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### Executive Compensation Incentives Contingent on Long-term Accounting Performance

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## Executive Compensation Incentives Contingent on Long-term Accounting Performance

### Comments

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# Executive Compensation Incentives Contingent on Long-term Accounting Performance

Zhi Li and Lingling Wang

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## Abstract

The percentage of S&P 500 firms using multi-year accounting-based performance (MAP) incentives to CEOs increased from 16.5% in 1996 to 43.3% in 2008. The use and design of MAP incentives depend on the signal quality of accounting vs. stock performance, shareholder horizons, strategic imperatives, and board independence. After the technology bubble, option expensing, and the publicity of option backdating, firms increasingly use stock-based MAP plans to replace options, resulting in changes in pay structure but not pay level. While firms respond to the evolving contracting environment, they consider firm characteristics and shareholder preferences and do not blindly follow the trend.

*JEL classification: M12; J33; G32; M41*

*Keywords: Long-term incentives, accounting-based performance plans, CEO compensation*

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## 1. Introduction

U.S. public firms increasingly tie CEO compensation to long-term accounting performance. The percentage of S&P 500 firms that adopt multi-year accounting-based performance (MAP) incentives has more than doubled from 16.5% in 1996 to 43.3% in 2008. The average annualized target payout from the plans is around \$2.2 million, roughly two times a CEO's base salary, and exceeds the \$1.67 million average target pay of traditional bonus plans. In recent years, expected payouts from MAP incentives have exceeded those of option grants and become the most significant component of CEO compensation for firms with MAP incentives. Despite their growing popularity and being one of the key building blocks of executive incentive design, long-term accounting-based incentives receive little attention in academic literature and are the least understood type of performance incentives.<sup>1</sup> This lapse in research can lead to a biased understanding of the true ex ante incentives that executives face.

Moreover, the recent shift towards MAP incentives suggests that the landscape of long-term incentives for CEOs has changed from a purely stock price driven approach (i.e. restricted stocks and option grants) to a combination of accounting and stock performance-based incentives. It is unclear whether the shift is an outcome of incentive alignment, CEO rent-seeking, or changes in accounting rules and market sentiment during the period. To shed light on these issues, we offer the first large sample study that documents the use and design of MAP plans, investigates the cross-sectional variation in the determinants of plan adoption and structure, and analyzes the growing trend of MAP incentives.

From over 8,600 annual proxy filings of all S&P 500 firms from 1996 to 2008, we identify 1,936 MAP contracts granted to CEOs during the period and hand-collect the details of these contracts.<sup>2</sup> These contracts evaluate managers based on sets of pre-determined accounting-based targets over multi-year

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<sup>1</sup> Figure 1 illustrates the four quadrants of incentive contracts of U.S. public firms along the two dimensions of incentive design: the choice of performance measures (accounting vs. stock performance) and the length of the performance evaluation period (one year vs. multi-year). Researchers have extensively studied three of the four types of incentives: incentives based on stock returns of various horizons (i.e. stock and option grants, performance plans contingent on stock returns) and incentives contingent on short-term accounting performances (i.e., bonuses). In contrast, there are only a limited number of studies on long-term accounting performance incentive using small samples of contracts granted during the '70s and '80s (Larcker, 1983; Tehrani, Travlos and Waagelein, 1987; Kumar and Sopariwala, 1992; Gaver, Gaver and Battistel, 1992), and we are not aware of any study on these incentives in the past two decades.

<sup>2</sup> Appendix A provides an example of a MAP plan initiated by Boeing Co in 2006.

performance periods (generally three years). Failure to achieve the minimum performance criteria results in no payment. The performance criteria can be based on earnings, sales, cash flows, or efficiency measures like economic value added (EVA). About 20% of the MAP plans disclose that their firms use relative performance evaluation (RPE) to evaluate firm accounting performance against peer groups. The expected payout from MAP plans can be cash-based (about 42%), equity-based (55%), or both (3%), with companies increasingly granting equity-based MAP plans after 2002.

We first examine firms' decisions to adopt MAP plans based on the predictions of contracting theories along the two dimensions that uniquely characterize MAP contracts: the choice of accounting performance and the multi-year evaluation period. Agency theory suggests that firms prefer performance measures with high signaling quality in reflecting executive efforts (e.g., Jensen and Meckling, 1976; Holmstrom, 1979; Murphy, 1985). Thus, the grant decision depends on the relative signal-to-noise ratio of accounting versus stock performance (e.g., Holmstrom and Milgrom, 1987; Lambert and Larcker, 1987). Consistent with this expectation, we find that a firm is more likely to adopt a MAP contract if the ratio of stock volatility to accounting volatility is high. Certain firm characteristics can also affect the relative informativeness of stock and accounting signals. In high-growth firms, stock price may better incorporate the potential consequences of managerial actions than accounting measures (Lambert and Larcker, 1987). In contrast, stock prices may be less informative in complex firms because they are difficult to evaluate for outsiders. Supporting these views, we find that firms with high sales growth rates are less likely to grant a MAP contract, while multi-segment firms are more likely to do so.

