ (p-value)	(1) $\Delta\text{Prob}$ (p-value)	(2) $\Delta\text{Prob}$ (p-value)
1998 or later indicator variable	0.0434*** (0.000)	0.0439*** (0.000)	0.0271*** (0.000)	0.0277*** (0.000)
N	9,421	9,451	9,045	9,045
Pseudo R <sup>2</sup>	0.0041	0.0042	0.0023	0.0025

**Table 3. CEO turnover**

Number and percent of firms experiencing no turnover over a five-year period. Turnover is measured using total turnover. Total turnover is all CEO turnover including turnover due to mergers and acquisitions and delistings from a major stock exchange. Occurrences where the CEO dies in office is defined as a non-turnover event.

Year	1992
Number of firms in the sample in 1992	464
Number of firms experiencing no turnover between 1992 and 1997	166
Percent of firms experiencing no turnover between 1992 and 1997	35.77%
Year	1998
Number of firms in the sample in 1998	723
Number of firms experiencing no turnover between 1998 and 2003	178
Percent of firms experiencing no turnover between 1998 and 2003	24.62%

**Table 4. Probit regressions of the probability of internal CEO turnover on performance**

Probit regression estimates of the likelihood of internal CEO turnover during the period from 1992 to 2005. Internal turnover excludes turnover due to mergers and acquisitions and delistings from a major stock exchange. Occurrences where the CEO dies in office are defined as non-turnover events. The dependent variable equals one if the CEO turnovers and zero otherwise.  $\Delta$ Prob measures the change in the probability of CEO turnover per unit change in the relevant explanatory variables. For indicator variables, the coefficient represents the change in the probability associated with moving the indicator from 0 to 1. Models are estimated with robust standard errors to control for heteroskedasticity. CEO age dummy equals 1 if lagged CEO age is greater than or equal to 60 and zero otherwise. p-values are in parentheses. \*, \*\*, and \*\*\* indicate significance at the 10%, 5% and 1% levels, respectively. .

Variable	1992 - 2005	1992-1997	1998 – 2005	1992 - 2005	1992-1997	1998 – 2005
	$\Delta$ Prob (p-value)	$\Delta$ Prob (p-value)	$\Delta$ Prob (p-value)	$\Delta$ Prob (p-value)	$\Delta$ Prob (p-value)	$\Delta$ Prob (p-value)
Return on S&P 500	-0.1052*** (0.000)	0.0849** (0.021)	-0.1650*** (0.000)	-0.0961*** (0.000)	0.0873** (0.020)	-0.1546*** (0.000)
Industry return – return on S&P500	-0.0469** (0.019)	0.0833** (0.033)	-0.0955*** (0.000)	-0.0365* (0.068)	0.0978** (0.013)	-0.0859*** (0.000)
Industry-adjusted stock return	-0.0667*** (0.000)	-0.0247 (0.155)	-0.0894*** (0.000)	-0.0621*** (0.000)	-0.0243 (0.175)	-0.0835*** (0.000)
Change in ROA	—	—	—	-0.1653** (0.049)	-0.1287 (0.306)	-0.1669 (0.136)
CEO age dummy	0.1473*** (0.000)	0.1303*** (0.000)	0.1605*** (0.000)	0.1487*** (0.000)	0.1304*** (0.000)	0.1629*** (0.000)
Number of obs	8,929	3,717	5,212	8,694	3,627	5,067
Pseudo R <sup>2</sup>	0.0649	0.0605	0.0748	0.0677	0.0620	0.0783

**Table 5. Probit regressions of the probability of internal CEO turnover on performance and lagged performance**

Probit regression estimates of the likelihood of internal CEO turnover during the period from 1992 to 2005. Internal turnover excludes turnover due to mergers and acquisitions and delistings from a major stock exchange. Occurrences where the CEO dies in office are defined as non-turnover events. The dependent variable equals one if the CEO turnovers and zero otherwise.  $\Delta$ Prob measures the change in the probability of CEO turnover per unit change in the relevant explanatory variables. For indicator variables, the coefficient represents the change in the probability associated with moving the indicator from 0 to 1. Models are estimated with robust standard errors to control for heteroskedasticity. CEO age dummy equals 1 if lagged CEO age is greater than or equal to 60 and zero otherwise. \*, \*\*, and \*\*\* indicate significance at the 10%, 5% and 1% levels, respectively. p-values are in parentheses.

