# The Cyclicality of CEO Turnover

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## Abstract

CEO turnover is highly pro-cyclical. This paper examines whether contracting incentives encourage CEOs to depart when the economy is doing well. We find robust evidence that pro-cyclical turnover is largely driven by CEOs who time their retirements in order to maximize the values of their Supplemental Executive Retirement Plans (SERPs). Since CEO pay is pro-cyclical and SERP payouts are based on pay in the final years of tenure, CEOs have the incentive to retire when the economy is doing well. SERP-driven pro-cyclical retirement is particularly present in firms with strong corporate governance, which suggests retirement cyclicality is a tool firms use to convey incentives and effectively manage retention. To our knowledge, our paper is the first to empirically test determinants of pro-cyclical turnover. In doing so, we provide needed evidence on the predictors of voluntary retirement, a common but rarely studied type of CEO departure.

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## 1. Introduction

Prior literature finds that CEO turnover is higher when the economy is doing well; i.e., it is pro-cyclical.[1] This paper examines whether voluntary turnover induced by contract incentives can explain this cycle. We focus on the role of Supplemental Executive Retirement Plans (SERPs), because SERPs' values are positively sensitive to salary and bonus pay in the last year of a CEO's tenure. Accordingly, retiring during periods of high economic growth is likely more beneficial to CEOs with SERPs than retiring during periods of low growth. We find that CEOs with strong incentives from SERPs are significantly more likely to retire when economic growth is high. Our evidence suggests a significant amount of pro-cyclical turnover can be explained by CEOs' desires to maximize their pensions.

The empirical literature on CEO turnover is almost entirely focused on forced turnover, even though the majority of CEOs depart voluntarily. The bulk of studies try to predict forced turnover with cross-sectional variation in performance. These studies find that low performance leads to more turnover in the cross-section, but the effect is relatively small (see Brickley, 2003). Meanwhile, evidence from the time series finds CEOs leave their positions more often when the overall economy is doing well. Figure 1 charts GDP growth and turnover frequency for S&P 1500 CEOs from 1993-2012. Moving from the lowest year of GDP growth (in 2009, when growth was –2.8%) to the highest (in 1999, when growth was 4.7%) nearly doubles the probability of a

[1] Mikkelson and Partch (1997) find a significant decline in turnover rates from the mid-1980s to the period from the late-1980s to early 1990s, which included a recession. They attribute the change to a less hostile takeover market. Eisfeldt and Rampini (2008) find a correlation between GDP and CEO turnover of more than 0.8. Their theoretical findings suggest counter-cyclical agency frictions make it more expensive to compensate CEOs for control rights during downturns. Kaplan and Minton (2012) find a persistent positive relation between lagged S&P 500 returns and turnover, but do not explain it.

turnover event, from 11% to 20%. The relatively large effect contrasts with turnover rates that are counter-cyclical for U.S. workers as a whole (Boeri, 1996).

This time-series characteristic is unlikely to be driven by firings for two reasons. First, forced turnovers are relatively rare. Estimates put the percentage at around 15 to 25 percent of all departures (Engel et al., 2003; Huson et al., 2001; Jenter and Kanaan, 2015). Voluntary departures make up the vast majority of turnovers. Second, firings increase when aggregate outcomes are poor (Jenter and Kanaan, 2015), which is unlikely during growth periods. For these reasons, we focus on whether voluntary turnover drives cyclicality.

In particular, we focus on the role of SERPs because a) most departing CEOs are at or nearing retirement age and b) SERP values are more sensitive to conditions in the year of departure than other benefits. The typical SERP pays a defined benefit according to the highest three or five years of the CEOs cash pay (salary plus bonus). Pay rarely decreases, so the highest years of pay are usually the last years of the CEOs tenure. Sundaram and Yermack (2007) estimate that an extra dollar of cash pay in the last year of tenure is worth $1.10 in SERP benefits. CEO pay closely tracks the business cycle (Eisfeldt and Rampini, 2008; see Figure 2). All else equal, a CEO with a SERP who departs in a high economic growth year will likely receive a larger benefit than a CEO with a SERP who departs in a low growth year.

We measure SERP incentives using pension disclosures required under the SEC's enhanced disclosure rules of 2006. We find that CEOs with relatively large SERP incentives are more likely than CEOs with relatively low or no SERP incentives to depart the firm when the overall economy is doing well. We further find that the SERP-related turnover is primarily driven by CEOs above the age of 65, a common vesting age for SERPs. Estimates show a CEO over the age of 65 with a SERP-only pension will depart the firm with an added 0.08 probability for a one

standard deviation increase in GDP growth. For comparison, cross-sectional findings show that moving from the top to bottom decile of performance increases the probability of turnover by only 4% (Brickley, 2003). Our evidence finds that the effect of SERP incentives on pro-cyclical retirement is large, statistically significant, and very robust.

We next examine several variations of our main result. An important feature of SERPs is that their payouts increase with tenure. We find that SERPs' effect on pro-cyclical retirement is concentrated among CEOs with tenures of at least five years. The cross-sectional finding supports our hypothesis that SERPs convey incentives to retire when the economy is doing well.

SERPs are sometimes described as "golden handcuffs" because firms use them as a retention tool for highly-valued executives. The benefits have also been criticized as performance-insensitive perquisites in disguise (Bebchuk and Fried, 2005). While we do not explicitly model the determinants of SERPs, we provide descriptive evidence of whether SERP-driven pro-cyclical retirements are associated with efficient contracting. Specifically, we test whether the effect of SERPs is associated with cross-sectional variation in governance quality, as measured by Gompers et al. (2003). We find that the effect of SERPs on the over-65 departure decision is concentrated in firms that score high on governance factors. We also test whether departure announcement returns vary according to whether the CEO has a SERP. We find the market responds positively to CEOs who retire without SERPs, but does not respond significantly to retirements by CEOs with SERPs. This initial evidence suggests SERPs make retirements more predictable, and that CEOs without SERPs may be staying too long. Overall, our findings are that SERP-driven pro-cyclical retirement is associated with effective contracting and CEO performance.

Our final set of analyses considers alternative explanations for pro-cyclical retirement. First, we examine the role of stock and option values in determining pro-cyclical turnover. Unlike

SERPs, values of existing stock and option holdings do not vary with departure timing, per se. A CEO who retires when the value of her holdings is low need not liquidate upon retirement. She is allowed to hold the portfolio until values increase. However, if the CEO is in need of liquidity upon retirement, then he may prefer to retire when his portfolio is highly valued. Our SERP findings are robust to including changes in portfolio values as an additional explanatory factor. Consistent with past research, portfolio values negatively predict turnover events, although less so for the over-65 set of CEOs.

Second, we explore the role of pro-cyclical mergers and acquisition activity in explaining CEO turnover during economic growth periods. Our primary analysis excludes firm-years in which the firm was acquired. In subsequent analysis, we include acquisition years and test whether mergers explain pro-cyclical turnover. We find that CEOs whose firms are acquired during economic growth periods are less likely to leave the firm. More importantly, including the M&A factor does not change our inference with regard to SERPs.

Finally, we examine whether lucrative post-retirement board opportunities explain pro-cyclical turnover. We find little evidence to support the alternative hypothesis that cyclical board membership opportunities drive retirement. In fact, our results show that the rate of economic growth in the retirement year corresponds negatively to new board service post-retirement.

A change in CEO, regardless of the reason, is a significant event for any firm.[2] Even though most departures by CEOs are voluntary, prior research has largely focused on performance-induced, forced turnover (e.g., Coughlan and Schmidt, 1985; Weisbach, 1988; Jensen and Murphy,

[2] Several studies find CEO turnovers affect subsequent firm activity and performance. These include Denis and Denis (1995), Weisbach (1995), and Huson et al. (2004). Fee and Hadlock (2004) and Hayes et al. (2006) find these events affect turnover in other top-level executive positions. Meanwhile, Clayton et al. (2005) find the events are associated with equity volatility.

1990; Kaplan and Minton, 2012; Jenter and Kanaan, 2015). Voluntary turnover events are arguably as important to the firm, yet they have been largely ignored in the literature. Our paper is one of few to examine the voluntary departure decision.

Prior research documents but does not explain the reasons for pro-cyclicality in turnover events. To our knowledge, our paper is the first to test why CEO turnover is pro-cyclical, and whether contracting can explain the effect. We provide evidence that incentives from SERPs explain a significant portion of cyclicality in CEO departures. Moreover, our descriptive evidence suggests these contracting incentives are beneficial to the firm and its shareholders.

Age, in terms of magnitude, is a primary driver of turnover, suggesting retirements are worth understanding in more detail. Our paper specifically examines retirement incentives and shows that time-series factors are significant determinants for this decision. To our knowledge, our paper is the first to document that the bulk of turnover cyclicality is driven by CEOs' voluntary retirement.

Our paper also highlights the complexity of the contracting problem for older CEOs who wish to retire. SERPs provide a relatively low-risk, lucrative benefit to CEOs and an effective retention tool for the firm. Once the vesting terms are met, SERPs provide incentives for CEOs to retire according to macroeconomic conditions, rather than firm-specific conditions alone. As Jenter and Kanaan (2015) describe, pro-cyclical turnover is broadly inconsistent with optimal matching models.

The rest of the paper proceeds as follows: Section 2 provides background on CEO pension incentives and develops our main hypothesis. Section 3 describes our data and research design.

Section 4 presents our results. Section 5 explores the welfare implications of our findings. Section 6 examines alternative explanations. Section 7 concludes.

## 2. Background and Hypothesis Development

CEO turnover positively varies with the business cycle (Eisfeldt and Rampini, 2008; Kaplan and Minton, 2012; Mikkelson and Partch, 1997). Many papers argue that CEO pay is linked to aggregate economic activity because aggregate shocks are only "partially filtered" out.[3] The strong positive relationship between CEO turnover and aggregate economic activity is not a result of the partial filtering. Partial filtering would predict that more CEOs are fired when the economy is doing poorly, possibly because they are wrongly blamed for poor performance.

An alternative explanation to performance-induced firings is that pro-cyclical turnover is driven by incentives. A majority of CEOs depart voluntarily and are more likely to do so with age. Therefore, it is natural to turn to CEO retirement decisions, along with pension practices, as a possible explanation for pro-cyclical turnover.

