

**Has the “CEO Effect” Increased in Recent Decades?
A New Explanation for the Great Rise in
America’s Attention to Corporate Leaders**

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ABSTRACT

We introduce a new explanation for one of the most pronounced phenomena on the American business landscape in recent decades: a dramatic increase in attributions of CEO significance. Specifically, we test the possibility that America’s CEOs became seen as increasingly significant because they were, in fact, increasingly significant. Employing variance partitioning methodologies on data spanning 60 years and more than 18,000 firm-years, we find that the proportion of variance in performance explained by individual CEOs, or “the CEO effect,” increased substantially over the decades of study. We discuss the theoretical and practical implications of this finding.

One of the central debates among organizational scholars concerns the question of how much influence executives, particularly chief executive officers (CEOs), have on company outcomes, and correspondingly how much influence they are *seen* as having. This tension about attributions of executive significance is on especially vivid display when one considers the dramatic increase in attention to CEOs that occurred over the latter decades of the twentieth century, at least in the United States. In the 1950s, for instance, CEOs were not particularly noteworthy. They were seen as “bland,” “interchangeable,” “organization men” (summarized in Khurana, 2002; Whyte, 1956); almost all of them were appointed only after decades of steady ascendance in their firms; they were rarely fired; and their pay, primarily a simple salary, was only slightly more than for the executives who reported directly to them (Frydman & Saks, 2010; Vancil, 1987).

By the 1990s, and beyond, CEOs had become imbued with appreciably more importance – or at least a perception of importance. They were prominently featured in the press, with more than a few achieving celebrity status (Hayward, Rindova, & Pollock, 2004). Many were hired as outsiders, with the hopes that they would be change agents (Khurana, 2002). If their firms faltered, CEOs were much more likely to be fired than were earlier predecessors (Kaplan & Minton, 2011; Murphy & Zabochnik, 2004). And their compensation typically totaled several times that of the executives who worked for them (Frydman & Jenter, 2010). In short, between the 1950s and the 2000s, corporate chiefs in the U.S. became seen less as titular figureheads and more as pivotal drivers of (both favorable and unfavorable) firm performance.

We take as a well-documented given that attributions of CEO significance increased greatly in recent decades, and ask: *Why?* A common explanation is that American society – including the media, boards, and other stakeholders – succumbed to the “romance of leadership”

(Meindl, Ehrlich, & Dukerich, 1985), naively bestowing more and more credit (and blame) on CEOs. In this vein, for instance, Khurana (2002:78) commented pejoratively about society's heightened "fixation" on CEOs in recent decades.

But beyond any increased romanticization, which we do not rule out, there is a second possibility: Perhaps America's CEOs became seen as increasingly significant *because they were, in fact, increasingly significant*. Is it possible that CEOs in recent decades had more influence on company outcomes – for good and for ill – than did their earlier postwar counterparts?

To explore this question, we follow those researchers who have used variance partitioning techniques to isolate the proportion of variance in performance that is attributable to CEOs (as opposed to contextual factors), often referred to as "the CEO effect" (e.g., Lieberman & O'Connor, 1972; Crossland & Hambrick, 2011; summarized in Bowman & Helfat, 2001).

Reflecting the long-term nature of our inquiry, we collected a dataset spanning 60 years, 30 industries, and more than 18,000 firm-years. Using two distinct variance partitioning methodologies, and examining multiple performance measures, we find a considerably increased CEO effect, or proportion of variance in performance attributable to CEOs.

As such, we contribute to literature on leader significance by demonstrating that CEO effects can change over time in a given society. Most researchers in this stream have sought to identify a "general" CEO effect, while others have focused on contrasts in CEO effects between industries or countries. But there has been no consideration of the possibility that CEO effects can change systemically over time in a given country. Our study also provides a new, substantive explanation for one of the most pronounced phenomena on the American business landscape in recent decades: a dramatic increase in attributions of CEO significance.