A firm's choice of incentive contracts also depends on its shareholders' horizon. Several studies show that shareholders use compensation incentives to align managerial horizons with their own (e.g., Bolton, Scheinkman, and Xiong, 2006; Cadman and Sunder, 2014). Because MAP incentives utilize long-term evaluation periods and firms often emphasize "managerial long-term focus" at the time of the grants,<sup>3</sup> we expect MAP incentives to be less desirable to short-term shareholders. We find confirming evidence that

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<sup>3</sup> For examples of firms that emphasize long-term focus when granting MAP incentives, see Boeing Co.'s 2006 proxy statement; ConocoPhillips Co.'s 2005 proxy statement; and Brown-Forman Corporation's 2007 proxy statement.

firms consider shareholders' horizon preferences when design compensation incentives. Firms with more short-term shareholders, as measured by various shareholder turnover measures, are less likely to use MAP incentives.

We next study the design of MAP incentives, such as the choice of accounting criteria, the length of the performance period, the decision to use relative performance evaluation, and the award type (cash vs. stock). Consistent with predictions from contracting theories, we find that firms are more likely to choose a performance measure when it is less volatile and is related to the firm's strategic priorities. Firms use more relative performance evaluation when firm performance co-moves more with industry performance. Firms with volatile past performance and more long-term shareholders prefer longer evaluation periods. Financially constrained firms and firms that require a certain level of CEO ownership are more likely to choose stock-based MAP plans over cash-based ones. In general, the findings are consistent with the view that firms design MAP incentives to better align the CEO's interests with the firm's strategic priorities and concerns.

The percentage of S&P 500 firms using MAP incentives grew significantly since 2002. To examine if the time series trend has changed the determinants of granting a MAP plan, we divide the sample into pre- and post-2002 sub-groups. We find that in both periods, the decision to grant MAP incentives depends on accounting signal quality, shareholder horizon, and board independence. Early adopters (firms that started granting MAP plans before 2002) have the highest stock to accounting volatility ratios, the longest shareholder horizons, and the most independent boards. Late adopters (firms that started granting MAP plans after 2002) trail behind in all three aspects, while firms that never adopt MAP plans come in last. These results suggest that companies that benefit the most from using long-term accounting signals adopt MAP plans first. Firms with short-term shareholders and weak accounting signals choose not to adopt long-term accounting-based incentives regardless of the shifting trend after 2002.

There remains the question that what has swayed those "late adopters" towards MAP incentives after 2002. The growing popularity of MAP incentives since the early 2000s coincides with the burst of the stock bubble, the expensing of equity-based compensation, and several high profile accounting and option

backdating scandals. We examine whether these non-mutually exclusive factors contribute to the time series trend of MAP plan adoptions. First, the technology bubble may have made directors and shareholders more wary of the signal quality of stock performance, as they witnessed that stock prices can deviate from fundamental values for a prolonged period of time. Consistent with this view, we find that firms that experienced elevated valuations during the bubble period (i.e. 1997 to 1999) are more likely to initiate MAP grants after 2002.

Second, the trend to expense options creates a more level playing field between stock options and other compensation incentives and may have pushed some firms that were previously on the fence towards MAP plans. Many firms started to voluntarily expense option grants around 2002, and the SEC adopted FASB ASC Topic 718 that mandates option expensing after June 2005 (Aboody, Barth, and Kasznik, 2004). Firms, especially the ones that are barely profitable, may have granted stock options because they can defer related compensation costs to temporarily boost reported earnings. After the accounting treatment change that removes the expensing advantage, we expect these firms to start switching to other types of compensation incentives. Supporting this argument, we find that firms with close to zero net profit margins prior to the accounting treatment change (2000 to 2002) are more likely to adopt MAP plans in subsequent years. Third, the breakout of option backdating scandals in 2005 and 2006 may have created negative public sentiment towards stock options and drive some firms to switch from option grants to MAP incentives. Consistent with this view, we find that firms in industries with more incidences of option backdating are more likely to initiate MAP plans after these incidences are publicized.