### *2.1 Executive Retirement Plans*

Firms offer a variety of pension plans to their employees and CEOs. Retirement plans may generally be classified into two categories: defined benefit (DB) plans and defined contribution (DC) plans. DB plans guarantee a fixed amount of money each year during retirement, whereas DC plans invest a fixed amount of money during each year that an employee works. DB plans were once common, but U.S. firms have slowly shifted to using mostly DC plans over the last twenty years, especially for new employees (Poterba et al., 2008, 2009).

[3] See Bertrand and Mullainathan (2001), Frydman and Saks (2010), Jenter and Kanaan (2015), Murphy (1985) and Garen (1994). Jenter and Frydman (2010) and Aggarwal (2008) review the literature more fully.

Federal law regulates both types of pension plan. The Employee Retirement Income Security Act (ERISA) of 1974 is the most important single piece of regulation. ERISA sets funding, benefit, accrual, vesting, informational and fiduciary standards. It also sets accounting standards that firms must use to value retirement plans. Pensions that are regulated by ERISA provide tax benefits to employers and employees and are guaranteed by the Pension Benefit Guaranty Corporation. The size of tax-qualified plans is capped by law. In 2019, the maximum allowed annual benefit under DB plans is $225,000 and the maximum contribution to DC plans is $56,000 (IRS, 2018).

Since top executives often have very large salaries, the pension plan promised by the firm's formula is usually above the tax-qualified cap set by the IRS. For this reason, firms with defined-contribution or 401(k) plans may offer their executives deferred compensation plans as a way to increase their retirement savings in a tax beneficial way. Firms with defined-benefit plans may instead offer their executives a second, non-qualified retirement plan alongside their topped-out ERISA-qualified plan. This second plan is called a Supplemental Executive Retirement Plan (SERP). In many cases, the SERP has the same structure as the employee retirement plan, although in some cases they are riskier and embed larger performance incentives.

*2.2 Hypothesis: Pro-cyclical Departure Incentives from SERPs*

SERPs pay a fixed amount of money each year, until the death of the executive and his or her spouse. Sundaram and Yermack (2007) provide detail on SERPs for a sample of 237 large capitalization firms. We summarize their findings here. The typical annuity payment is equal to the average of the highest three or five years' salary plus bonus, times the number of qualified years of service, times a multiplier (usually between 0.015 and 0.020). Since pensionable income very rarely decreases, the highest years of service are almost always equal to the final years of

service. By Sundaram and Yermack's (2007) estimate, an extra dollar of salary and bonus in the last year adds an additional $1.10 to the present value of the SERP.[4]

A large literature establishes that pay is affected by circumstances outside of CEOs' control, such as industry and aggregate shocks (Bertrand and Mullainathan, 2001; Gibbons and Murphy, 1990). Since executive pay is closely linked to aggregate conditions, pension payments are, too. Therefore, CEOs may have a strong incentive to retire when the economy is doing well. After periods of low growth, CEOs may try to delay their retirement so that their pension increases. The hypothesis of this paper is that the cyclicality in CEO turnover is at least partially a response to these pension incentives.

Of course, there are many reasons why SERPs would not explain pro-cyclical turnover. The majority of SERPs fully vest once the executive reaches a pre-specified age, usually 65. If the CEO retires early, the annuity decreases. If she retires after the pension start age, she foregoes annuity payments for the years of additional work. According to Sundaram and Yermack (2007), turnover rates of older CEOs at their pension start age are 50-60%, indicating that SERPs encourage CEOs to retire immediately at vesting, regardless of firm or economy-wide performance conditions.

Prior evidence finds that boards and CEOs negotiate other pay outcomes to either discourage or encourage retirement. Sundaram and Yermack (2007) find that CEOs negotiate for extra pay if they remain in the post after their pension is fully vested, in order to subsidize the lost annuity. Alternatively, special bonuses might encourage retirement in a particular year. Boards

[4] Prior literature finds the added salary and bonus income in a retirement year is important to CEOs with SERPs. Kalyta (2009) surveys a cross-section of 2,039 CEO pension plans in a single year and classifies them on the strength of their incentives. He finds that firms with especially pay-sensitive SERPs report unusually high discretionary accruals shortly before their CEO retires.

that want to retain a CEO during a boom period can presumably supplement foregone retirement income with other types of pay if doing so would benefit shareholders. In this case, we would not expect to find pro-cyclical turnover is related to incentives from SERPs.

CEOs tend to hold portfolios of stock and options that are large relative to the values of their pensions. These portfolio values are also pro-cyclical in nature; however, portfolios do not automatically get liquidated upon retirement. A CEO who retires when the value of his stock and option portfolio is relatively low may hold it until it recovers, regardless of his retirement date. A need for liquidity might constrain her ability to hold the shares until the market rebounds. If so, we would expect SERPs to counteract cyclicality by providing liquidity during bear markets. CEOs with strong SERP incentives would be more apt than CEOs without SERPs to retire during a downturn, the opposite of our prediction.

Ultimately, whether the incentives from SERPs are meaningful predictors of turnover during economic growth periods is an empirical question, which we address in this paper.

## 3. Data and Research Design

The main sources for the data used in this paper are the S&P ExecuComp database and the Capital IQ Compustat North America database. The ExecuComp database contains information about top executives and firms listed in the S&P 500, Small Cap and Mid Cap indices. It includes data on executive pay and bonuses, as well as demographics for top company officers. The Compustat database contains financial information for most publicly traded firms in North America. The sample used in this paper extends from 1993-2012. BEA data on real GDP growth is included as well. Price and returns data is from CRSP. Acquisitions data is from SDC Platinum.

*3.1 Measuring Incentives from SERPs*

To test the hypothesis that pro-cyclical CEO turnover depends on pension incentives, we construct a new database of pension structure using data available in ExecuComp. ExecuComp includes pension data only from 2006 onward. This is because firms were required to make data on pension plans available only following SEC rule changes in 2006.[5] For each executive and each plan, ExecuComp includes data on pension names, values and annual changes in value. ExecuComp does not classify pensions plans by their type or structure. Therefore, we use text analysis to create a classification. Any plan whose name contained any of the following words was classified as a SERP: "Supplement", "Senior officer", "Executive", "SERP", "SKERP"[6], "Non-qualified", "Non qualified", "Nonqualified"[7], "Restoration", "Excess", and "Equalization". These terms generally indicate that a plan is a SERP, as opposed to a plan with a DC-type structure or a deferred compensation agreement. Using this data, we classified which firms did have a SERP. See the Appendix for detail on how we verify this classification.

We calculate the total pension value belonging to SERPs by summing the value of the individual pension plans classified as SERPs. SERP values vary greatly according to factors such as age, life expectancy, vesting terms, borrowing costs, and the estimated annuity payout (Sundaram and Yermack, 2007). We do not directly model SERP values according to these factors. Instead, we calculate the fraction of the CEO's pension that belonged to a SERP for each firm year. Using this calculation, we calculate the average SERP fraction for all CEO-years in which that firm's data is available. We create a measure of SERP Size as a fraction of total pension

[5] The key changes are described in Securities Act Release No. 8732A and Securities Act Release No. 8765. Further discussion is available at http://www.sec.gov/divisions/corpfin/guidance/execcomp402interp.htm.
[6] SKERP refers to "Supplemental Key Executive Retirement Plan".
[7] SERPs are referred to as non-qualified because they are not tax qualified or regulated by ERISA.

benefits to identify the firms that provide strong incentives from SERPs. This is the main variable used to empirically test the SERP hypothesis. Most of the variation in this measure comes from whether the firm provides a SERP or not. Since the SERP status of firms changes very little from year to year, we use the average value of this variable for all sample firm-years, including those prior to when SERP data became available. In this way, we use data from 2006-2012 to classify firms for 1993-2012 even though data from 1993-2005 was not available.

*3.2 Measuring CEO Turnover*

Our paper aims to assess turnover cyclicality in the aggregate. Therefore, we measure CEO turnover with an indicator equal to one if the year is the CEO's final year with the firm, regardless if the departure is voluntary or forced. The final year is measured as the year of the CEO departure date given by ExecuComp. If a departure date is missing, we use the last year that the executive is indicated as the CEO. We exclude fiscal years in which more than one executive is named as CEO.

*3.3 Main Specification*

The main regression specification used to test the SERP hypothesis is the following linear probability model:

$$\begin{aligned} Final\ Year_{it} = {} & \beta_1 Excess\ Returns_{it} + \\ & \beta_2 Age \geq 65_{it} + \beta_3 SERP\ Size_i + \\ & \beta_4 SERP\ Size * (Age \geq 65)_{it} + \\ & \beta_5 GDP\ Growth * (Age \geq 65)_{it} + \beta_6 GDP\ Growth * SERP\ Size_{it} + \\ & \beta_7 GDP\ Growth * SERP\ Size * (Age \geq 65)_{it} + \gamma X_{it} + \epsilon_{it} \end{aligned} \quad (1)$$

where:

- $Final\ Year_{it}$ is an indicator variable equal to 1 if the CEO of firm *i* is in his or her final year in year *t*, 0 otherwise

- $Excess\ Returns_{it}$ is the simple difference between S&P 500 value-weighted returns and firm *i*'s stock returns for year *t*
- $SERP\ Size_i$ represents the mean of total SERP value as a proportion of total pension value for all fiscal years in which pension data is available for firm *i*
- $Age \geq 65_{it}$ is an indicator variable equal to 1 of the CEO of firm *i* is age 65 or older during year *t*, 0 otherwise
- $GDP\ Growth_t$ is the percentage point change in GDP for year *t*
- $X_{it}$ represents a vector of control variables that include book-to-market, log(assets), log(sales) and return-on-assets and year, sector, and year-by-sector fixed effects.

Note Eq. (1) does not include a main effect for $GDP\ Growth_t$. This effect is subsumed by the year fixed effect. We analyze the main effect of $GDP\ Growth_t$ in Section 4.

According to our hypothesis, the triple interaction term $GDP\ Growth_t * SERP\ Size_i * (Age \geq 65_{it})$ will have a positive coefficient. This is because we expect the state of the economy to affect retirement-age CEOs with SERPs more strongly than retirement-age CEOs without SERPs. We use age 65 to indicate retirement age because, like many other types of workers, most CEOs retire around age sixty-five (Jenter and Lewellen, 2015) and because this is the most common vesting age for SERPs (Sundaram and Yermack, 2007). To alleviate concerns that our results are related to acquisition activity, we exclude years during which the firm was acquired. We return to M&A-induced turnover in Section 6.