THE POSSIBILITY OF AN INCREASED “CEO EFFECT”

Ever since Lieberman and O’Connor’s (1972) seminal study, researchers have been interested in understanding and measuring “the CEO effect,” or the degree to which company performance is traceable to CEOs as opposed to contextual factors. These scholars acknowledge, on the one hand, the potential for CEOs to influence their firms’ performance – through their strategic decisions, organizational design choices, and leadership behaviors – while also recognizing the constraints that prevent CEOs from having complete leeway in determining their companies’ forms and fates. For these researchers, the question is not *whether* managers matter, but rather *how much* they matter (e.g., Crossland & Hambrick, 2011; Mackey, 2008).

Using large data panels, typically spanning 15-20 years, researchers have used several forms of variance partitioning methodology (VPM) to isolate how much variance in firm-year performance is due to CEOs as opposed to contextual factors, including calendar year (to gauge macroeconomic conditions), industry (some are inherently more munificent than others), and firm (some have stronger health and resources than others). Representative are Crossland and Hambrick’s (2007) findings for their U.S. sample, using sequential ANOVA to partition variance in return on assets (ROA): calendar year=4 percent of variance; industry=12 percent; company=19 percent; CEO=13 percent; and the remaining 52 percent is unexplained.

Beyond an interest in the general magnitudes of CEO effects, researchers also have used VPM to study *differences* in CEO effects across contexts. For instance, Crossland and Hambrick (2007, 2011) found that the CEO effect was far greater for U.S. firms than for Japanese firms, a contrast they traced to cultural differences regarding leeway for individual action, as well as tolerance for uncertainty and risk taking. Similarly, in their early study, Lieberman and O’Connor (1972) showed that the CEO effect varied considerably across industries; it was greater, for

instance, in advertising-intensive industries than in commodity industries, and in high-growth industries than in low-growth industries.

If the CEO effect varies across national or industry settings, it is only reasonable to expect that observers are aware of these differences, and will attach more, or less, significance to CEOs accordingly. In this vein, for instance, CEOs in high-discretion settings – those that allow a great deal of executive leeway and impact – are paid more than CEOs in low-discretion settings; their incentive-based pay is especially greater; and they are much more susceptible to dismissal (Cho & Hambrick, 2006; Crossland & Chen, 2013; Finkelstein & Boyd, 1998).

Following this logic, then, perceptions of leader significance may vary depending on the degree to which CEOs place distinctive marks on their firms. If CEOs have little influence on firm performance, observers will attach little importance to them. If CEOs have substantial impact, observers will be more attentive to them. Accordingly, it is possible that the great rise in attributions of CEO significance over recent decades was due to an increased CEO effect. Thus:

Hypothesis: Among U.S. public corporations over the period 1950-2009, there was an increase in the proportion of variance in performance attributable to individual CEOs.

METHOD

Sample and Data Sources

Following other researchers who have examined CEO effects on firm performance, we used a panel design, sampling selected industries, firms within those industries, and CEOs within those firms (Crossland & Hambrick, 2007; Lieberman & O'Connor, 1972). Given our 60-year timeframe, our sampling procedure required us to acknowledge and balance multiple considerations. First, because we sought to test for an increased CEO effect across the overall U.S. business landscape, it was essential to include a broad and representative array of industries. Second, since new industries can emerge and old ones can shrink or die, it was important – given

our long timeframe – that we allow for industries to enter and leave our sample. Third, at the same time, however, it was ideal to have as much continuity in industry representation as possible, to minimize risks of fallacious comparisons between periods. Fourth, because accurate identification of CEOs required painstaking manual search, especially in the early decades of our timeframe, we could only examine a manageable sample of industries and firms.

These considerations led to a multi-step sampling procedure. Using the Compustat-CRSP database, we started by identifying – for each year between 1950 and 2009 – all the (3-digit SIC) industries that had at least four firms with revenues of at least \$100 million (in 2009 dollars). The minimum of four firms allowed us to reasonably control for industry conditions. We then selected those industries that met the four-firm minimum for at least 10 consecutive years, so as to exclude short-lived industries and (more importantly) to allow extended examination of CEO effects. After excluding financial services, which have distinctive accounting practices, and unclassifiable industries (SICs ending in 99), a total of 198 3-digit industries remained.