Variable	Full sample			Model 2		
	1992-2005 $\Delta$ Prob (p-value)	1992-1997 $\Delta$ Prob (p-value)	1998 – 2005 $\Delta$ Prob (p-value)	1992-2005 $\Delta$ Prob (p-value)	1992-1997 $\Delta$ Prob (p-value)	1998 – 2005 $\Delta$ Prob (p-value)
Return on S&P 500	-0.1249*** (0.000)	0.0726* (0.057)	-0.2094*** (0.000)	-0.1062*** (0.000)	0.0856** (0.029)	-0.1859*** (0.000)
Industry return – return on S&P500	-0.0230 (0.260)	0.0983** (0.013)	-0.0488** (0.046)	-0.0134 (0.513)	0.1056*** (0.008)	-0.0364 (0.143)
Industry-adjusted stock return	-0.0658*** (0.000)	-0.0225 (0.191)	-0.0879*** (0.000)	-0.0591*** (0.000)	-0.0196 (0.268)	-0.0779*** (0.000)
Change in ROA	—	—	—	-0.1737* (0.054)	-0.1346 (0.313)	-0.2164* (0.071)
Lagged return on S&P 500	0.0628*** (0.006)	-0.0360 (0.353)	0.1450*** (0.000)	0.0677*** (0.003)	-0.0409 (0.301)	0.1514*** (0.000)
Lagged industry return – return on S&P500	-0.0465** (0.015)	-0.0523 (0.181)	-0.0292 (0.185)	-0.0326* (0.094)	-0.0430 (0.280)	-0.0134 (0.551)
Lagged industry-adjusted stock return	-0.0525*** (0.000)	-0.0624*** (0.001)	-0.0491*** (0.000)	-0.0449*** (0.000)	-0.0538*** (0.003)	-0.0409*** (0.002)
Lagged change in ROA	—	—	—	-0.2121*** (0.007)	-0.2861*** (0.007)	-0.1963* (0.071)
CEO age dummy	0.1469*** (0.000)	0.1316*** (0.000)	0.1563*** (0.000)	0.1488*** (0.000)	0.1328*** (0.000)	0.1589*** (0.000)
Number of obs	8,796	3,647	5,149	8,525	3,537	4,988
Pseudo R <sup>2</sup>	0.0740	0.0703	0.0876	0.0775	0.0750	0.0909



**Table 6. Probit regressions of the probability of internal CEO turnover on performance**

Probit regression estimates of the likelihood of internal CEO turnover during the period from 1992 to 2005. Internal turnover excludes turnover due to mergers and acquisitions and delistings from a major stock exchange. Occurrences where the CEO dies in office are defined as non-turnover events. The dependent variable equals one if the CEO turnovers and zero otherwise.  $\Delta$ Prob measures the change in the probability of CEO turnover per unit change in the relevant explanatory variables. For indicator variables, the coefficient represents the change in the probability associated with moving the indicator from 0 to 1. Models are estimated with robust standard errors to control for heteroskedasticity. CEO age dummy equals 1 if lagged CEO age is greater than or equal to 60 and zero otherwise. \*, \*\*, and \*\*\* indicate significance at the 10%, 5% and 1% levels, respectively. p-values are in parentheses.