*3.3 Sample*

Table 1 shows summary statistics at the firm and CEO level. Panel A provides statistics on CEOs and their pensions. The mean CEO age is 55.6 years. Around 10% of the CEOs are age 65 or above. Just over 11% are in their final year of service. We estimate 41.1% of sample firm years are associated with pensions, but only 26% with SERPs. The mean pension value for years 2006 and beyond (when pension data is available in the proxy) is $2.4 million. More than half of that figure ($1.4 million) is in the form of SERPs.

Panel B of Table 1 provides descriptive statistics on firm characteristics. The median firm in the sample was founded in 1984 and mean sample sales is around $4.4 billion. Panel C compares firms that have a SERP to those that do not within the post-2006 sample. Firms with SERPs tend to be larger, have greater sales, and give larger pensions. In our empirical work, we will perform several checks to ensure that differences in these other variables are not driving the main results.

## 4. Results

The results of tests of Eq. (1) are shown in Table 2. All specifications include a control for firm excess returns, which have the expected negative coefficient (significant at 1%). We exclude turnover that coincides with firms being acquired. All columns include year and sector fixed effects; Columns 3 and 4 add sector-by-year fixed effects.[8] Columns 2 and 4 also include controls for firm-level variables: log assets, book-to-market, log sales, and ROA. The coefficient on the $GDP\ Growth * SERP\ Size * (Age \geq 65)_{it}$ has a coefficient of around 0.037 that is statistically significant in every specification at the 5% level. The coefficient on the $GDP\ Growth * SERP\ Size_{it}$, estimated at around 0.009, is also positive and statistically significant, indicating that even younger CEOs with large incentives from SERPs choose to depart during growth periods; however, the relationship is three to four times larger for CEOs age 65 or older. Since prior evidence finds the majority of SERPs do not fully vest until age 65, the significant age effect provides evidence for our SERP plan hypothesis.

To provide robustness, we further conduct a series of alternative specifications. We further test the cross-sectional variation in our findings according to CEO tenure and provide descriptive evidence on the degree of cyclicality explained by SERPs.

[8] Ideally, we would include firm fixed effects, but since most firms in the sample feature only a single CEO turnover year, this would greatly reduce the sample size.

*4.1 Robustness Checks*

4.1.a. Additional controls

To test the robustness of these results, we include a further set of control variables interacting CEO age, the state of the economy, and the sector of particular firms. Since SERPs are more common in some sectors than others, it could be that the effects of SERPs on CEO turnover are driven by varying cyclicality by sector. The results of this specification are given in Table 3, Panel A. Even with the large number of control variables the results are still statistically significant at the 5% level and unchanged from Table 2.

4.1.b. Market returns as a measure of cyclicality

Much of the prior literature uses stock-market returns as a measure of aggregate performance rather than GDP growth. Moreover, it is plausible that CEOs' pay – and therefore their pensions – are directly linked to aggregate market returns rather than the broader indicator of economic activity that GDP growth measures. Table 3, Panel B replicates Table 2 using S&P 500 returns instead of GDP growth. Results are similar.

4.1.c. Instrumental variable approach

Table 1, Panel C shows that firms with and without SERPs differ across several dimensions. It is plausible that some other aspect of executive compensation or firm structure is driving the main results, and SERP prevalence is correlated with this omitted variable.

To allay such fears, we conduct an instrumental variables analysis. SERPs are less prevalent among younger firms than among older ones. If the omitted variable is unrelated to firm age, then firm age is a relevant instrument for SERP structure.

We use year of incorporation as an instrument for SERP Size. We measure year of incorporation as the first year that a firm appears in Compustat.[9] If the SERP size variable is endogenously determined, then the interactions between SERP Size, GDP growth, and CEO age must be as well. As we only have a single instrument, we limit specifications to those that only include a single endogenous variable, $SERP\ Size$. We do this by estimating separate regressions, limited to old or young CEOs, in both high growth and low growth periods. Results are shown in Table 3, Panel C. The estimated coefficient is largest where CEOs are above age 65 and GDP growth is at or above the median. It is also significant for younger CEOs during high growth periods, but the effect is much smaller.

A second possible concern is that the difference in estimates is due to some other difference between newer and older firms. This would violate the exclusion restriction in our specifications. Despite these caveats, the 2SLS estimates provide supporting evidence that SERPs are driving CEO turnover cyclicality.

*4.2 Cross-sectional variation in CEO Tenure*

In addition to age, the SERP hypothesis also makes a prediction about which CEOs should be most affected. CEOs with a short tenure are unlikely to have accrued enough years of service for the SERP to make a difference to them. Table 4 divides the sample into CEOs who have a tenure above 5 years (the median value) and below. Consistent with our SERP hypothesis, the coefficient on the key variable $GDP\ Growth * SERP\ Size * (Age \geq 65)_{it}$ is only statistically significant for those CEOs who have had their job for 5 years or more.

[9] Since Compustat data begins in 1950, all firms founded before 1950 are grouped together.

*4.3 Analysis of Cyclicality Main Effect*

Our main analysis includes year fixed effects that subsume the main effect of GDP growth on CEO turnover. In order to analyze the extent of turnover cyclicality explained by SERP-driven retirements, we remove the year fixed effects and include the un-interacted $GDP\ Growth$ variable in our regression. The results of these tests are reported in Table 5.

Column 1 of Table 5 finds that the GDP growth effect is strong and highly significant at the 5% level.[10] These results align with Figure 1. Column 2 includes an interaction between $GDP\ Growth * (Age \geq 65)_{it}$ as well as an indicator for whether the CEO is 65 or older. The specification finds that all pro-cyclical turnover in the sample is driven by CEOs of retirement age. Column 3 includes our SERP variables. The results indicate that pro-cyclical departure is entirely concentrated in either older CEOs or CEOs with strong SERP incentives. These results further suggest that pro-cyclical turnover is driven by voluntary retirements. Moreover, the findings in Column 3 are nearly identical to those in Table 2, Column 2. The comparison suggests GDP growth captures the bulk of the time-series effect on retirement.

## 5. Welfare Implications

The welfare implications of retirement cyclicality are not immediately apparent. The retirement of an established CEO may be particularly harmful during recessions because CEO ability matters more when profits are lower. The opposite is also possible: it may be cheaper to replace bad CEOs in recessions because capital is unproductive, as Eisfeldt and Rampini (2008)

[10] While the coefficient on $GDP\ Growth$ appears smaller in absolute value terms than the coefficient on $Excess\ Return$, it is the case that we record $GDP\ Growth$ in percentage points while $Excess\ Return$ is in decimals. That is, GDP growth of 1.5% is entered as 1.5 while excess return of 1.5% is entered as 0.015. If $GDP\ Growth$ were also in decimals, the coefficient would be 100 times larger.

suggest. For this reason, the results in this paper may be consistent with both optimal contracting or with corporate governance failure.

We find that the pension effects shown above are larger for firms with strong shareholder governance. We also perform an event study to examine stock market reactions to CEO retirements. While the results in this section are somewhat speculative, they suggest that SERPs are used as a tool to induce turnover by CEOs at the right times.

*5.1 Well- versus poorly-governed firms*

We use a measure of corporate governance constructed by Gompers et al. (2003). Gompers et al. (2003) identify 22 charter provisions and bylaws that weaken shareholder power within firms and count how many are present at each firm in their sample. Examples of anti-shareholder rules include provisions to slow hostile bidders, poison pills, greenmail rules, and golden parachutes.

Gompers et al. (2003) show that governance quality changes very little from year to year within a given firm, so to fill in missing years, the governance of each firm is taken to be the average over the years in which data is available. This yields governance data for 1,628 out of 3,034 firms in the database. The median number of anti-shareholder provisions is 9. Therefore we create an indicator to mark firms that have at least 9 such provisions (poorly-governed firms) and fewer than 9 (well-governed firms).[11]

Table 6 replicates the results of Table 2, limiting the sample to firms marked as well-governed (Panel A) and those marked as poorly-governed (Panel B). If SERP-induced turnover is a governance problem, then firms with strong shareholder control ought to override CEOs' wishes and instead pressure them to retire at the optimal time. If SERP-induced turnover is consistent with

[11] This database was downloaded from the web site of Andrew Metrick who has generously made them available online. See Gompers et al. (2003) for further details of variable construction.

good governance, then one might expect that CEOs in firms with poor shareholder governance are able to resist the incentives created by the board to induce departure at the right times.

The coefficients on the $GDP\ Growth * SERP\ Size * (Age \geq 65)_{it}$ variable are large and statistically significant for well-governed firms, but not for poorly-governed firms. For poorly-governed firms, pro-cyclical incentives from SERPs hold regardless of the age of the CEO. This finding suggests poorly-governed firms set younger vesting requirements for SERPs. Overall, the results suggest that SERPs are consistent with good governance practices, particularly when vesting requirements are stringent. This is more consistent with the hypothesis that SERP-driven turnover cyclicality is the result of optimal contracting rather than misaligned incentives.

*5.2 Event study: Departure announcement returns, by SERP*

To shed further light on the welfare implications of SERP status and executive retirements, we perform an event study of stock market reactions to CEO retirement announcements. CEO departure data comes from Jenter and Kanaan (2015) and Peters and Wagner (2014), which we have updated and expanded with 177 new observations.[12]

This database is created from news articles first announcing the retirement date of CEOs. CEO departures are classified into those whose departures are forced and unforced on the basis of news coverage. Jenter and Kanaan (2015) and Peters and Wagner (2014) provide further details on the construction of this database, which we have followed closely.

Stock price data is from CRSP. We estimate daily excess returns using the CAPM. CAPM betas of stock returns on the value-weighted stock return index are calculated using a window from 280 to 30 trading days before the announcement date, and excess returns are calculated in a window of 20 trading days around the announcement date (results are robust to changing these,

[12] We would like to thank Dirk Jenter for generously making these data available to us.

however). To focus on CEO retirement, we limit the sample to CEOs who depart above age 60, who have a tenure of at least 365 days,[13] and whose departure is described as unforced in contemporaneous news coverage. This yields a sample of 171 CEOs without a SERP and 110 CEOs with a SERP.