To make the sample of industries manageable, as required by our need to carefully identify CEOs, we next generated two random subsamples. Among the 23 industries that were adequately represented for the entire 60-year timeframe (which we label “long-term industries”), we randomly selected 15 for inclusion. Among the other industries that met our thresholds for at least 10 years but not for the complete 60 years, we randomly selected 15 for inclusion.

If an industry consisted of 30 or fewer firms in a given year, all were included in the sample. If there were more than 30 firms, we randomly drew 30 which we retained as long as they were in the CRSP-Compustat database and assigned to the focal industry. If a drawn firm was dropped from the database (through merger, going private, or bankruptcy) or reassigned to

another industry, another randomly drawn firm was added to the sample; to ensure adequate observations for these added firms, we included data on their earlier years as well.

The ultimate sample included 1015 firms across 30 industries, with each industry represented an average of 43 years, for a total of 18,467 firm-years of data. To put our sample in comparative perspective, Lieberman and O'Connor (1972) examined 13 industries over 20 years, and a total of 3340 firm-years; Weiner and Mahoney (1981) examined 193 manufacturing firms over 19 years for a total of 3667 firm-years; and more recently, Crossland and Hambrick's (2007) U.S. sample consisted of eight industries over 13 years, and a total of 1464 firm-years.

Identifying CEOs

We used a variety of sources to identify the CEO for each firm-year. For the years after 1992, we used the Execucomp database, supplemented by company press releases and SEC filings. For 1975 to 1992, we examined press announcements and SEC filings to identify the CEO, who was almost always clearly identified. Prior to the mid-1970s, however, the title of Chief Executive Officer (CEO) was rarely used, so more painstaking efforts were required.

In those earlier decades, the top executive of a firm typically had the title of president (Allen, 1959), but in some cases the chairman of the board was the top executive. Lieberman and O'Connor (1972) faced this same challenge; as a result, they coded a change in leadership any time there was a new president *or* a new chairman, almost certainly introducing considerable error into their coding. Because of our interest specifically in CEOs, we sought to more clearly identify these individuals. Thus, the following process was undertaken to document the top executive in each firm-year prior to 1975. First, the president and chairman of the board were identified for each firm-year, using *Standard and Poor's Register of Corporations, Directors, and Executives*. Each leader was then researched using archival sources, including newspapers,

press releases, and SEC filings. If someone was designated in these sources as “chief executive” or “top executive,” he or she was coded as such. If a chief executive was not clearly indicated, we then turned to newspaper accounts of each leader’s appointment or departure. When the chief executive was designated in media coverage, it was coded as such. Where no such designation was made, the president was assumed to be the top executive. When company accounts or news releases reported more than one CEO in a given year, the individual serving for more than six months was recorded for that year. Our overall sample included 2,732 distinct CEOs.

Measures of Firm Performance

Following prior research, we examined the CEO effect on three measures of firm performance: return on sales (ROS), return on assets (ROA), and market-to-book ratio (MTB) (Crossland & Hambrick, 2011; Lieberman & O’Connor, 1972; Mackey, 2008). ROS was net income divided by total revenues; ROA was net income divided by total assets; MTB was the market value of shareholders’ equity divided by the book value of equity. (We used the natural log of MTB, because this variable was highly skewed.) Data for each measure were collected from the merged CRSP-Compustat database.

Model and Estimation

To isolate the proportion of variance in performance attributable to CEOs, or the “CEO effect,” researchers have employed an array of variance partitioning methodologies (Lieberman & O’Connor, 1972; Weiner & Mahoney, 1981; Mackey, 2008; Crossland & Hambrick, 2007; 2011; summarized in Bowman & Helfat, 2001). Using large data panels, researchers seek to partition variance in firm-year performance among four explanatory factors, essentially operationalized as large sets of dummy variables – for calendar year, industry, firm, and individual CEO. In doing so, researchers are able to ascertain the degree to which CEOs are associated with *distinctive*

levels of performance during their time observed. CEOs' contributions, which might be positive or negative, are "distinctive" to the extent that they a) differ from what would be predicted by contextual factors (year, industry, and firm) and b) are consistent within their tenures, i.e., individual CEOs exhibit hallmark tendencies. The method does not shed light on the specific qualities that cause individual CEOs to make positive or negative contributions, but it is ideal for assessing the overall magnitude of CEO impact, as is our objective.