When switching from options to MAP incentives, our analysis shows that firms prefer to use stock-based MAP plans over cash-based ones. Specifically, the percentage of stock-based MAP plans increased from 43.4% in 2002 to 69.4% in 2008. In contrast, the percentage of cash-based MAP plans decreases from 53.1% to 28.8% despite their generally more favorable accounting expensing treatment than equity-

based pay.<sup>4</sup> Firms granting stock-based MAP plans experience significantly greater decreases in option grants than matched peers in the post-2002 period, while the differences in the changes of options grants are insignificant between firms granting cash-based MAP plans and their matched peers. Replacing stock options with stock-based MAP plans shows that firms do not shy away from equity-based pay in the post-bubble period. Instead, firms try to combine accounting and stock performance together to provide more balanced long-term incentives.

In contrast to the incentive alignment view of MAP incentives, an alternative explanation is that powerful CEOs use these incentives to extract rents at the expense of shareholders. Not supporting the CEO power view, we find that firms with independent boards are more likely to use MAP plans and proxies for CEO power are not positively related to the grant decision. Further, in both pre-2002 and post-2002 periods, CEOs with either cash- or stock-based MAP contracts do not receive higher total or excess pay compared with their matched peers without such contracts.

Our paper adds to the executive compensation literature by providing details on the under-studied long-term accounting-based incentive contracts. Studying the adoption and structure of these contracts helps us to evaluate whether firms design incentives in accordance with the general contracting theory. In addition, together with earlier studies on bonuses, options and other stock grants, our study helps researchers and practitioners piece together the universe of ex-ante incentives faced by CEOs.

We also contribute to the literature by documenting and exploring the time series trend of MAP incentives, which reflects an important regime shift in compensation design in the past decade. Our study indicates that firms are moving towards incorporating diverse long-term performance hurdles to evaluate executives. The shift towards MAP plans also provides a good opportunity to study if changes in compensation design are related to changes in public policy and sentiment, which is an important area that more academic studies are called for (Murphy, 2012). Our evidence shows that while firms respond

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<sup>4</sup> Cash-based performance plans with pure accounting-based performance criteria are unaffected by the FASB rule change and enjoy the most favorable accounting treatment both before and after 2005. They can be expensed when the performance criteria are satisfied and the plan payouts are earned.



to changes in the macro environment, they still consider firm characteristics and shareholder preferences and do not blindly follow the trend.

Our study also shows that this current change in CEO compensation design significantly differs from a previous noteworthy trend shift. In the late '80s and early '90s, firms started paying CEOs generous option grants in response to the shareholder activism that demanded higher pay–performance sensitivity. The increase in option grants did not substitute for other forms of compensation and significantly increased the overall pay level of executives (Murphy, 2012). In contrast, the current shift towards MAP plans is accompanied by a simultaneous reduction in stock options, resulting in changes in CEO pay structure, but not in pay level.

## **2. Literature review**

Larcker (1983) pioneered studies in long-term accounting performance contracts and studied 25 firms that granted long-term accounting-based performance plans to CEOs between 1972 and 1979. Several follow-up studies examine long-term performance plans granted in the '70s and '80s.<sup>5</sup> The lack of recent research on MAP plans is probably due to data limitation and a lack of attention to incentives that are not based on stock returns. To our knowledge, our study is the first to reveal the recent trend of firms' increasingly using long-term accounting-based incentives, and is the first large sample study that provides a descriptive analysis on the design of MAP incentives and explores firms' motivations to adopt such incentives.

It is important to understand the details of performance plans to fully account for the true ex ante incentives firms provide to CEOs (e.g., Kole, 1997, Johnson and Tian, 2000). With hand collected data, several recent studies are moving towards this direction. Kim and Yang (2012) study the performance metrics used in annual bonus plans from 2006 to 2009. De Angelis and Grinstein (2014) investigate

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<sup>5</sup> Tehranian, Travlos and Waegelein (1987) study 66 divesting firms that have some form of long-term performance plans from 1974 to 1982 and find that these firms received more favorable market reactions on the divestiture announcement days. Kumar and Sopariwala (1992) investigate 62 firms that adopted long-term performance plans contingent upon the “achievement of long-term accounting numbers” from 1978 to 1982. These firms experienced positive announcement day returns and subsequent improvements in accounting performance. Contrary to previous findings, Gaver, Gaver and Battistel (1992) use a sample of 209 performance plan adoptions in the 1970s and report no significant market reaction.

performance-contingent contracts issued in 2007. Gerakos, Ittner, and Larcker (2007) study a subsample of firms that grant performance-vested stock options between 1993 and 2002. Bettis et al. (2010) investigate 983 equity grants with performance provisions from 1995 to 2001. Bettis et al. (2014) study option and stock grants with any performance provision for a sample of large firms from 1998 to 2012.