<b>Panel A:</b>			
Variable	Full sample	1992-1997	1998 – 2005
	1992 - 2005		
	$\Delta$ Prob	$\Delta$ Prob	$\Delta$ Prob
	(p-value)	(p-value)	(p-value)
Two-year return on S&P 500	-0.0361** (0.023)	0.0246 (0.375)	-0.0344* (0.098)
Two year industry return – return on S&P500	-0.0394*** (0.006)	0.0115 (0.647)	-0.0541*** (0.002)
Two year industry-adjusted stock return	-0.0602*** (0.000)	-0.0418*** (0.001)	-0.0700*** (0.000)
CEO age dummy	0.1472*** (0.000)	0.1324*** (0.000)	0.1602*** (0.000)
Number of obs	8,796	3,647	5,149
Pseudo R <sup>2</sup>	0.0682	0.0660	0.0720
<b>Panel B:</b>			
Variable	Full sample	1992-1997	1998 – 2005
	1992 - 2005		
	$\Delta$ Prob	$\Delta$ Prob	$\Delta$ Prob
	(p-value)	(p-value)	(p-value)
Average of current and lagged return on S&P 500	-0.0721** (0.023)	0.0491 (0.375)	-0.0689* (0.098)
Average of current and lagged industry return – return on S&P500	-0.0789*** (0.006)	0.0230 (0.647)	-0.1081*** (0.002)
Average of current and lagged industry-adjusted stock return	-0.1204*** (0.000)	-0.0835*** (0.000)	-0.1399*** (0.000)
CEO age dummy	0.1472*** (0.000)	0.1324*** (0.000)	0.1602*** (0.000)
Number of obs	8,796	3,647	5,149
Pseudo R <sup>2</sup>	0.0682	0.0660	0.0720

**Table 7. Probit regressions of relation of internal CEO turnover and performance for *Fortune* 500 firms in and not in the S&P 500 Index**

Probit regression estimates of the likelihood of internal CEO turnover for *Fortune* 500 firms during the period from 1992 to 2005. Internal turnover excludes turnover due to mergers and acquisitions and delistings from a major stock exchange. Occurrences where the CEO is promoted to another CEO position, remains CEO of the delisting firm, is selected for a government position, dies in office, or leaves office due to illness are defined as non-turnover events. Firms are divided into those in the S&P 500 index and those not in the index. The dependent variable equals one if the CEO turnovers and zero otherwise.  $\Delta$ Prob measures the change in the probability of CEO turnover per unit change in the relevant explanatory variables. For indicator variables, the coefficient represents the change in the probability associated with moving the indicator from 0 to 1. Models are estimated with robust standard errors to control for heteroskedasticity. CEO age dummy equals 1 if lagged CEO age is greater than or equal to 60 and zero otherwise. \*, \*\*, and \*\*\* indicate significance at the 10%, 5% and 1% levels, respectively. p-values are in parentheses.

Variable	Full Sample		1992 - 1997		1998 – 2005	
	In S&P 500 Index	All other firms	In S&P 500 Index	All other firms	In S&P 500 Index	All other firms
	$\Delta$ Prob (p-value)	$\Delta$ Prob (p-value)	$\Delta$ Prob (p-value)	$\Delta$ Prob (p-value)	$\Delta$ Prob (p-value)	$\Delta$ Prob (p-value)
Return on S&P 500	-0.1574*** (0.000)	-0.0823** (0.020)	0.0713 (0.151)	0.0694 (0.235)	-0.2828*** (0.000)	-0.1165** (0.016)
Industry return – return on S&P500	-0.0177 (0.508)	-0.0286 (0.364)	0.1592*** (0.003)	0.0155 (0.797)	-0.0601* (0.060)	-0.0371 (0.333)
Industry-adjusted stock return	-0.0452*** (0.005)	-0.0823*** (0.000)	0.0110 (0.672)	-0.0461* (0.052)	-0.0714*** (0.000)	-0.1038*** (0.000)
Lagged return on S&P 500	0.0931*** (0.002)	0.0218 (0.525)	-0.0528 (0.304)	0.0055 (0.925)	0.2097*** (0.000)	0.0561 (0.225)
Lagged industry return – return on S&P500	-0.0454* (0.077)	-0.0422 (0.141)	-0.0824 (0.135)	-0.0006 (0.991)	-0.0180 (0.532)	-0.0399 (0.241)
Lagged industry-adjusted stock return	-0.0565*** (0.000)	-0.0503*** (0.000)	-0.0884*** (0.002)	-0.0451* (0.051)	-0.0457** (0.012)	-0.0548*** (0.003)
CEO age dummy	0.1772*** (0.000)	0.1022*** (0.000)	0.1696*** (0.000)	0.0758*** (0.000)	0.1789*** (0.000)	0.1216*** (0.000)
Number of obs	5,190	3,606	2,118	1,529	3,072	2,077
Pseudo R <sup>2</sup>	0.0904	0.0574	0.1005	0.0411	0.1050	0.0716