We used two distinct VPM techniques for assessing the CEO effect. First, we used sequential ANOVA, which, beginning with Lieberman and O'Connor's (1972) study, has been used most frequently in this research stream. Following others who have used sequential ANOVA, we introduced predictors in the following order: year, industry, firm, and CEO, thus fully accounting for contextual influences before assessing CEO effects. Second, following Crossland and Hambrick (2011), we used multi-level modeling (MLM), which has the advantage of explicitly accounting for the nested structure of the data. For the MLM analysis, we specified a four-level nested model: years, within CEOs, within firms, within industries. We used Stata commands *anova* and *xtmixed*, respectively, for the ANOVA and MLM analyses.

RESULTS

Table 1 presents means and standard deviations for each performance indicator, by 20-year period. Consistent with prior reports (Khurana, 2002), average profitability (ROS and ROA) of American firms declined over the periods examined; MTB dipped in the middle period but increased slightly overall. Standard deviations of all three performance metrics increased considerably over time.

We conducted two distinct tests of our hypothesis, which was the expectation of an increased CEO effect over the 60-year timespan. Given that the CEO effect can only be

estimated from a data panel (not for a specific year), our first test was to use sequential ANOVA and MLM analyses to isolate the CEO effect, or proportion of variance explained by individual CEOs, for three distinct 20-year periods: 1950-69 (Period 1), 1970-89 (Period 2), and 1990-2009 (Period 3). Results are shown in Table 2.

 Insert Tables 1 and 2 about here

In support of our hypothesis, the CEO effect increased monotonically from Period 1 to 2 to 3, for each of the three performance metrics (ROS, ROA, MTB), across both ANOVA and MLM analyses (a total of 6 tests). For instance, from the ANOVA analysis of ROS, the CEO effect increased from 4.1% to 10.9% to 16.2%; for MLM, the CEO effect on ROS increased from 8.6% to 20.3% to 26.4%. When these CEO effects (essentially partial r^2 's) are converted to r^2 's, and Fisher's z-test is applied, all the increases between Period 1 and Period 3 were highly significant ($p < .001$), providing strong support for our hypothesis.

These changes in CEO effects were not an artifact of changes in the number of years observed for individual CEOs. Across the three periods, as seen in Table 1, the average CEO duration in our data panel was relatively uniform: 5.4, 5.9, and 5.2 years, respectively. Although researchers have documented an increased rate of CEO dismissals over our period of interest (Kaplan & Minton, 2011; Khurana, 2002), we surmise that at least two countervailing trends – appointment of younger CEOs and elimination of mandatory retirement for CEOs (Vancil, 1987) – meant that overall average tenure lengths did not change very much.

Interestingly, while the CEO effect increased substantially over the three periods, the influence of contextual factors, particularly industry and firm, declined appreciably. We will discuss this more below, but these results indicate that industry membership became far less

determinative of a company's performance, and company performance became far less inertial.¹ The increase in the proportion of variance "unexplained" is no doubt largely due to the great increase in the aggregate amount of variance present, as reported above, as well as to generally increased volatility and unpredictability of business performance, as others have found (e.g., Thomas & D'Aveni, 2009). The key finding for our purposes, however, is that CEOs accounted for a greater proportion of overall variance. Over our observed timespan, individual CEOs – more and more – placed their distinctive marks on the performance of their firms.

As a second test of our hypothesis, we repeated ANOVA and MLM analyses for a series of rolling 20-year periods, rather than for the fixed three-period set-up (e.g., the first period was from 1950-1969, the second was 1951-1970, and the final was 1990-2009). This allowed us to assess, as closely as possible, year-by-year changes in the CEO effect. For conciseness, we calculated – for each of the 41 rolling 20-year periods – the average CEO effect across six analyses: ANOVA and MLM for each of ROS, ROA, and MTB. These averages were then plotted over time as shown in Figure 1. As can be seen, the CEO effect hovered in the 10-12% range for 20-year periods ending before the mid-1980s; it then increased to the 15-17% range for periods ending in the 1990s; and increased to around 20% for all remaining periods. Using simple regression, we calculated the best-fitting trendline through these datapoints (dashed line); results indicated a highly significant positive slope ($p < .001$), again supporting our hypothesis.