Our study differs from those of Gerakos et al. (2007) and Bettis et al. (2010, 2014) in both the research question and the type of contracts studied. As demonstrated in Figure 1, we focus on firms' choices of ex ante performance incentives and choose to study a clearly defined category of compensation incentives: all contracts that are contingent on meeting long-term accounting performance requirements. In contrast, the other papers focus on equity grants with any type of performance provisions attached, i.e., the performance period can be either short- or long-term, and the performance matrices can be stock price- or accounting-based. For example, 46.3% of the equity grants in Bettis et al. (2010) are contingent on only stock performance hurdles. Moreover, these papers focus exclusively on equity-based grants and do not include cash-based performance grants. In our sample, 41.5% of MAP plans are cash-based grants and almost none of the MAP plans are option-based.

The research questions that we focus on are the cross-sectional determinants and time-series trend of the use and design of long-term accounting-based performance incentives. In comparison, Gerakos et al. (2007) and Bettis et al. (2010) both focus on why firms add various performance provisions to traditional option or stock awards. Bettis et al. (2014) investigates how the added performance provisions change the equity grants' expected values and sensitivity to stock price (delta) and volatility (vega). Our study, combined with these other studies in the area, helps piece together the changing compensation landscape in U.S. towards performance-contingent plans and evaluates the validity of such change.

### **3. Data collection and MAP contracts**

#### *3.1. Sample and data sources*

We begin with all firms that appear at least once in the S&P 500 index from 1996 to 2008. We start our sample period in 1996 because that since May 1996, the SEC has required all public U.S. firms to

submit filings via the EDGAR system.<sup>6</sup> We collect information on compensation plans from each firm's annual proxy statements (DEF 14A). The initial sample consists of 8,683 firm-year (859 firms) observations with identifiable proxy statements.

We obtain accounting and segment data from the *Compustat* database and compensation data from the *ExecuComp* database. Stock-related data are from the *Center for Research in Security Prices* (CRSP) database. We require each sample firm to have information on market capitalization and total compensation, which restricts our sample for firm characteristic analysis to 8,418 firm-years (859 firms). Information on institutional holdings and turnovers is from the *CDA Spectrum* database of the SEC 13-f filings. We obtain board of director characteristics and CEO tenure data from the *RiskMetrics* database and use annual proxy statements to fill in missing information.

### 3.2. Identifying MAP contracts

Since 1992, the SEC has required firms to disclose all elements of compensation in formatted tables in proxy statements.<sup>7</sup> Prior to 2006, most firms report the magnitudes and horizons of their granted MAP plans in “Long-term Incentive Plans” tables (the name may vary across filings). The new SEC amendment in December 2006 requires firms to report the expected payouts and performance horizons of MAP plans as a part of the “Grants of Plan-Based Awards” tables in proxy statements. Other contractual details are often disclosed in the “Compensation Discussion and Analysis” section or in the footnotes of the “Summary Compensation Table” and the “Grants of Plan-Based Awards” tables.

We use the following four criteria to identify a MAP plan. First, the performance evaluation period has to be longer than 12 months. We exclude plans that are called long term by the firm but the CEO can receive payments if a specific *annual* target is met within the performance period.<sup>8</sup> Second, the terms of the contract must be specified before the performance period. We exclude plans that allow firms to set

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<sup>6</sup> See details at <http://www.sec.gov/edgar/aboutedgar.htm>.

<sup>7</sup> Executive Compensation Disclosure, Release No. 33-6962 (October 16, 1992).

<sup>8</sup> For example, in 2006, Campbell Soup Co. granted a three-year long-term incentive plan. During the 2006–2008 performance period, the executive could receive one-third of the target payment each year if a specific earnings per share goal for that fiscal year was achieved. We consider such plans similar to annual bonus plans.

the performance criteria annually or to revise them during the performance period.<sup>9</sup> Third, at least one of the performance hurdles used has to be accounting based. Plans that rely only on stock performance hurdles are not included. Lastly, we consider only contingent-vesting plans that grant no payout if the CEO misses the minimum performance criteria. From 1996 to 2008, 383 firms granted 1,936 MAP plans to their CEOs that cover 2,463 (28.37%) firm years in our sample.<sup>10</sup> Within the sample, 19 firms employed MAP plans in all 13 years, 37 firms used MAP plans in 10 years or more, 120 firms granted MAP plans for 5 to 9 years, and 207 firms used MAP plans for less than five years.