**Table 8. Probit regressions of internal CEO turnover for *Fortune* 500 firms on performance and governance**

Probit regression estimates of the likelihood of internal CEO turnover for *Fortune* 500 firms during the period 1992 to 2005. Internal turnover excludes turnover due to mergers and acquisitions and delistings from a major stock exchange. Occurrences where the CEO dies in office are defined as non-turnover events. The dependent variable equals one if the CEO turnovers and zero otherwise.  $\Delta$ Prob measures the change in the probability of CEO turnover per unit change in the relevant explanatory variables. For indicator variables, the coefficient represents the change in the probability associated with moving the indicator from 0 to 1. Models are estimated with robust standard errors to control for heteroskedasticity. CEO age dummy equals 1 if lagged CEO age is greater than or equal to 60 and zero otherwise. \*, \*\*, and \*\*\* indicate significance at the 10%, 5% and 1% levels, respectively. p-values are in parentheses.

Variable	Full Sample $\Delta$ Prob (p-value)	1992 – 1997 $\Delta$ Prob (p-value)	1998 - 2005 $\Delta$ Prob (p-value)
Return on S&P 500	-0.1328*** (0.000)	0.0743* (0.080)	-0.2189*** (0.000)
Industry return – return on S&P500	-0.0282 (0.216)	0.0982** (0.027)	-0.0559** (0.040)
Industry-adjusted stock return	-0.0758*** (0.000)	-0.0338* (0.063)	-0.0947*** (0.000)
Lagged return on S&P 500	0.0743*** (0.004)	-0.0113 (0.793)	0.1467*** (0.000)
Lagged industry return – return on S&P500	-0.0562*** (0.008)	-0.0378 (0.405)	-0.0472** (0.050)
Lagged industry-adjusted stock return	-0.0481*** (0.000)	-0.0836*** (0.000)	-0.0327** (0.018)
G index	0.0030* (0.069)	0.0040* (0.082)	0.0019 (0.407)
CEO age dummy	0.1444*** (0.000)	0.1312*** (0.000)	0.1519*** (0.000)
High G Index dummy	0.0630 (0.686)	0.2512 (0.389)	-0.0267 (0.877)
High G Index dummy x(Return on S&P 500)	0.0842 (0.183)	0.0264 (0.802)	0.1110 (0.214)
x(Industry return – return on S&P500)	0.0289 (0.611)	0.0794 (0.455)	0.0097 (0.892)
x(Industry-adjusted stock return)	0.0504 (0.140)	-0.0114 (0.849)	0.0802* (0.057)
x(Lagged return on S&P 500)	-0.0467 (0.458)	-0.0878 (0.412)	-0.0529 (0.539)
x(Lagged industry return – return on S&P500)	0.0558 (0.320)	-0.0586 (0.550)	0.0937 (0.162)
x(Lagged industry- adjusted stock return)	-0.0606* (0.085)	0.0306 (0.566)	-0.1061** (0.018)
x(G index)	-0.0061 (0.543)	-0.0131 (0.350)	0.0003 (0.983)
x(CEO age dummy)	0.0372* (0.064)	0.0345 (0.228)	0.0402 (0.144)
Number of obs.	8,338	3,428	4,910
Pseudo R <sup>2</sup>	0.0814	0.0836	0.0934

**Table 9. Block ownership and Board of Directors**

Block ownership and board independence for *Fortune 500* firms during the period 1992 to 2005. Block ownership data for sample firms are taken from Cremers and Nair (2005). Independent director data are taken from IRRC Directors database on WRDS.