Figure 3 shows cumulative excess returns for the window of –20 to +20 trading days around CEO departure announcements. Univariate statistics, shown in Table 7, find a positive reaction of about 0.25% daily returns to retirement announcements for firms without SERPs. CEOs with SERPs have slightly negative but insignificant abnormal stock returns in the period around their retirement. The positive returns to announcements for non-SERP firms are robust to the exclusion of outliers and variations in the window around announcement dates.[14]

A natural explanation is that retirements in SERP firms are well-anticipated and there is little market reaction, whereas retirements in firms without SERPs are not well-anticipated and so there is a strong reaction. This finding also suggests that non-SERP CEOs stay in their jobs too long, so markets react positively when they depart.

Section 5 has examined some of the welfare implications of cyclical CEO retirements. The results in Table 6 suggest that SERP-driven pro-cyclical retirement is consistent with positive governance, since the effect is strongest for these firms. The results in Table 7 suggest SERPs help to align CEO retirements with the interests of shareholders. For this reason, they may be better

[13] Executives with a shorter tenure are often hired on an interim basis while a search for a permanent CEO is being conducted.

[14] Ideally, it would also be possible to compare announcement returns for CEOs retiring in periods of high economic growth versus low economic growth. However, in the available sample, such few CEOs retire in periods of low growth that it is not feasible to estimate announcement returns with any accuracy.

thought of as one (out of many) tools that well-governed firms can use to induce desired behavior by CEOs.

## 6. Alternative Explanations

### *6.1 Stock and option portfolios*

CEOs hold large portfolios of stock and options that are sensitive to price movements. It is possible that the SERP finding is due to CEOs choosing to retire when their stock portfolios are valued more highly, rather than their SERPs. Indeed, evidence from the economics literature suggests white collar workers time their retirements according to their savings (Coile and Levine, 2011); however, prior work finds voluntary turnover is negatively related to stock and option holding values (Balsam and Miharjo, 2007). Nevertheless, we test this alternative explanation by including the log change in the value of the CEOs stock and option portfolio over the fiscal year, along with the starting log portfolio value, to our tests of Eq. (1). We measure portfolio values using the method in Core and Guay (2002). If all CEOs leave the firm when the value of their portfolio is high, we expect the change in value to positively predict departures. We expect the effect to be concentrated in older CEOs if the retirements are driven by portfolio values.

Results are provided in Table 8, Panel A. The effect of both large portfolios and portfolios that have grown in value over the year is to retain CEOs. This effect is reduced for CEOs who are of retirement age. More importantly, including these additional variables does not weaken our results regarding SERPs. Even after controlling for changes in the CEOs portfolio, SERP incentives continue to predict pro-cyclical departures, particularly for older CEOs.

### *6.2 M&A activity*

Our analysis up to this point has excluded acquisition years in order to better isolate the effect of SERPs on the decision to retire. Yet, some of the cyclicality of CEO turnover noted by

previous work may be driven by cyclical M&A activity. The next set of tests asks whether M&A activity can explain cyclical turnover more generally.

Sample construction of the M&A data follows Jenter and Lewellen (2015). The data source is Security Data Corporation's Mergers and Acquisitions database. We include all completed deals from 1993-2012 with a value greater than $1 million. We exclude privatizations, share repurchases, exchange offers and recapitalizations. This yields a total of 77,678 completed deals over this 20-year period. We use a dummy variable to mark retirements in the executive retirement database that coincide with M&A deals. This variable is equal to 1 for each firm-year where a matching deal is found and 0 otherwise. We match firms by CUSIP, and to determine matching deals, we require that the firm be listed in the M&A database as a target.

Table 8, Panel B has the results of linear regressions relating turnover to merger activity, CEO age and GDP growth. The specification includes an indicator variable for whether the CEO was acquired in a merger (*Merger*). This indicator variable strongly predicts CEO departures; however, the effect is slightly reduced for CEOs who depart during high growth periods. The interaction between the acquisition year variable and GDP growth is negative and significant at the 1% level. In addition, the inference regarding SERPs and SERP-driven cyclicality is substantively the same as in prior results. SERPs continue to predict turnover during high growth periods, and the effect is stronger for CEOs over the age of 65. Clearly, M&A activity does seem to drive CEO turnover; however, it is not a complete explanation for the degree of observed retirement-age cyclicality.

*6.3 Directorship opportunities*

The third alternative hypothesis we test is that cyclical CEO retirement is due to cyclical board membership opportunities. If this theory is correct, CEOs retiring in high growth periods should be more likely to receive a board memberships than CEOs retiring in low-growth periods.

We use data on directorships from GMI Ratings. This database contains names and biographical information from 23,369 directors in 2,297 firms from 2007 to 2014, including director age and the first year of directorship. While it would be preferable for the database to contain coverage of directorships beginning in 1993, this data does include directors who began many years before. In particular, half of all directors in this data began their service in or before 2003.

Directorship data is merged with the primary database on the basis of executive last name, first name and date of birth. Since both Compustat and GMI ratings are created on the basis of proxy statements, executive names generally match exactly. We allow year of birth to differ by at most two years. The match leaves a CEO-level data set with 5,027 CEOs who have some directorship listed in the GMI Ratings data. We create an indicator variable equal to 1 for individuals who begin a new directorship post-retirement.

To test the cyclical retirement opportunity possibility, we run linear regressions to determine whether board service is related to economic conditions when the CEO retired. All tests have as their dependent variable the indicator for executives who began new board service of some kind after retirement. The main explanatory variable is GDP growth in the year the CEO retired. The results are presented in Table 8, Panel C. Columns 1 and 2 correspond to specifications that use the entire data set, and Columns 3 and 4 limit the data to executives who left their position at age 65 or above. Columns 1 and 3 are without controls, and Columns 2 and 4 include firm excess

returns, log total assets, log sales, book-to-market, and ROA as controls. Since the decision to retire may be affected by unmeasured opportunities for board service, we instrument for departure year GDP growth using GDP growth in the year that the CEO turns 65, which is the year that the greatest number of CEOs retire. The results from this specification are in Columns 5 and 6.

Columns 3 to 6 are most relevant because departures by older CEOs are less likely to be due to firing and are more closely related to retirement decisions. In Columns 3 and 4, the GDP growth variable is slightly negative and either slightly or not statistically significant. The estimates in Columns 5 and 6, which use instruments for GDP growth at the time of CEO departure, are negative and highly statistically significant. Overall, we do not find evidence that board membership opportunities are pro-cyclical – rather, they are counter-cyclical. Board opportunities are unlikely to explain the cyclicality in CEO retirement.

## 7. Conclusion

Prior literature documents but does not explain the positive relation between CEO turnover and macroeconomic growth. Our paper finds evidence that this relation is largely driven by retirement incentives in the form of SERPs. In doing so, we provide needed insight on the determinants of voluntary retirement. Voluntary retirements compose a large percentage of overall turnover, but the empirical literature has largely ignored them.

Most of the research on incentives has historically focused on the incentives created by CEO pay and CEOs' portfolios of stock and options. There is increasing evidence that retirement also provides CEOs with important incentives (Brickley et al., 1999; Kalyta, 2009; Sundaram and Yermack, 2007; Wei and Yermack, 2011). This paper contributes to the literature by showing that incentives created by pension plans affect CEO behavior.

We do not explicitly test whether pro-cyclical retirement incentives are beneficial for the firm, or whether they are an intended or unintended consequence of pension contracts. Our initial evidence suggests SERP-driven pro-cyclical retirement is associated with better governance and positive market reactions. Future iterations of our paper might examine whether pro-cyclical retirement is beneficial for reputation or succession purposes.

**Appendix: Verifying SERP Classifications**

To verify the accuracy of our SERP classification procedure and provide greater detail about the pension structure of a subsample of firms, we randomly sampled 100 firms, 50 we identified as having a SERP (HASSERP=1) and 50 we identified as having no SERP (HASSERP=0). We selected a random year's statement for each firm from the years where pension data was available. We downloaded a proxy statement for that firm and year (or for the closest year one could be found for that firm) from the SEC EDGAR online database. We checked the pension structure of the CEO for this firm-year by hand to verify the quality of the automated coding and to determine other potentially important aspects of pension structure.

To understand the structure of pensions, we coded whether firms had any of five key types of pension plan on the basis of the proxy statement.

1. A tax-qualified defined contribution pension or a cash balance plan (other than 401(k) plans, which were available at all firms in the sample). Although cash balance plans are a form of defined benefit plan, we have classified them with defined contribution plans since their incentive structure is more similar to that of DC plans.
2. A supplemental defined-contribution plan, deferred compensation, or cash balance plan. Often these were only made available to senior executives. For firms that matched employee pension contributions to qualified cash balance plans or 401(k)'s, the supplemental or deferred compensation plan often had the same matching structure.
3. A traditional ERISA-qualified defined benefit pension plan based on employee final pay. As with the cash balance plans, these are generally available for all employees in the firm.
4. A supplemental defined-benefit plan or SERP based on employee final pay.
5. A suspended or frozen plan. Several firms in the sample had previously maintained a SERP but no longer contributed to it or offered it to new employees. Therefore, they listed the suspended plan but no longer contributed to it or changed its value. This was especially common for firms that had small SERPs, especially those for which the SERP was only a small part of the executive.

Of the 50 firms with HASSERP=1, 10% do not have a SERP or a defined-benefit pension plan; of the 50 firms with HASSERP=0, only 14% do have such a plan. This demonstrates that the text classification scheme works reasonable well. Only 88% of the firms with HASSERP=1 describe a basic (qualified) defined benefit pension plan, and many of the remainder also have such a plan for their regular employees which executives do not participate in. It is also notable that 11% of the firms in this sample have a suspended plan.