¹ We confirmed the extraordinary decline in the influence of industry membership on firm performance by conducting numerous sensitivity tests – winsorizing extreme outliers, selectively dropping industries, etc.; however, the pattern shown was robust to each of these tests. This observed decline is in keeping with some scholars' assertions that many industries have become extremely amorphous in recent decades (Bettis & Hitt, 1995; McGahan & Porter, 2005; McGee & Thomas, 1986; Ruefli & Wiggins, 2003). And it is consistent with evidence that, over the period 1980 to 2000, there was a widespread tendency for company strategies to become more heterogeneous within industries (Hambrick *et al.*, 2005). Similarly, the large decline in the firm effect is consistent with research showing less performance persistence over the period of study (Thomas & D'Aveni, 2009; Wiggins & Ruefli, 2005).

 Insert Figure 1 about here

While not shown in a table, we also repeated the tests of our hypothesis using two revised samples. In the first, we assessed the CEO effect using a sample of just the 15 long-term industries. In the second, acknowledging that single-year CEOs and single-CEO firms can distort the CEO effect (e.g., Mackey, 2008), we repeated the analysis after eliminating those cases. Patterns and magnitudes of results were virtually unchanged from what we report here.²

DISCUSSION

Our study provides a new vantage for understanding the considerable increase in attributions of CEO significance that occurred in recent decades. Our findings suggest that perceptions of increased CEO influence might be explained, at least in part, by an increase in actual CEO influence. Across multiple performance measures, we show that the effects of individual chief executives on company outcomes rose considerably over the period 1950-2009.

Although it is beyond our scope to develop theory for why such an increase might have occurred, it is useful to consider potential drivers of this pattern. We will briefly highlight three shifts that may have contributed to the increased CEO effect we have documented.

First, the period immediately following World War II, roughly 1950-1970, was an era of stability and steady growth, during which executives were oriented toward balancing the needs

² It would be ideal to study CEOs who move across firms, as this would allow better insights on CEO vs. firm effects. Mackey (2008) pursued this idea, but found only about 5-7% of all CEOs in her overall sample were multi-time CEOs. Moreover, she concluded that the CEO effects observed for these few CEOs were probably biased, as these CEOs were distinctly (and positively) impactful in their first CEO positions, and were hired into their second CEO positions by firms that sought impactful leaders. In our case, a further complication arises: While rare in the recent period studied by Mackey, multi-time CEOs were almost non-existent in the early decades of our sample. From 1950-1969, our sample included just four such CEOs. The ensuing two periods had nine and ten, respectively. We tracked these CEOs across firms and coded them accordingly. Thus, our reported results reflect their multiple appointments. Further, our results are unchanged when we omit these few multi-time CEOs.

of various constituencies (Khurana, 2007; Lazonick & O'Sullivan, 2000). Commencing in the late 1970s, the rise of investor capitalism required CEOs to emphasize shareholders above others (Useem, 1996). An ethos of *satisficing* gave way to an imperative of *maximizing* shareholder returns, which required CEOs to take bigger risks and engage in bolder actions, as superior returns cannot come from incrementalism or imitation. In turn, executives' effects on performance – both upward and downward – became bigger as well.

Second, following the period of postwar stability, by the 1980s the business environment had become appreciably more dynamic and fast-paced (Thomas & D'Aveni, 2009). Heightened technological intensity, shorter product lifecycles, and increased domestic and foreign competition all have been documented as contributing to a new era of “hypercompetition” (Bettis & Hitt, 1995; D'Aveni, 1994; Irvine & Pontiff, 2009; Wiggins & Ruefli, 2005). With such increased dynamism and complexity, CEOs were subjected to much more arduous tests. In turn, the skills and inclinations of individual CEOs became more consequential, with the best (and worst) leaders making increasingly distinctive marks on their firms.