The expected payment from a MAP plan is convex with a lower boundary at zero. A cash-based MAP plan has a fixed maximum payout, while the maximum payment from a stock-based MAP plan has unbounded upward potential as the underlying stock price increases. For illustration, Figure 2 presents the payoff structure of a stock-based MAP plan granted by the Coca-Cola Company in 2006.

### 3.3. *The contractual features of MAP contracts*

After identifying a MAP contract, we collect the following contract features: 1) the start and end dates of the performance period, 2) the performance measures and benchmarks, 3) the expected threshold, target, and maximum payouts, 4) the award type, which can be cash, stocks, options, or mixed.<sup>11</sup> Firms can grant MAP plans on an overlapping or non-overlapping basis. A firm can grant a new MAP award every year (overlapping grants). For example, Coca-Cola Co. granted its CEO a three-year MAP grant in 1996 that covers the performance period from 1996 to 1998, and then granted a 1997 grant that covers 1997 to 1999. Alternatively, a firm may grant a new MAP plan only when the previous one expires (non-overlapping grants). Altria Group Inc. granted its CEO a MAP plan in 1998 that covers the performance

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<sup>9</sup> For example, AT&T granted a three-year long-term incentive plan in 1996 that allows the performance level to be set on a yearly basis.

<sup>10</sup> The total number of MAP plans in our sample is 2,061 with 125 firm-year observations have two or more MAP grants in a year. For years with multiple grants, we aggregate the payout amounts as the payout amount for that year. If the performance periods are not the same, we take the later year as the last performance year. All results hold if we exclude these 138 firm-year observations from our analysis.

<sup>11</sup> The award type specifies the form of the expected contingent payout, which can be a cash-based award with fixed value or stock and option grants with fixed shares. After the payout amount is determined at the end of the performance period, irrespective of the award type, the actual remuneration to executives can be paid out in cash, equivalent stocks, or a mixed payment. The MAP plan from Boeing Co, as shown in Appendix A, is an example where the award type is cash based, but the actual payment can be made in cash or stock at the board's discretion. Firms often make payment decisions based on CEOs' existing stock ownership levels.

period from 1998 to 2000, and then granted the next plan in 2001 to cover 2001 to 2003. Out of the 1,936 grants in our sample, 204 (10.54%) grants are non-overlapping and 1,732 (89.46%) are overlapping. Firms may favor overlapping grants because CEOs prefer to receive regular payments on an annual basis. Overlapping plans also give firms more flexibility to adjust performance criteria as economic environment and business strategies change.

Figure 3 presents the time series trend of MAP grants. In 1997, about 21.22% of the firms were covered by a MAP award.<sup>12</sup> The percentage is more than doubled to 43.31% in 2008. As Panel B illustrates, 43.4% of MAP grants are stock-based grants in 2002, and the number increases to 69.4% in 2008. In contrast, the percentage of cash-based MAP grants decreases from 53.1% to 28.8% in that same period. This pattern suggests that the rise of MAP contracts is mostly driven by the increasing use of stock-based MAP contracts. Panel A of Figure 4 shows the industry distribution of firm-year observations that are covered by MAP plans based on the one-digit Standard Industrial Classification (SIC) code. For comparison, we also include the industry distribution of all firm years in our sample. A  $\chi^2$  test indicates that the two distributions are not different ( $p$ -value equals 0.243), suggesting that there is no clustering of MAP plans in a particular industry. Panel B shows that the industry distribution of MAP plans does not change much before and after 2002, suggesting that the increasing use of MAP plans after 2002 is not a phenomena particular to certain industries.

Table 1 presents detailed contractual features of the 1,936 MAP awards. As shown in Panel A, the length of the performance period ranges from 1.5 years to 10 years, with the majority of the awards (82.85%) using a three-year period. In terms of award type in Panel B, 41.48% of the awards were cash based and 55.27% were stock based, with 3.20% using a mixture of cash, stock, and options. Only one MAP award in our sample defines the expected payment in options.<sup>13</sup>

Panel C shows the type of performance benchmark used to evaluate firm performance. Of the 1,936 MAP awards, 63.22% of the plans evaluate performance against an absolute value selected by the board.

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<sup>12</sup> The coverage in 1996 may be biased downward because this year is the first year of our sample collection. The sample would miss MAP awards granted before 1996, but covers the year 1996.

<sup>13</sup> This MAP award was a one-time grant made by Hudson City Bancorp Inc. in 2006.

Three hundred and eleven (16.06%) grants use at least one relative measure, where the accounting performance is compared to that of selected peer companies or the constituents of a specific index. We could not find benchmark information for 20.71% of MAP grants. Firms often cite protecting proprietary information as the reason for not disclosing the benchmark information.