Year	Block ownership		5% Blockholder Present	Percent of independent directors		Not an independent Board
	Mean	Median	Percent of firms	Mean	Median	Percent of firms
1992	0.0987	0.0692	61.44%			
1993	0.0969	0.0671	62.86			
1994	0.1092	0.0763	66.25			
1995	0.1120	0.0766	68.39			
1996	0.1116	0.0868	69.77	0.6161	0.6363	28.53%
1997	0.1179	0.0993	69.96	0.6427	0.6667	23.42
1998	0.1305	0.1062	75.31	0.6480	0.6667	21.70
1999	0.1341	0.1173	73.35	0.6564	0.6923	20.98
2000	0.1349	0.1192	73.29	0.6648	0.7000	19.81
2001	0.1370	0.1201	72.98	0.6860	0.7273	16.86
2002	0.1453	0.1276	78.07	0.7092	0.7333	12.36
2003	0.1362	0.1164	75.75	0.7242	0.7500	10.09
2004	0.1694	0.1452	82.96	0.7383	0.7500	7.57
2005	0.1725	0.1517	81.90			
1992-1997	0.1090	0.0793	67.03%	0.6293	0.6667	26.00%
1998-2005	0.1447*	0.1243*	76.64%*	0.6876*	0.7143*	15.94*

\*Statistically different from 1992-1997 average at the 1% significance level.

**Table 10. Probit regressions of internal CEO turnover for *Fortune* 500 firms on performance and block ownership**

Probit regression estimates of the likelihood of internal CEO turnover for *Fortune* 500 firms during the period 1992 to 2005. Internal turnover excludes turnover due to mergers and acquisitions and delistings from a major stock exchange. Occurrences where the CEO dies in office are defined as non-turnover events. The dependent variable equals one if the CEO turnovers and zero otherwise. Block ownership data for sample firms are taken from Cremers and Nair (2005).  $\Delta$ Prob measures the change in the probability of CEO turnover per unit change in the relevant explanatory variables. For indicator variables, the coefficient represents the change in the probability associated with moving the indicator from 0 to 1. Models are estimated with robust standard errors to control for heteroskedasticity. CEO age dummy equals 1 if lagged CEO age is greater than or equal to 60 and zero otherwise. \*, \*\*, and \*\*\* indicate significance at the 10%, 5% and 1% levels, respectively. p-values are in parentheses.