Third, at the same time that CEOs were being encouraged to consider bold and novel actions, there was a proliferation of new paths to pursue. In the final decades of the century, CEOs saw a major expansion in the slate of available options – a wide array of international markets, more locales for offshoring and outsourcing, and an expanded menu of legitimate organizational forms (including alliances, consortia, and networks) (Burkholder, 2006; Felin, Zenger, & Tomsik, 2009; Rajagopal & Bernard, 1994). With this broadened menu, CEOs could engage in widely varying strategies, with widely diverging outcomes. In sum, any or all of these three shifts could account for the increased CEO effect we have documented.

Conditions for Heightened Romance of Leadership

Although we have posited that increased attention to CEOs may have been due to their increased substantive influence on company outcomes, it is also possible that naïve romanticization was at work as well. Indeed, given that attributions of leader significance are amplified under conditions of extreme performance (Meindl *et al.*, 1985), some of the statistics we report suggest that conditions became ripe for romanticization of CEOs over our period of interest. As Table 1 shows, there was greatly increased variance in firm performance over time. In the early period, companies in the U.S. tended to perform in a relatively narrow range; in later periods, there were many more extreme winners and losers, which is precisely the condition that gives rise to romanticization (Meindl *et al.*, 1985).

Or consider some of the trends shown in Table 2. In the period 1950-1969, company performance in a given year was due overwhelmingly to factors that were relatively easy to comprehend, notably macro-economic conditions, industry factors, and the firm's overall health and position. By the period 1990-2009, these straightforward contextual factors were not nearly as predictive of performance. Instead, other transitory or opaque factors (captured in the "unexplained" term in the models) played a greater role. In short, over the period of interest, the causes of firm performance became more difficult to comprehend, or at least to parsimoniously model, thus possibly feeding an illusion that managerial magic or villainy might be at work.

Of course, increased CEO effects and romanticization might have been symbiotic in propelling attributions of CEO significance, operating recursively in a spiraling manner. For instance, a *mélange* of precipitating factors in the early 1980s might have brought about a yearning for better corporate leadership (romanticization), which in turn caused boards to search more broadly for CEOs who could "make a difference," which in turn yielded increased CEO effects on company outcomes, which then caused the media to become fascinated with CEOs,

prompting boards to pay even more generously for charismatic and colorful CEOs who were then given great freedom, which further increased the CEO effect on company performance, and so on. Namely, increased romanticization may have engendered greater managerial influence, and greater CEO influence almost surely engendered more romanticization.

Contributions and Implications

Our study highlights how leader influences can change over time in a given society. Whereas prior research has reported cross-sectional contrasts in CEO effects in different countries, we show that it may be very fruitful to examine changes in CEO effects in a given country. The most obvious opportunities are to examine changes in CEO effects following political regime changes, widespread privatization, or deregulation movements. But our results suggest there is also a need to consider how CEO influence can rise or fall as a result of multiple, cumulative forces over longer periods of time, rather than because of any single abrupt trigger.

More broadly, our study illustrates the importance of studying how the determinants of firm performance can shift over time, throughout an entire economic system. Although not our main focus, our results reaffirm that industry membership became far less determinative of firm performance, and that company performance became far less inertial over the decades examined. Such temporal patterns serve as an important reminder that the basic relevance of distinct theoretical perspectives – say, industrial organization economics, resource-based view, or dynamic capabilities – can ebb or flow as macro conditions change.

The study also has implications for upper echelons theory, which posits that executives inject their own individual biases into their decisions (Hambrick & Mason, 1984). Given that upper echelons theory is only predictive to the extent that executives have influence over outcomes (Finkelstein & Hambrick, 1990), the current study suggests the need to consider how

changes in macro, or societal, factors might act as moderators for their predictions. From our project, for instance, one could hypothesize that, in the United States, executive characteristics were more strongly associated with strategic choices in recent decades than in earlier postwar decades.