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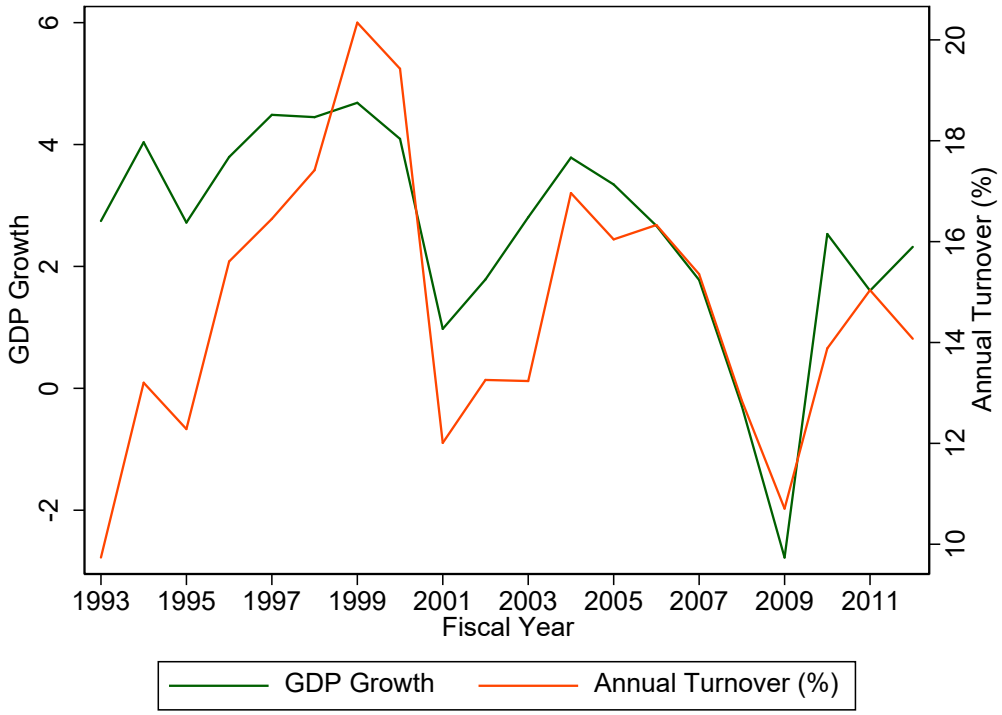
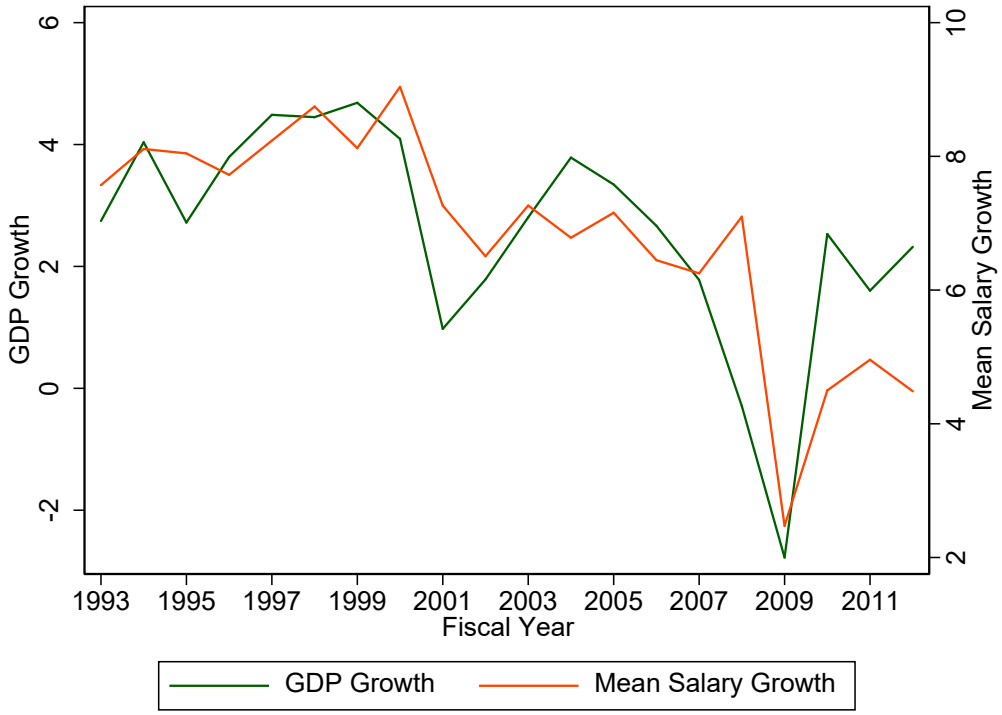
**Figure 1: CEO Turnover and the Business Cycle**




This figure plots the change in GDP Growth and CEO Turnover rates over time. The left axis is GDP growth. The right axis is the percent annual turnover. Annual Turnover (%) is calculated by dividing the fraction of ExecuComp CEOs in their final year by the total number of ExecuComp CEOs in that year.

**Figure 2: Salary Growth and the Business Cycle**




This figure plots the change in GDP Growth and CEO Salary Growth rates over time. The left axis is GDP growth. The right axis is the average salary growth. Mean Salary Growth is calculated as the average percentage point increase in salary for ExecuComp CEOs in a given year.

**Figure 3: Cumulative Excess Returns around Retirement Announcements**


Event study of cumulative excess returns around retirement announcement dates. CAPM of stock returns on the value-weighted stock return index are calculated using a window from 270 to 20 trading days before the announcement date, and excess returns are calculated in a window of -/+20 trading days around the announcement date. Sample limited to CEOs who depart above age 60, have a tenure of at least 365 days, and whose departure is described as unforced in contemporaneous news coverage.

## Table 1: Descriptive Statistics

*Panel A: CEO and Pension Characteristics*

| | N | Mean | Std Dev | P25 | P50 | P75 |
|---|---|---|---|---|---|---|
| CEO Age | 22,035 | 55.6 | 7.60 | 51 | 56 | 60 |
| Age ≥ 65 | 22,035 | 0.102 | 0.302 | 0 | 0 | 0 |
| Final Year | 22,035 | 0.115 | 0.320 | 0 | 0 | 0 |
| Has a Pension | 22,035 | 0.411 | 0.492 | 0 | 0 | 1 |
| Has a SERP | 22,035 | 0.263 | 0.440 | 0 | 0 | 1 |
| SERP Size | 22,035 | 0.197 | 0.322 | 0 | 0 | 0.348 |
| Total Pension Value ($000s) | 9,474 | 2,405 | 6,482 | 0 | 0 | 1,225 |
| SERP Value ($000s) | 9,454 | 1,397 | 5,161 | 0 | 0 | 0 |

This panel presents summary statistics of CEO pension data for a sample of 22,035 firm years from 1993-2012. *CEO Age* is the age of the acting CEO as of fiscal year end. *Age ≥ 65* is an indicator variable equal to 1 if the *CEO Age* is greater than or equal to 65, 0 otherwise. *Final Year* is an indicator variable equal to 1 for a fiscal year in which there is a CEO turnover event, 0 otherwise. *Has a Pension* is equal to 1 if the annual proxy reports pension details for any of the firm sample years, 0 otherwise. *Has a SERP* is equal to 1 if we identify a CEO as having a SERP for any firm sample year, 0 otherwise. *Total Pension Value* is the total recorded pension value for the CEO at a given fiscal year, 2006 or after. *SERP Value* is the estimated value of the CEOs SERP for a given fiscal year, 2006 or after. SERP and Pension variables are coded using the name of each plan from ExecuComp.

*Panel B: Firm Characteristics*

| | Mean | Std. Dev. | P25 | P50 | P75 |
|---|---|---|---|---|---|
| Total Assets ($mm) | 6,324 | 14,073 | 540 | 1,550 | 4,973 |
| Market Value ($mm) | 6492 | 20935 | 573 | 1482 | 4349 |
| Book-to-Market | 0.681 | 0.290 | 0.466 | 0.681 | 0.892 |
| Sales ($mm) | 4,432 | 9,050 | 492 | 1292 | 3903 |
| Excess Return | 0.093 | 0.664 | -0.201 | 0.007 | 0.244 |
| Return-on-Assets | 0.155 | 0.120 | 0.091 | 0.143 | 0.212 |
| Firm Start Year | 1978 | 17.0 | 1962 | 1984 | 1993 |
| # Anti-Shareholder Provisions (GIM) | 9.00 | 2.45 | 7.25 | 9.00 | 10.63 |

This panel provides summary firm characteristics for a sample of 22,035 firm-years from 1993-2012. *Total Assets* is the total book value of assets reported as of the fiscal year-end. *Market Value* is the total market value of equity as of the fiscal year-end. *Book-to-Market* is equal to the total book value of assets divided by the sum of the book value of debt and market value of equity as of fiscal year-end. *Excess Return* is the difference between firm annual return and value-weighted S&P500 return for the fiscal year. *Return-on-Assets* is equal to the firms operating income for a fiscal year divided by the average of the beginning and ending book value of assets. *Firm Start Year* is the first year firms appear in Compustat, which begins in 1950. Therefore, it is left-truncated, making the mean upward-biased but the median correct. *#Anti-Shareholder Provisions* is from Gompers et al. (2003) and counts the number of anti-shareholder rules in corporate regulations and bylaws.

*Panel C: Non-SERP versus SERP Firms*

| | No SERP | | | SERP | | |
|---|---|---|---|---|---|---|
| | Mean | SD | P50 | Mean | SD | P50 |
| Age | 55.3 | 7.94 | 55 | 56.6 | 6.44 | 57 |
| Log(Assets) | 7.13 | 1.57 | 7.00 | 8.34 | 1.48 | 8.29 |
| Log(Market Value) | 7.18 | 1.56 | 7.06 | 8.00 | 1.48 | 7.95 |
| Book-to-Market | 0.656 | 0.301 | 0.645 | 0.753 | 0.244 | 0.774 |
| Return-on-Assets | 0.157 | 0.131 | 0.147 | 0.147 | 0.084 | 0.135 |
| # Anti-Shareholder Provisions | 8.58 | 2.37 | 8.57 | 10.01 | 2.34 | 10 |
| | | | | | | |
| Pension Value ($) | 664 | 3,372 | 0 | 7,856 | 9,937 | 4,545 |
| Firm Start Year | 1982.0 | 15.5 | 1986 | 1967.1 | 17.3 | 1961 |

This panel presents summary statistics for firms that grant SERPs versus firms that do not provide SERPs to their CEOs. Firms are classified as having a SERP if they have a SERP available in any year. This panel includes data on firms where it is possible to measure SERP status; i.e. firms appearing after 2006. *CEO Age* is the age of the acting CEO as of fiscal year end. *Total Assets* is the total book value of assets reported as of the fiscal year-end. *Market Value* is the total market value of equity as of the fiscal year-end. *Return-on-Assets* is equal to the firms reported operating income for a fiscal year divided by the average of the beginning book value of assets. *Sales* is the total reported sales as of fiscal year-end. *#Anti-Shareholder Provisions* is from Gompers et al. (2003) and counts the number of anti-shareholder rules in corporate regulations and bylaws; see Section 5. *Pension Value* is the total recorded pension value for the CEO at a given fiscal year end. SERP and Pension variables are coded using the name of each plan from ExecuComp. *Firm Start Year* is the first year firms appear in Compustat, which begins in 1950. Therefore, it is left-truncated, making the mean upward-biased but the median correct.