Panel D of Table 1 presents information on performance criteria used in MAP contracts. Earnings-based performance measures, such as earnings per share, return on assets (ROA), net income, and return on equity (ROE), are most widely used. About 83.42% of the awards include at least one earnings-based performance hurdle and 56.15% use earnings-based targets exclusively. Sales-based targets are the next most popular criterion (16.12%), followed by measures based on cash flows and economic value added (EVA) (8.83% and 8.21%, respectively). Twenty eight (1.45%) MAP plans use an “unknown” accounting measure, where the firms did not disclose the specific accounting criteria used. We find that 394 (20.35%) MAP grants combine some forms of stock price based criteria with accounting-based performance criteria.<sup>14</sup> Our results are robust if we exclude these 394 awards from our analysis.

Panel E of Table 1 presents the annualized threshold, target, and maximum expected payouts of MAP awards, along with other compensation components.<sup>15</sup> The target amount is paid out when the target performance criteria are reached. For stock-based MAP grants, the target payout amount is calculated as target shares times grant day stock price. If the firm meets or exceeds the highest performance criteria, the MAP payout is “capped” at the maximum value, which is usually set as a multiple of the target value. The threshold payout is the minimum positive pay if firm achieves the minimum performance criteria. Failing to meet the minimum performance criteria would result in zero payment.<sup>16</sup> For non-overlapping MAP

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<sup>14</sup> We separate MAP awards that specify the weights of the stock-based and accounting-based performance criteria and report only the accounting-based component as a MAP grant. For these 394 MAP grants, we either cannot determine the weight for different criteria or the stock criteria acts as a multiplier that magnifies the plan’s payout.

<sup>15</sup> The panel does not include 15 grants that have no information on total compensation in ExecuComp. For the remaining 1,921 grants, 57 grants do not disclose any payout information. There are 56 grants disclosed both the threshold and maximum payout, but not the target payout. For these grants, we estimate the target amount as the average of threshold and maximum pay. All missing threshold or maximum values remain untreated, resulting in different numbers of observations in Panel E.

<sup>16</sup> In our sample, 40% of MAP plans do not disclose threshold pay. Some plan payouts may decline gradually to zero as performance deteriorates, and thus do not specifically define a non-zero threshold pay (i.e. the 2001 MAP grant from McGraw-Hill Co). Some firms may simply choose not to disclose the threshold pay as it is not required by SEC.

grants, the payouts are only received every couple of years when the performance periods end. We annualize the expected payments from these MAP grants by dividing the threshold, target, and maximum payouts by the number of years in the performance periods. We convert all values to 2007 dollar levels using the Consumer Price Index compiled by the U.S. Bureau of Economic Analysis.

In our sample, the average (median) annualized target payout for a MAP award is \$2.15 million (\$1.41 million). The average (median) maximum annualized payout is \$3.89 million (\$2.65 million) and the minimum annualized payout is \$0.73 million (\$0.47 million). On average, the annual target payout is about 22.30% of CEOs' total compensation and is the second largest pay component after option grants in our sample period for MAP-plan granting firms.<sup>17</sup> We plot the mean annualized MAP target payouts and the estimated values of annual option grants from 1996 to 2008 in Figure 5.A. As shown, the target payouts of MAP grants are significantly lower than option grants in the first half of the sample period, but the two grants become comparable afterwards. This trend is true for both firm-year observations with MAP grants and for all firm-year observations in our sample. To control for the size of CEO total compensation, we further divide the annualized MAP target pay and the value of option grants by total compensation. With the average annual percentages, we find a similar pattern in Figure 5.B. After 2004, the target awards of MAP plans as a percentage of CEO total pay exceeds the percentage of option grants in CEO total pay. Taken together, the results suggest that MAP plans have grown to be a very significant component of CEO compensation in recent years.

#### **4. Determinants of granting a MAP plan**

##### *4.1. Hypothesis development*

Contracting theories suggest that firms should adopt MAP plans when long-term accounting

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<sup>17</sup> The comparison should be interpreted with caution because the expected value of MAP plans depends on both the ex ante probability of meeting the performance criteria and the expected payout amounts. Most companies do not fully disclose plan details that are needed to estimate the probability of achieving the performance criteria. For example, firms may not disclose the sales growth target to protect proprietary information, or the formula and adjustments used to calculate the accounting criteria (i.e. EVA, ROIC, or adjusted operating income). Moreover, currently there is no widely accepted model estimating the value of accounting performance contingent plans as the Black-Scholes (1973) model does for option grants. The SEC requires firms to expense equity-based MAP grants at the grant date fair value based on the probable performance outcome. Companies often choose to use the target award value as the grant day fair value.

performance best reflects executive actions and shareholder preferences. In this section, we develop hypothesis based on the predictions of contracting theories and discuss the construction of empirical proxies for each determinant we propose.