Variable	Full Sample	Full Sample	1992 – 1997	1992 – 1997	1998 - 2005	1998 - 2005
	$\Delta$ Prob (p-value)	$\Delta$ Prob (p-value)	$\Delta$ Prob (p-value)	$\Delta$ Prob (p-value)	$\Delta$ Prob (p-value)	$\Delta$ Prob (p-value)
Return on S&P 500	-0.1242*** (0.000)	-0.1633*** (0.000)	0.0671* (0.077)	0.0299 (0.532)	-0.2109*** (0.000)	-0.2820*** (0.000)
Industry return – return on S&P500	-0.0266 (0.193)	-0.0356 (0.220)	0.0924** (0.020)	0.1146** (0.033)	-0.0510** (0.039)	-0.0993*** (0.006)
Industry-adjusted stock return	-0.0680*** (0.000)	-0.0731*** (0.000)	-0.0296* (0.076)	-0.0333 (0.135)	-0.0870*** (0.000)	-0.0984*** (0.000)
Lagged return on S&P 500	0.0640*** (0.005)	0.0279 (0.392)	-0.0401 (0.298)	-0.0175 (0.727)	0.1471*** (0.000)	0.0956** (0.048)
Lagged industry return – return on S&P500	-0.0444** (0.021)	-0.0852*** (0.002)	-0.0478 (0.220)	-0.1294*** (0.009)	-0.0285 (0.200)	-0.0560* (0.079)
Lagged industry- adjusted stock return	-0.0503*** (0.000)	-0.0281* (0.063)	-0.0633*** (0.001)	-0.0279 (0.253)	-0.0463*** (0.000)	-0.0252 (0.182)
Lagged percent of total block ownership	0.0977*** (0.000)	0.0213 (0.580)	0.0996*** (0.009)	0.0600 (0.508)	0.0698** (0.042)	-0.0141 (0.768)
CEO age dummy	0.1469*** (0.000)	0.1472*** (0.000)	0.1305*** (0.000)	0.1293*** (0.000)	0.1564*** (0.000)	0.1572*** (0.000)
Lagged percent of total block ownership						
x(Return on S&P 500)	—	0.3050* (0.097)	—	0.3203 (0.328)	—	0.5103** (0.048)
x(Industry return – return on S&P500)	—	0.0757 (0.647)	—	-0.1653 (0.616)	—	0.3337* (0.093)

Variable	Full Sample	Full Sample	1992 – 1997	1992 – 1997	1998 - 2005	1998 - 2005
	$\Delta$ Prob (p-value)	$\Delta$ Prob (p-value)	$\Delta$ Prob (p-value)	$\Delta$ Prob (p-value)	$\Delta$ Prob (p-value)	$\Delta$ Prob (p-value)
Lagged percent of total block ownership						
x(Industry-adjusted stock return)	—	0.0402 (0.619)	—	0.0429 (0.731)	—	0.0795 (0.448)
x(Lagged return on S&P 500)	—	0.2778 (0.113)	—	-0.1826 (0.558)	—	0.3779 (0.116)
x(Lagged industry return – return on S&P500)	—	0.3294** (0.030)	—	0.7284** (0.022)	—	0.2201 (0.203)
x(Lagged industry-adjusted stock return)	—	-0.1757** (0.031)	—	-0.3480** (0.020)	—	-0.1491 (0.134)
Number of obs.	8,739	8,739	3,618	3,618	5,121	5,121
Pseudo R <sup>2</sup>	0.0774	0.0795	0.0762	0.0824	0.0885	0.0914

**Table 11. Probit regressions of internal CEO turnover for *Fortune* 500 firms on performance and independent directors**

Probit regression estimates of the likelihood of internal CEO turnover for *Fortune* 500 firms during the period 1997 to 2005. Internal turnover excludes turnover due to mergers and acquisitions and delistings from a major stock exchange. Occurrences where the CEO dies in office are defined as non-turnover events. The dependent variable equals one if the CEO turnovers and zero otherwise. Independent director data are taken from IRRC Directors database on WRDS. No independent board equals one if a majority of directors are not independent.  $\Delta$ Prob measures the change in the probability of CEO turnover per unit change in the relevant explanatory variables. For indicator variables, the coefficient represents the change in the probability associated with moving the indicator from 0 to 1. Models are estimated with robust standard errors to control for heteroskedasticity. CEO age dummy equals 1 if lagged CEO age is greater than or equal to 60 and zero otherwise. \*, \*\*, and \*\*\* indicate significance at the 10%, 5% and 1% levels, respectively. p-values are in parentheses.