## Table 2: CEO Turnover and GDP Growth: The Effect of Age and SERPs

| VARIABLES | (1) Final Year | (2) Final Year | (3) Final Year | (4) Final Year |
|---|---|---|---|---|
| Excess Return | -0.054*** | -0.042*** | -0.059*** | -0.047*** |
| | (-11.41) | (-8.12) | (-11.50) | (-8.43) |
| Age≥65 | 0.080*** | 0.072*** | 0.081*** | 0.072*** |
| | (4.85) | (4.01) | (4.85) | (3.99) |
| SERP Size | -0.051*** | -0.059*** | -0.051*** | -0.062*** |
| | (-5.67) | (-6.04) | (-5.52) | (-6.07) |
| SERP Size*(Age≥65) | 0.004 | 0.030 | 0.004 | 0.030 |
| | (0.09) | (0.58) | (0.09) | (0.59) |
| *GDP Growth*(Age≥65)* | 0.010* | 0.011** | 0.009* | 0.011** |
| | (1.82) | (2.03) | (1.77) | (2.03) |
| *GDP Growth*SERP Size* | 0.009*** | 0.009*** | 0.009*** | 0.009*** |
| | (3.22) | (2.90) | (2.92) | (2.95) |
| *GDP Growth*SERP Size*(Age≥65)* | 0.037** | 0.039** | 0.037** | 0.037** |
| | (2.39) | (2.27) | (2.38) | (2.21) |
| Observations | 22,035 | 19,752 | 22,035 | 19,752 |
| R-squared | 0.026 | 0.031 | 0.034 | 0.040 |
| Year & Sector FEs | X | X | X | X |
| Firm Controls | | X | | X |
| Year X Sector FEs | | | X | X |

This table tests the effect of SERPs on CEO turnover events for a sample of firm-years from 1993 to 2012 that excludes acquisition years. The dependent variable in all specifications is an indicator variable equal to 1 in the final year of a CEO's tenure, 0 otherwise. *Excess Return* is the difference between firm returns and value-weighted S&P500 returns. The variable *Age≥65* is an indicator equal to 1 when the CEO's age is greater than or equal to 65, 0 otherwise. *SERP Size* is calculated as the average fraction of the CEOs total pension represented by the SERP for all firm-years where SERP data is available. It is set to 0 for firms without a SERP; observations where it is calculated to be greater than 1 are dropped. *GDP Growth* is the percentage change in real gross domestic product for a given fiscal year. Real GDP growth data is from the BEA. Firm controls include *Log(Total Assets)*, *Book-to-Market*, *Return-on-Assets*, and *Log(Sales)* by year. Standard errors are clustered at the firm level. Robust t-statistics are in parentheses. ***, **, * denote significance levels of 0.01, 0.05, and 0.10, respectively.

## Table 3: GDP Growth, CEO Turnover, and the Effect of SERPs: Robustness

*Panel A: Additional Controls*

| VARIABLES | (1) Final Year | (2) Final Year |
|---|---|---|
| Excess Return | -0.059*** | -0.047*** |
| | (-11.61) | (-8.52) |
| SERP Size | -0.048*** | -0.057*** |
| | (-5.14) | (-5.68) |
| SERP Size*(Age≥65) | -0.014 | 0.005 |
| | (-0.30) | (0.10) |
| *GDP Growth*SERP Size* | 0.008*** | 0.009*** |
| | (2.74) | (2.75) |
| *GDP Growth*SERP Size*(Age≥65)* | 0.037** | 0.039** |
| | (2.21) | (2.22) |
| Observations | 22,035 | 19,752 |
| R-squared | 0.037 | 0.043 |
| Year & Sector FEs | X | X |
| Year X Sector FEs | X | X |
| GDP Growth X (Age≥65) X Sector Controls | X | X |
| Firm Controls | | X |

This table tests the effect of SERPs on CEO turnover events for a sample of firm-years from 1993 to 2012 that excludes acquisition years. The dependent variable in all specifications is an indicator variable equal to 1 in the final year of a CEO's tenure, 0 otherwise. *Excess Return* is the difference between firm returns and value-weighted S&P500 returns. The variable *Age≥65* is an indicator equal to 1 when the CEO's age is greater than or equal to 65, 0 otherwise. *SERP Size* is calculated as the average fraction of the CEOs total pension represented by the SERP for all firm-years where SERP data is available. It is set to 0 for firms without a SERP; observations where it is calculated to be greater than 1 are dropped. *GDP Growth* is the percentage change in real gross domestic product for a given fiscal year. Real GDP growth data is from the BEA. Firm controls include *Log(Total Assets)*, *Book-to-Market*, *Return-on-Assets*, and *Log(Sales)* by year. Each specification includes the triple interaction *GDP Growth*(Age≥65)**Sector indicators along with all lower-order interaction terms. Standard errors are clustered at the firm level. Robust t-statistics are in parentheses. ***, **, * denote significance levels of 0.01, 0.05, and 0.10, respectively.

*Panel B: Alternative Measure of Cyclicality using S&P 500 Returns*

| VARIABLES | (1) Final Year | (2) Final Year | (3) Final Year | (4) Final Year |
|---|---|---|---|---|
| Excess Return | -0.054*** | -0.042*** | -0.059*** | -0.047*** |
| | (-11.45) | (-8.12) | (-11.56) | (-8.47) |
| Age≥65 | 0.107*** | 0.103*** | 0.107*** | 0.103*** |
| | (9.04) | (8.10) | (8.98) | (8.00) |
| SERP Size | -0.032*** | -0.041*** | -0.033*** | -0.042*** |
| | (-4.69) | (-5.43) | (-4.77) | (-5.52) |
| SERP Size*(Age≥65) | 0.072** | 0.107*** | 0.071** | 0.105*** |
| | (2.10) | (2.76) | (2.09) | (2.73) |
| *S&P500 Return*(Age≥65)* | -0.051 | -0.049 | -0.050 | -0.046 |
| | (-1.00) | (-0.91) | (-0.97) | (-0.85) |
| *S&P500 Return*SERP Size* | 0.027 | 0.022 | 0.030 | 0.033 |
| | (0.87) | (0.68) | (0.91) | (0.97) |
| *S&P500 Return*SERP Size*(Age≥65)* | 0.353** | 0.302** | 0.349** | 0.288* |
| | (2.48) | (1.98) | (2.46) | (1.89) |
| Observations | 22,035 | 19,752 | 22,035 | 19,752 |
| R-squared | 0.025 | 0.030 | 0.034 | 0.039 |
| Year & Sector FEs | X | X | X | X |
| Firm Controls | | X | | X |
| Year X Sector FEs | | | X | X |

This table tests the effect of SERPs on CEO turnover events for a sample of firm-years from 1993 to 2012 that excludes acquisition years. The dependent variable in all specifications is an indicator variable equal to 1 in the final year of a CEO's tenure, 0 otherwise. *Excess Return* is the difference between firm returns and value-weighted S&P500 returns. The variable *Age≥65* is an indicator equal to 1 when the CEO's age is greater than or equal to 65, 0 otherwise. *SERP Size* is calculated as the average fraction of the CEOs total pension represented by the SERP for all firm-years where SERP data is available. It is set to 0 for firms without a SERP; observations where it is calculated to be greater than 1 are dropped. *S&P500 Return* is the value-weighted S&P500 return for the calendar year. Firm controls include *Log(Total Assets)*, *Book-to-Market*, *Return-on-Assets*, and *Log(Sales)* by year. Standard errors are clustered at the firm level. Robust t-statistics are in parentheses. ***, **, * denote significance levels of 0.01, 0.05, and 0.10, respectively.

*Panel C: Instrumental Variables Approach*

| VARIABLES | (1)<br>Final Year | (2)<br>Final Year | (3)<br>Final Year | (4)<br>Final Year |
|---|---|---|---|---|
| *SERP Size* | 0.605*** | 0.264 | 0.064*** | 0.011 |
| | (3.30) | (1.46) | (2.60) | (0.43) |
| Constant | 0.131*** | 0.161*** | 0.078*** | 0.111*** |
| | (3.69) | (5.74) | (12.12) | (20.47) |
| Observations | 1,080 | 1,158 | 8,977 | 10,784 |
| Age | ≥65 | ≥65 | <65 | <65 |
| Growth | High | Low | High | Low |

This panel uses a two-stage least squares approach to test the effect of SERPs on CEO turnover events for a sample of firm-years from 1993 to 2012 that excludes acquisition years. In all specifications, the instrument is the firm's first year of appearance on Compustat (or 1950, whichever is latest) and the endogenous variable *SERP Size*. The second-stage dependent variable in all specifications is an indicator variable equal to 1 in the final year of a CEO's tenure, 0 otherwise. Columns (1) and (2) limit the sample to CEOs whose age is greater than or equal to 65. Columns (3) and (4) limit the sample to CEOs whose age is less than 65. Columns (1) and (3) limit the sample to firm-years where *GDP Growth* is greater than or equal to median of 2.72%. Columns (2) and (4) limit the sample to firm-years where *GDP Growth* is less than median of 2.72%. Real GDP growth data is from the BEA. All other data is from Compustat. Robust t-statistics are in parentheses. ***, **, * denote significance levels of 0.01, 0.05, and 0.10, respectively.