#### *4.1.1. MAP plans and the choice of performance measures*

When managerial efforts are not directly observable, agency theories suggest designing incentive contracts that rely on signals to evaluate executive performance (e.g., Jensen and Meckling, 1976; Holmstrom, 1979; Murphy, 1985; Jensen, 1986; Holmstrom and Milgrom, 1987). Therefore, the choice of performance measures depends on each measure's signal quality.

Previous research has shown that a firm's choice of performance measures is affected by each measure's signal-to-noise ratio with respect to managerial actions (Holmstrom, 1979; Lambert and Larcker, 1987). If a firm's stock performance is volatile relative to its accounting performance, the firm may assign more weight to its accounting performance and vice versa. Following the literature, we use the firm's ratio of stock volatility to accounting performance volatility to capture the relative amount of noise in different signals. Stock volatility is measured as the standard deviation of monthly stock returns over the past five years, while the accounting volatility is the standard deviation of return on asset (ROA) over the same period. Using the signal-to-noise ratio measure, we hypothesize the following.

*H1A: A firm is more likely to grant MAP plans when its ratio of stock performance volatility to accounting performance volatility is high.*

Companies with complex business structures are more difficult for outsiders to appraise and their stock prices would be less informative than those of single segment firms. Thus, we expect complex firms to prefer incorporating internal accounting performance measures to supplement external signals when evaluating executive actions. Using the number of business segments to measure the complexity of the firm's business operations, we hypothesize the following.

*H1B: Multi-segment firms are more likely to grant MAP plans.*

The other factor that affects the weights on different performance measures is how sensitive these signals are to managerial actions. Lambert and Larcker (1987) argue that high-growth firms would prefer



using stock performance because stock prices can better incorporate the future consequences of managerial actions. Accounting-based measures, however, are generally less sensitive due to the constraint of the Generally Accepted Accounting Principles and cost-based reporting requirements. Therefore, we expect high-growth firms to give more weight to stock-based measures than to accounting-based measures, as CEO actions have greater future consequences in these firms.

H1C: *Firms with high sales growth rates are less likely to grant MAP plans.*

#### 4.1.2. *MAP plans and shareholder investment horizons*

Studies show that shareholders want to align the manager's horizon with that of their own. Bolton et al. (2006) present a model showing that if incumbent shareholders have short-term speculative goals, the optimal compensation contract should emphasize short-term stock returns. Cadman and Sunder (2014) document that venture capitalists provide managers with relatively short-horizon incentive contracts that correspond to their anticipated exit times. Froot, Perold, and Stein (1992) and Stein (1996) also suggest a link between the short-term investment horizon of shareholders and short-termism in managerial behavior.

MAP plans utilize a multi-year evaluation period, and firms often emphasize managerial long-term focus as one of the main reasons to grant these plans in proxy statements. Larcker (1983) argues that a long-term performance plan is an effective tool to extend managerial decision horizon and prevent myopic behavior. Thus, firms with more short-term shareholders would be less likely to adopt a MAP plan. We focus our analysis on the effect of short-term shareholders because the predictions for firms with more long-term shareholders are not clear. Firms have several long-term incentive tools at their disposal, such as restricted stocks and/or option grants with a long vesting period. The choice between MAP plans and other long-term incentive contracts depends on the contracting environment and firm characteristics.

We first use the average monthly stock turnover ratio in a fiscal year to capture shareholder investment horizon. We expect the average shareholder horizon to be shorter if the stock turnover ratio is higher (e.g., Polk and Sapienza, 2009; Dong, Hirshleifer and Teoh, 2012). An alternative horizon measure that we use is the value weighted average of each firm's institutional investors' portfolio churn

ratios, as formalized by Gaspar, Massa and Matos (2005). The churn ratio uses institutional investors' entire portfolio holdings to capture their investment horizons, which minimizes the potential influence of any individual firm's trading volume change. We also use a firm's value weighted institutional investor turnover ratio as a third proxy for investor horizons. Using these horizon proxies, we hypothesize the following.

H2: *Firms that have more short-term shareholders are less likely to adopt MAP plans.*

#### 4.2. *Firm characteristics and the decision to grant MAP incentives*

Table 2 presents the univariate comparison of firm characteristics between firm-year observations covered by a MAP plan and those that are not. All key variables of interest are significantly different between the two groups. Firm-year observations with MAP awards have a significantly higher stock-to-earnings volatility ratio, a lower sales growth rate, and more business segments. The differences support our hypothesis that firms prefer accounting-based performance signals when these signals are more reliable. The average monthly stock turnover is significantly lower in firm-year observations with MAP grants, suggesting that shareholder horizons of MAP-plan granting firms tend to be longer.