Variable	1997 - 2005	1997 - 2005
	$\Delta$ Prob (p-value)	$\Delta$ Prob (p-value)
Return on S&P 500	-0.2284*** (0.000)	-0.2209*** (0.000)
Industry return – return on S&P500	-0.0491* (0.059)	-0.0536* (0.065)
Industry-adjusted stock return	-0.0732*** (0.000)	-0.0831*** (0.000)
Lagged return on S&P 500	0.1696*** (0.000)	0.1316*** (0.000)
Lagged industry return – return on S&P500	-0.0265 (0.275)	-0.0432 (0.110)
Lagged industry-adjusted stock return	-0.0592*** (0.000)	-0.0670*** (0.000)
CEO age dummy	0.1521*** (0.000)	0.1521*** (0.000)
No independent board indicator variable	-0.0072 (0.546)	-0.0376* (0.030)
No independent board indicator variable		
x(Return on S&P 500)	—	-0.0747 (0.394)
x(Industry return – return on S&P500)	—	0.0331 (0.598)
x(Industry-adjusted stock return)	—	0.0435 (0.210)
x(Lagged return on S&P 500)	—	0.2797*** (0.006)
x(Lagged industry return – return on S&P500)	—	0.0831 (0.160)
x(Lagged industry-adjusted stock return)	—	0.0420 (0.260)
Number of obs.	4,480	4,480
Pseudo R <sup>2</sup>	0.0891	0.0923

**Table 12. Probit regressions of internal CEO turnover for *Fortune* 500 firms on performance and SOX legislation**

Probit regression estimates of the likelihood of internal CEO turnover for *Fortune* 500 firms during the period 1992 to 2005. Internal turnover excludes turnover due to mergers and acquisitions and delistings from a major stock exchange. Occurrences where the CEO is promoted to another CEO position, remains CEO of the delisting firm, is selected for a government position, dies in office, or leaves office due to illness are defined as non-turnover events. The dependent variable equals one if the CEO turnovers and zero otherwise. The SOX dummy equals one for years after 2002.  $\Delta$ Prob measures the change in the probability of CEO turnover per unit change in the relevant explanatory variables. For indicator variables, the coefficient represents the change in the probability associated with moving the indicator from 0 to 1. Models are estimated with robust standard errors to control for heteroskedasticity. CEO age dummy equals 1 if lagged CEO age is greater than or equal to 60 and zero otherwise. \*, \*\*, and \*\*\* indicate significance at the 10%, 5% and 1% levels, respectively. p-values are in parentheses.

Variable	Full Sample $\Delta$ Prob (p-value)	Full Sample $\Delta$ Prob (p-value)	1998 - 2005 $\Delta$ Prob (p-value)
Return on S&P 500	-0.0677*** (0.006)	-0.0925*** (0.001)	-0.2985*** (0.000)
Industry return – return on S&P500	-0.0209 (0.347)	-0.0167 (0.480)	-0.0539* (0.065)
Industry-adjusted stock return	-0.0613*** (0.000)	-0.0604** (0.000)	-0.0854*** (0.000)
Lagged return on S&P 500	—	0.0182 (0.552)	0.2635*** (0.000)
Lagged industry return – return on S&P500	—	-0.0591*** (0.005)	-0.0130 (0.626)
Lagged industry-adjusted stock return	—	-0.0590*** (0.000)	-0.0530*** (0.000)
CEO age dummy	0.1450*** (0.000)	0.1456*** (0.000)	0.1561*** (0.000)
SOX dummy	0.0304** (0.022)	0.0236 (0.261)	0.0386* (0.093)
SOX dummy x(Return on S&P 500)	-0.3789*** (0.000)	-0.3369** (0.011)	-0.1528 (0.307)
x(Industry return – return on S&P500)	0.0321 (0.661)	0.0248 (0.741)	0.0638 (0.430)
x(Industry-adjusted stock return)	-0.0388 (0.216)	-0.0386 (0.216)	-0.0187 (0.584)
x(Lagged return on S&P 500)		-0.0083 (0.902)	-0.2533*** (0.004)
x(Lagged industry return – return on S&P500)		0.0819 (0.237)	0.0371 (0.617)
x(Lagged industry-adjusted stock return)		0.0312 (0.232)	0.0236 (0.411)
Number of obs.	8,929	8,796	5,149
Pseudo R <sup>2</sup>	0.0682	0.0762	0.0902