## Table 4: The Effect of SERPs: Long- versus Short-Tenured CEOs

*Panel A: Long-Tenured CEOs*

| VARIABLES | (1) Final Year | (2) Final Year | (3) Final Year | (4) Final Year |
|---|---|---|---|---|
| Excess Return | -0.045*** | -0.035*** | -0.047*** | -0.037*** |
| | (-7.42) | (-5.27) | (-7.00) | (-5.09) |
| Age≥65 | 0.063*** | 0.051*** | 0.064*** | 0.052*** |
| | (3.68) | (2.76) | (3.76) | (2.84) |
| SERP Size | -0.032** | -0.062*** | -0.033** | -0.066*** |
| | (-2.38) | (-4.16) | (-2.38) | (-4.29) |
| SERP Size*(Age≥65) | -0.032 | 0.006 | -0.033 | 0.006 |
| | (-0.71) | (0.12) | (-0.74) | (0.13) |
| *GDP Growth*(Age≥65)* | 0.009* | 0.012** | 0.008 | 0.011* |
| | (1.66) | (2.01) | (1.51) | (1.91) |
| *GDP Growth*SERP Size* | 0.012*** | 0.013*** | 0.012*** | 0.014*** |
| | (2.71) | (2.84) | (2.60) | (2.99) |
| *GDP Growth* SERP Size*(Age≥65)* | 0.040** | 0.038** | 0.040** | 0.037** |
| | (2.46) | (2.13) | (2.48) | (2.12) |
| Observations | 13,238 | 11,838 | 13,238 | 11,838 |
| R-squared | 0.023 | 0.029 | 0.038 | 0.044 |
| Year & Sector FEs | X | X | X | X |
| Firm Controls | | X | | X |
| Year X Sector FEs | | | X | X |

*Panel B: Short-Tenured CEOs*

| VARIABLES | (1) Final Year | (2) Final Year | (3) Final Year | (4) Final Year |
|---|---|---|---|---|
| Excess Return | -0.068*** | -0.052*** | -0.078*** | -0.062*** |
| | (-9.58) | (-6.78) | (-10.16) | (-7.43) |
| Age≥65 | 0.191*** | 0.196*** | 0.191*** | 0.194*** |
| | (3.10) | (2.89) | (3.03) | (2.79) |
| SERP Size | -0.078*** | -0.060*** | -0.079*** | -0.062*** |
| | (-6.15) | (-4.39) | (-5.80) | (-4.24) |
| SERP Size*(Age≥65) | 0.296 | 0.330 | 0.280 | 0.321 |
| | (1.36) | (1.35) | (1.25) | (1.29) |
| *GDP Growth*(Age≥65)* | 0.011 | 0.006 | 0.009 | 0.005 |
| | (0.52) | (0.29) | (0.44) | (0.20) |
| *GDP Growth*SERP Size* | 0.007* | 0.005 | 0.007* | 0.006 |
| | (1.88) | (1.25) | (1.65) | (1.28) |
| *GDP Growth* SERP Size*(Age≥65)* | -0.062 | -0.051 | -0.054 | -0.045 |
| | (-1.00) | (-0.73) | (-0.85) | (-0.63) |
| Observations | 8,797 | 7,914 | 8,797 | 7,914 |
| R-squared | 0.047 | 0.062 | 0.064 | 0.080 |
| Year & Sector FEs | X | X | X | X |
| Firm Controls | | X | | X |
| Year X Sector FEs | | | X | X |

This table tests the effect of SERPs on CEO turnover events for a sample of firm-years from 1993 to 2012 that excludes acquisition years. The dependent variable in all specifications is an indicator variable equal to 1 in the final year of a CEO's tenure, 0 otherwise. Excess Return is the difference between firm returns and value-weighted S&P500 returns. The variable *Age≥65* is an indicator equal to 1 when the CEO's age is greater than or equal to 65, 0 otherwise. *SERP Size* is calculated as the average fraction of the CEOs total pension represented by the SERP for all firm-years where SERP data is available. It is set to 0 for firms without a SERP; observations where it is calculated to be greater than 1 are dropped. *GDP Growth* is the percentage change in real gross domestic product for a given fiscal year. Real GDP growth data is from the BEA. The specifications in Panel A include firm-years in which the current CEO has held the position for at least 5 years. The specifications in Panel B include firm-years in which the current CEO has held the position for less than 5 years. Firm controls include *Log(Total Assets)*, *Book-to-Market*, *Return-on-Assets*, and *Log(Sales)* by year. Standard errors are clustered at the firm level. Robust t-statistics are in parentheses. ***, **, * denote significance levels of 0.01, 0.05, and 0.10, respectively.

## Table 5: CEO Turnover and the Main Effect of GDP Growth

| VARIABLES | (1)<br>Final Year | (2)<br>Final Year | (3)<br>Final Year |
|---|---|---|---|
| Excess Return | -0.042*** | -0.041*** | -0.041*** |
| | (-8.23) | (-8.20) | (-8.16) |
| Age≥65 | 0.122*** | 0.079*** | 0.071*** |
| | (11.82) | (4.91) | (4.02) |
| SERP Size | | | -0.063*** |
| | | | (-6.45) |
| SERP Size*(Age≥65) | | | 0.031 |
| | | | (0.62) |
| *GDP Growth* | 0.002** | 0.001 | -0.000 |
| | (2.11) | (0.78) | (-0.17) |
| *GDP Growth*(Age≥65)* | | 0.018*** | 0.011** |
| | | (3.40) | (2.01) |
| *GDP Growth*SERP Size* | | | 0.008*** |
| | | | (2.73) |
| *GDP Growth*SERP Size*(Age≥65)* | | | 0.038** |
| | | | (2.26) |
| Observations | 19,752 | 19,752 | 19,752 |
| R-squared | 0.025 | 0.026 | 0.029 |
| Sector FEs | X | X | X |
| Firm Controls | X | X | X |

This table tests the effect of GDP Growth on CEO turnover events for a sample of firm-years from 1993 to 2012 that excludes acquisition years. The dependent variable in all specifications is an indicator variable equal to 1 in the final year of a CEO's tenure, 0 otherwise. *Excess Return* is the difference between firm returns and value-weighted S&P500 returns. The variable *Age≥65* is an indicator equal to 1 when the CEO's age is greater than or equal to 65, 0 otherwise. *SERP Size* is calculated as the average fraction of the CEOs total pension represented by the SERP for all firm-years where SERP data is available. It is set to 0 for firms without a SERP; observations where it is calculated to be greater than 1 are dropped. *GDP Growth* is the percentage change in real gross domestic product for a given fiscal year. Real GDP growth data is from the BEA. Firm controls include *Log(Total Assets)*, *Book-to-Market*, *Return-on-Assets*, and *Log(Sales)* by year. Standard errors are clustered at the firm level. Robust t-statistics are in parentheses. ***, **, * denote significance levels of 0.01, 0.05, and 0.10, respectively.

## Table 6: The Effect of SERPs: Well- versus Poorly-Governed Firms

*Panel A: Well-Governed Firms*

| VARIABLES | (1) Final Year | (2) Final Year | (3) Final Year | (4) Final Year |
|---|---|---|---|---|
| Excess Return | -0.058*** | -0.046*** | -0.064*** | -0.053*** |
| | (-10.11) | (-7.30) | (-10.28) | (-7.63) |
| Age≥65 | 0.085*** | 0.078*** | 0.085*** | 0.078*** |
| | (4.42) | (3.80) | (4.39) | (3.77) |
| SERP Size | -0.042*** | -0.047*** | -0.041*** | -0.045*** |
| | (-2.94) | (-2.89) | (-2.83) | (-2.75) |
| SERP Size*(Age≥65) | -0.039 | -0.024 | -0.036 | -0.021 |
| | (-0.71) | (-0.42) | (-0.64) | (-0.36) |
| *GDP Growth*(Age≥65)* | 0.004 | 0.005 | 0.004 | 0.005 |
| | (0.61) | (0.80) | (0.57) | (0.78) |
| *GDP Growth*SERP Size* | 0.003 | 0.001 | 0.002 | -0.000 |
| | (0.64) | (0.14) | (0.47) | (-0.01) |
| *GDP Growth*SERP Size*(Age≥65)* | 0.041** | 0.045** | 0.039** | 0.044** |
| | (2.27) | (2.51) | (2.18) | (2.41) |
| Observations | 13,595 | 12,224 | 13,595 | 12,224 |
| R-squared | 0.025 | 0.029 | 0.036 | 0.041 |
| Year & Sector FEs | X | X | X | X |
| Firm Controls | | X | | X |
| Year X Sector FEs | | | X | X |

*Panel B: Poorly-Governed Firms*

| VARIABLES | (1) Final Year | (2) Final Year | (3) Final Year | (4) Final Year |
|---|---|---|---|---|
| Excess Return | -0.047*** | -0.034*** | -0.049*** | -0.037*** |
| | (-5.61) | (-3.78) | (-5.48) | (-3.82) |
| Age≥65 | 0.074** | 0.058* | 0.075** | 0.057 |
| | (2.37) | (1.65) | (2.32) | (1.57) |
| SERP Size | -0.057*** | -0.064*** | -0.054*** | -0.066*** |
| | (-4.41) | (-4.76) | (-4.17) | (-4.87) |
| SERP Size*(Age≥65) | 0.056 | 0.106 | 0.048 | 0.105 |
| | (0.74) | (1.09) | (0.63) | (1.08) |
| *GDP Growth*(Age≥65)* | 0.021** | 0.026** | 0.022** | 0.026** |
| | (2.12) | (2.32) | (2.08) | (2.36) |
| *GDP Growth*SERP Size* | 0.013*** | 0.013*** | 0.012*** | 0.014*** |
| | (3.14) | (3.04) | (2.65) | (3.01) |
| *GDP Growth*SERP Size*(Age≥65)* | 0.026 | 0.021 | 0.028 | 0.020 |
| | (0.94) | (0.61) | (1.02) | (0.59) |
| Observations | 8,440 | 7,528 | 8,440 | 7,528 |
| R-squared | 0.035 | 0.043 | 0.055 | 0.066 |
| Year & Sector FEs | X | X | X | X |
| Firm Controls | | X | | X |
| Year X Sector FEs | | | X | X |

This table tests the effect of SERPs on CEO turnover events for a sample of firm-years from 1993 to 2012 that excludes acquisition years. The dependent variable in all specifications is an indicator variable equal to 1 in the final year of a CEO's tenure, 0 otherwise. *Excess Return* is the difference between firm returns and value-weighted S&P500 returns. The variable *Age≥65* is an indicator equal to 1 when the CEO's age is greater than or equal to 65, 0 otherwise. *SERP Size* is calculated as the average fraction of the CEOs total pension represented by the SERP for all firm-years where SERP data is available. It is set to 0 for firms without a SERP; observations where it is calculated to be greater than 1 are dropped. *GDP Growth* is the percentage change in real gross domestic product for a given fiscal year. Real GDP growth data is from the BEA. The specifications in Panel A (*Well-Governed Firms*) include firms with 9 or fewer anti-shareholder provisions according to Gompers, Ishii, and Metrick (2003). The specifications in Panel B (*Poorly-Governed Firms*) include firms with more than 9 anti-shareholder provisions. Firm controls include *Log(Total Assets)*, *Book-to-Market*, *Return-on-Assets*, and *Log(Sales)* by year. Standard errors are clustered at the firm level. Robust t-statistics are in parentheses. ***, **, * denote significance levels of 0.01, 0.05, and 0.10, respectively.