Beyond these theoretical implications, this study also points to an array of possible phenomenological investigations. For instance, has the CEO effect changed over time in other countries? Crossland and Hambrick (2007, 2011) documented major cross-sectional differences in executive effects in various nations, but they stopped short of fully considering how conditions might have changed, say in Japan or Germany, to alter the degree of CEO influence on company performance in these other countries. Research might also explore whether recent events in the U.S., notably the Enron-era debacles of 2001 and the financial meltdown of 2008, will bring about a diminishment of CEO influence. Our Figure 1 shows a slight recent decline in CEO effects, but it is too early to know whether CEOs in the U.S. are now operating, or will be operating, under conditions of greater restraint. Finally, given the observed increase in CEO effects on firm outcomes, one could argue that some of the corresponding rise in CEO compensation was warranted. As researchers continue to study the contentious issue of CEO pay, they might include consideration of CEO significance, and especially *changes* in CEO significance. These ideas are merely illustrative, highlighting the many research questions that arise by adopting a dynamic view of managerial influence – and, importantly, perceptions of such influence.

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Table 1:
Descriptive Statistics By 20-year Period

	Period 1 1950-1969	Period 2 1970-1989	Period 3 1990-2009
Firm-year observations	4004	7377	7086
Number of unique CEOs	737	1246	1355
Mean years observed per CEO (standard deviation)	5.43 (3.85)	5.92 (4.65)	5.23 (3.79)
ROS (annual means) (annual standard deviations)	5.54 (3.91)	3.78 (5.25)	1.61 (12.36)
ROA (annual means) (annual standard deviations)	7.07 (3.72)	5.21 (6.08)	2.35 (11.58)
MTB (log) (annual means) (annual standard deviations)	0.99 (0.37)	0.85 (0.38)	1.12 (0.54)

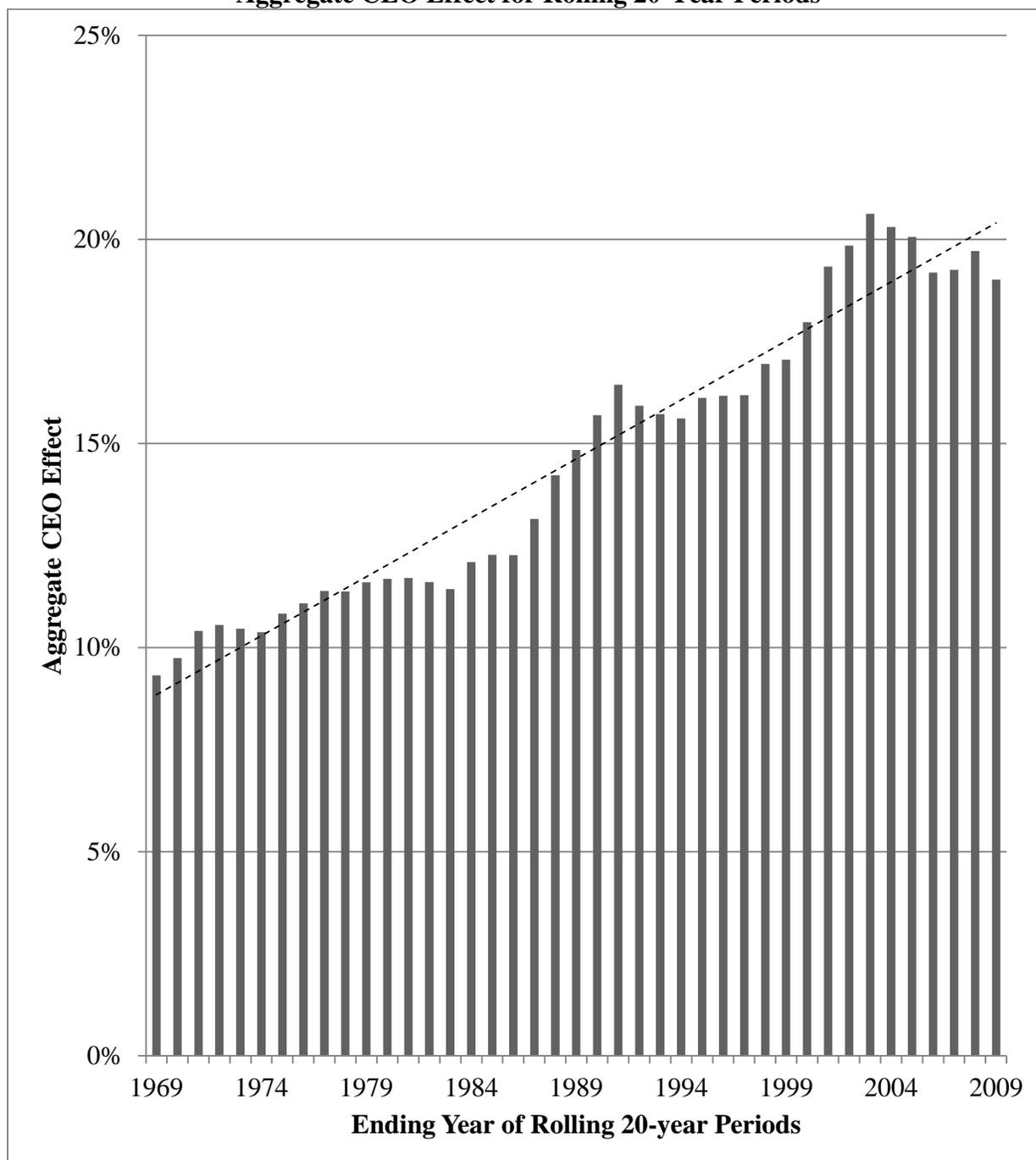
Years observed per CEO do not always equate with complete CEO tenures, due to left- and right-censoring by period cutpoints. Similarly, the number of unique CEOs reported here adds up to more than the overall total of 2732, as some CEOs appear in more than one reported period