**Table 13. Multinomial logit regression estimates of the likelihood of no CEO turnover, unforced CEO turnover and forced CEO turnover for *Fortune* 500 firms.**

Multinomial logit regression estimates of the likelihood of no CEO turnover, non-forced CEO turnover and forced CEO turnover for *Fortune* 500 firms during the period 1992 to 2005.  $\Delta$ Prob measures the change in the probability of the particular choice per unit change in the relevant explanatory variables. For indicator variables, the coefficient represents the change in the probability associated with moving the indicator from 0 to 1. Models are estimated with robust standard errors to control for heteroskedasticity. CEO age dummy equals 1 if lagged CEO age is greater than or equal to 60 and zero otherwise. \*, \*\*, and \*\*\* indicate significance at the 10%, 5% and 1% levels, respectively. p-values are in parentheses.

Variable	Unforced CEO turnover $\Delta$ Prob (p-value)	Forced CEO turnover $\Delta$ Prob (p-value)
Return on S&P 500	-0.0837*** (0.000)	-0.0285*** (0.000)
Industry return – return on S&P500	0.0013 (0.939)	-0.0212*** (0.000)
Industry-adjusted stock return	-0.0283*** (0.000)	-0.0293*** (0.000)
Lagged return on S&P 500	0.0421** (0.027)	0.0170** (0.031)
Lagged industry return – return on S&P500	-0.0306* (0.055)	-0.0031 (0.590)
Lagged industry-adjusted stock return	-0.0333*** (0.000)	-0.0116*** (0.004)
CEO age dummy	0.1590*** (0.000)	-0.0082*** (0.000)
Pseudo R <sup>2</sup> = 0.0914		

**Table 14. Probit regressions of the probability of external CEO turnover on performance**

Probit regression estimates of the likelihood of external CEO turnover for *Fortune* 500 firms during the period 1992 to 2005. The dependent variable equals one if the CEO turnovers and zero otherwise.  $\Delta$ Prob measures the change in the probability of CEO turnover per unit change in the relevant explanatory variables. For indicator variables, the coefficient represents the change in the probability associated with moving the indicator from 0 to 1. Models are estimated with robust standard errors to control for heteroskedasticity. CEO age dummy equals 1 if lagged CEO age is greater than or equal to 60 and zero otherwise. \*, \*\*, and \*\*\* indicate significance at the 10%, 5% and 1% levels, respectively. p-values are in parentheses.

Variable	Full sample			Model 2		
	1992-2005 $\Delta$ Prob (p-value)	1992-1997 $\Delta$ Prob (p-value)	1998 – 2005 $\Delta$ Prob (p-value)	1992-2005 $\Delta$ Prob (p-value)	1992-1997 $\Delta$ Prob (p-value)	1998 – 2005 $\Delta$ Prob (p-value)
Lagged return on S&P 500	0.0014 (0.803)	-0.0047 (0.593)	0.0092 (0.199)	-0.0006 (0.897)	0.0007 (0.906)	0.0045 (0.459)
Lagged industry return – return on S&P500	-0.0102* (0.087)	0.0077 (0.313)	-0.0137** (0.048)	-0.0118** (0.018)	-0.0066* (0.096)	-0.0125** (0.042)
Lagged industry-adjusted stock return	-0.0051 (0.223)	-0.0016 (0.634)	-0.0066 (0.266)	-0.0031 (0.385)	-0.0017 (0.418)	-0.0037 (0.474)
Lagged change in ROA	—	—	—	0.0185 (0.394)	0.0214* (0.081)	0.0160 (0.653)
CEO age dummy	0.0037 (0.116)	-0.0014 (0.551)	0.0082** (0.027)	0.0023 (0.238)	-0.0001 (0.950)	0.0047 (0.129)
Number of obs	7,821	3,285	4,536	7,625	3,196	4,429
Pseudo R <sup>2</sup>	0.0113	0.0125	0.0240	0.0169	0.0323	0.0208