## Table 7: Departure Announcement Returns, by SERP

| | (1) SERP | (2) No SERP |
|---|---|---|
| Cumulative Abnormal Return (0, +10) | -0.015 | 0.025** |
| | (-1.21) | (2.31) |
| Observations | 110 | 171 |

This table has univariate analyses of cumulative abnormal returns around retirement announcements. CAPM of stock returns on the value-weighted stock return index are calculated using a window from 270 to 20 trading days before the announcement date, and excess returns are calculated for the 10 day window following the announcement. The returns are limited to announcements where CEOs depart above age 60, have a tenure of at least 365 days, and whose departure is described as unforced in contemporaneous news coverage. Column 1 reports the average cumulative abnormal return following announcements for CEOs with SERPs. Column 2 reports the average cumulative abnormal return following announcements for CEOs without SERPs. T-statistics for the significance from zero of mean cumulative abnormal returns are reported in parentheses. ***, **, * denote significance levels of 0.01, 0.05, and 0.10, respectively.

## Table 8: GDP Growth and CEO Turnover: Alternative Explanations

*Panel A: Portfolio Values and CEO Turnover*

| VARIABLES | (1) Final Year | (2) Final Year | (3) Final Year | (4) Final Year |
|---|---|---|---|---|
| Excess Return | 0.019*** | 0.027*** | 0.015** | 0.023*** |
| | (2.70) | (3.47) | (1.97) | (2.84) |
| Age≥65 | 0.081*** | 0.084*** | 0.082*** | 0.085*** |
| | (4.94) | (4.83) | (4.95) | (4.87) |
| *ΔLog(Portfolio Value)* | -0.101*** | -0.114*** | -0.102*** | -0.115*** |
| | (-14.12) | (-14.47) | (-14.20) | (-14.55) |
| *ΔLog(Portfolio Value)*(Age≥65)* | 0.034** | 0.033* | 0.035** | 0.035* |
| | (1.98) | (1.83) | (2.06) | (1.91) |
| Lagged Log(Portfolio Value) | -0.016*** | -0.025*** | -0.016*** | -0.025*** |
| | (-8.85) | (-10.95) | (-8.76) | (-11.04) |
| SERP Size | -0.033*** | -0.059*** | -0.037*** | -0.063*** |
| | (-3.47) | (-5.70) | (-3.79) | (-6.00) |
| SERP Size*(Age≥65) | -0.006 | 0.025 | -0.006 | 0.024 |
| | (-0.12) | (0.47) | (-0.13) | (0.47) |
| *GDP Growth*(Age≥65)* | 0.009 | 0.010* | 0.008 | 0.010* |
| | (1.57) | (1.67) | (1.54) | (1.67) |
| *GDP Growth*SERP Size* | 0.007** | 0.008** | 0.009*** | 0.011*** |
| | (2.26) | (2.46) | (2.79) | (3.13) |
| *GDP Growth*SERP Size*(Age≥65)* | 0.040** | 0.040** | 0.039** | 0.038** |
| | (2.40) | (2.22) | (2.36) | (2.12) |
| Observations | 16,936 | 15,160 | 16,936 | 15,160 |
| R-squared | 0.046 | 0.054 | 0.057 | 0.066 |
| Year & Sector FEs | X | X | X | X |
| Firm Controls | | X | | X |
| Year X Sector FEs | | | X | X |

This table tests the effect of SERPs on CEO turnover events for a sample of firm-years from 1993 to 2012 that excludes acquisition years. The dependent variable in all specifications is an indicator variable equal to 1 in the final year of a CEO's tenure, 0 otherwise. *Excess Return* is the difference between firm returns and value-weighted S&P500 returns. The variable *Age≥65* is an indicator equal to 1 when the CEO's age is greater than or equal to 65, 0 otherwise. *ΔLog(Portfolio Value)* is the log change in total value of the CEOs portfolio of stock and options, multiplied by 100. *Lagged Log(Portfolio Value)* is the log of the total value of the CEOs portfolio of stock and options at the beginning of the fiscal year. *SERP Size* is calculated as the average fraction of the CEOs total pension represented by the SERP for all firm-years where SERP data is available. It is set to 0 for firms without a SERP; observations where it is calculated to be greater than 1 are dropped. *GDP Growth* is the percentage change in real gross domestic product for a given fiscal year. Real GDP growth data is from the BEA. Firm controls include *Log(Total Assets)*, *Book-to-Market*, *Return-on-Assets*, and *Log(Sales)* by year. Standard errors are clustered at the firm level. Robust t-statistics are in parentheses. ***, **, * denote significance levels of 0.01, 0.05, and 0.10, respectively.

*Panel B: M&A Activity*

| VARIABLES | (1) Final Year | (2) Final Year | (3) Final Year | (4) Final Year |
|---|---|---|---|---|
| Excess Return | -0.051*** | -0.040*** | -0.056*** | -0.045*** |
| | (-11.53) | (-8.15) | (-11.67) | (-8.57) |
| Age≥65 | 0.078*** | 0.070*** | 0.078*** | 0.070*** |
| | (4.71) | (3.93) | (4.71) | (3.90) |
| Merger | 0.053*** | 0.060*** | 0.053*** | 0.060*** |
| | (4.52) | (4.73) | (4.53) | (4.75) |
| Merger*(Age≥65) | 0.056 | 0.083 | 0.054 | 0.082 |
| | (1.05) | (1.41) | (1.03) | (1.40) |
| *GDP Growth*Merger* | -0.010*** | -0.013*** | -0.010*** | -0.013*** |
| | (-2.79) | (-3.23) | (-2.81) | (-3.30) |
| *GDP Growth*Merger*(Age≥65)* | -0.010 | -0.024 | -0.010 | -0.023 |
| | (-0.62) | (-1.30) | (-0.59) | (-1.24) |
| SERP Size | -0.049*** | -0.055*** | -0.048*** | -0.057*** |
| | (-5.46) | (-5.64) | (-5.26) | (-5.61) |
| SERP Size*(Age≥65) | 0.029 | 0.048 | 0.028 | 0.048 |
| | (0.57) | (0.88) | (0.57) | (0.89) |
| *GDP Growth*(Age≥65)* | 0.010* | 0.012** | 0.010* | 0.012** |
| | (1.93) | (2.18) | (1.92) | (2.22) |
| *GDP Growth*SERP Size* | 0.009*** | 0.008*** | 0.008*** | 0.009*** |
| | (3.16) | (2.90) | (2.88) | (2.92) |
| *GDP Growth*SERP Size*(Age≥65)* | 0.031* | 0.032* | 0.031* | 0.031* |
| | (1.88) | (1.81) | (1.88) | (1.77) |
| Observations | 25,830 | 23,123 | 25,830 | 23,123 |
| R-squared | 0.027 | 0.032 | 0.034 | 0.040 |
| Year & Sector FEs | X | X | X | X |
| Firm Controls | | X | | X |
| Year X Sector FEs | | | X | X |

This table tests the effect of SERPs on CEO turnover events for a sample of firm-years from 1993 to 2012, including acquisition years. The dependent variable in all specifications is an indicator variable equal to 1 in the final year of a CEO's tenure, 0 otherwise. *Excess Return* is the difference between firm returns and value-weighted S&P500 returns. The variable *Age≥65* is an indicator equal to 1 when the CEO's age is greater than or equal to 65, 0 otherwise. *Merger* is an indicator variable equal to 1 if the firm was acquired in a merger during the year, 0 otherwise. *SERP Size* is calculated as the average fraction of the CEOs total pension represented by the SERP for all firm-years where SERP data is available. It is set to 0 for firms without a SERP; observations where it is calculated to be greater than 1 are dropped. *GDP Growth* is the percentage change in real gross domestic product for a given fiscal year. Real GDP growth data is from the BEA. Firm controls include *Log(Total Assets)*, *Book-to-Market*, *Return-on-Assets*, and *Log(Sales)* by year. Standard errors are clustered at the firm level. Robust t-statistics are in parentheses. ***, **, * denote significance levels of 0.01, 0.05, and 0.10, respectively.

*Panel C: Directorship Opportunities*

| | All CEOs | All CEOs | Retire≥65 | Retire≥65 | Retire≥65 (IV) | Retire≥65 (IV) |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| *Departure Year* | -0.015*** | -0.011*** | -0.009* | -0.008 | -0.037** | -0.042** |
| *GDP Growth* | (-4.02) | (-3.01) | (-1.65) | (-1.34) | (-2.07) | (-2.12) |
| $R^2$ | 0.004 | 0.083 | 0.003 | 0.058 | | |
| *n* | 3,719 | 3,424 | 1,069 | 983 | 730 | 686 |
| Sector FE | | X | | X | | X |
| Firm Controls | | X | | X | | X |

This table tests GDP growth as a determinant of new board appointments for retiring CEOs. Columns 1-4 show estimated coefficients from OLS regressions in which the dependent variable is an indicator for whether a CEO began new board service after retirement. The independent variable *Departure Year GDP Growth* is equal to GDP growth in the year that the CEO left the firm. Columns 1 and 2 use the full sample of CEOs and Columns 3 and 4 limit the sample to CEOs who retired at age 65 or above. Columns 5 and 6 show results from a 2SLS specification in which *Departure Year GDP Growth* is instrumented for using GDP growth in the year that the CEO turned 65. Firm controls are *Excess Returns*, *Log(Total Assets)*, *Log(Sales)*, *ROA*, *Book-to-Market,* and sector indicators. GDP data is from the BEA. CEO data is from Compustat. Board service data is from BoardEx. Standard errors are clustered at the firm level. Robust t-statistics are in parentheses. ***, **, * denote significance levels of 0.01, 0.05, and 0.10, respectively.