Table 2:
Proportion of Variance in Firm Performance Explained, Sequential ANOVA and MLM

	<u>Sequential ANOVA</u>						<u>MLM</u>					
	Period 1 1950-1969	Period 2 1970-1989	Period 3 1990-2009	Test for differences in CEO Effect (Fisher's z)			Period 1 1950-1969	Period 2 1970-1989	Period 3 1990-2009	Test for differences in CEO Effect (Fisher's z)		
				Period 1-2	Period 2-3	Period 1-3				Period 1-2	Period 2-3	Period 1-3
ROS												
Year	3.1%	1.7%	1.8%				2.4%	1.5%	1.9%			
Industry	38.7%	10.2%	3.7%				28.3%	5.2%	1.9%			
Company	41.8%	34.6%	33.7%				44.8%	24.6%	17.3%			
CEO	4.1%	10.9%	16.2%	***	***	***	8.6%	20.3%	26.4%	***	***	***
Unexplained	12.3%	42.6%	44.7%				15.9%	48.4%	52.5%			
ROA												
Year	5.4%	3.2%	2.3%				4.0%	2.8%	2.3%			
Industry	16.1%	4.9%	3.5%				12.1%	1.9%	1.8%			
Company	47.9%	34.7%	31.8%				44.4%	24.5%	18.1%			
CEO	7.8%	10.8%	15.7%	*	***	***	13.8%	17.8%	22.9%	*	***	***
Unexplained	22.9%	46.4%	46.7%				25.7%	52.9%	54.9%			
MTB (natural log)												
Year	11.2%	10.4%	3.4%				10.0%	10.1%	3.6%			
Industry	28.2%	16.1%	11.7%				26.1%	11.9%	8.4%			
Company	39.3%	35.5%	35.0%				33.7%	26.1%	21.7%			
CEO	7.4%	9.5%	13.8%	+	***	***	14.4%	19.3%	22.4%	**	***	***
Unexplained	13.9%	28.5%	36.1%				15.8%	32.6%	43.9%			

*** p<0.001, ** p<0.01, * p<0.05, + p<0.1

**Figure 1:
Aggregate CEO Effect for Rolling 20-Year Periods**



Aggregate CEO effect is the mean of the CEO effects on ROS, ROA, and MTB for both ANOVA and MLM. The designated year is the ending year for each 20-year panel (e.g., 1969 represents the panel from 1950-1969). Trend line (dashed) represents linear regression of aggregated CEO effect on year counter (from 1 to 41). Coefficient was .29 and highly significant ($p < 0.001$).