To examine the determinants of a firm's propensity to grant a MAP plan, we estimate the following model:

$$Prob(=1 \text{ if firm grants a MAP plan in year } t) = f(\text{Stock volatility/earnings volatility}_{t-1}, \text{sale growth}_{t-1}, \# \text{ business segments}_{t-1}, \text{stock turnover proxies}_{t-1}, \text{control variables}) \quad (1)$$

The dependent variable is a binary variable that equals one if the CEO receives a MAP grant in year  $t$  and zero otherwise. We control for several CEO and firm characteristics that have been shown to affect compensation design in the literature. These variables include binary variables that indicate if the CEO is approaching retirement (age  $\geq 65$ ) or if the CEO is new (tenure  $\leq 2$ ), CEO tenure, CEO ownership, percentage of insider directors, board size, fiscal year stock return, return on assets, research and development (R&D) expenditures over total assets, advertising expenditures over total assets, capital expenditures over total assets, institutional ownership, and the natural log of the firm's market capitalization. We measure firm-level independent variables in the year prior to the respective MAP

grants. CEO variables are measured in the year of the grants except for CEO ownership, which is measured in the year prior to the respective MAP grants. We also include industry and year dummies to control for unobservable industry and year effects. The statistical significance is calculated based on robust standard errors clustered at the firm level. Appendix B provides the definitions and calculations for all variables. All non-binary variables are winsorized at the 99% and 1% values.

Table 3 presents the marginal effects from the probit model estimation of equation (1). As hypothesized, the likelihood of adopting a MAP plan is significantly positively related to the stock-to-earnings volatility ratio. In untabulated test, we re-estimate the volatility ratio using systematic stock volatility to capture the noise in stock performance that is unrelated to managerial actions and find similar result (coeff=0.007,  $p$ -value=0.001).<sup>18</sup> Firms with high sales growth rates are less likely to grant MAP plans, supporting the argument that growth firms may not prefer accounting measures because they are less sensitive to executive actions. In untabulated test, we use market-to-book ratio to replace sales growth rate and find a significant negative coefficient on this alternative proxy (coeff=-0.037,  $p$ -value=0.003). The significantly positive coefficient of the number of business segments is consistent with our hypothesis that complex firms are more likely to supplement stock performance with internal performance measures when evaluating CEOs. Collectively, these results suggest that firms prefer accounting performance measures when they provide better signals of executive efforts. In terms of economic significance, a one standard deviation increase in the stock-to-earnings volatility ratio or the number of business segments increases a firm's probability of granting a MAP plan by 3.64% and 3.08%, respectively. Meanwhile, a one standard deviation increase in sales growth rate decreases the probability by 2.98%.

To capture firms with more short-term (long-term) investors, we construct a high (low) stock turnover binary variable that equals one if the firm's average monthly stock turnover ratio is in the top (bottom) quartile that year, and zero otherwise. The coefficient on the top quartile dummy is -0.065 and significant

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<sup>18</sup> To obtain the systematic stock volatility, we first conduct time-series regressions of monthly stock returns on monthly value-weighted market returns for a five year rolling window. We then calculate the standard deviation of the predicted values as the systematic stock volatility.

at the 1% level, indicating that on average the probability of granting MAP plans in these firms is 6.5% lower than in other firms. The result confirms that firms with more short-term shareholders are less likely to use long-term incentives like MAP plans. The coefficient on the bottom turnover quartile dummy is positive but not significant, suggesting that the presence of long-term shareholders would not guarantee that firms will choose MAP plans over other long-term incentives. In untabulated tests, we use two alternative measures to construct the shareholder horizon dummies: the weighted average of the institutional investors' churn ratios as in Gaspar et al. (2005), and the weighted average turnover ratios of a firm's institutional investors. We obtain similar results with both measures. When using the weighted average churn ratios to construct the horizon dummies, the coefficient on the top quartile dummy is -0.030 and statistically significant at the 5% level. When using institutional investors' turnover ratios to construct the horizon dummies, the coefficient on the top quartile dummy is -0.048 and statistically significant at the 1% level. Similar to the baseline results, the coefficient on the bottom quartile dummy is insignificant for both alternative measures.

The results thus far are consistent with the view of incentive alignment, where board of directors choose performance signals that fit firm characteristics and shareholder horizons. A less benign view of incentive design is that powerful CEOs under weak governance can use incentive contracts to maximize their own benefits (i.e. Bebchuk and Fried, 2003). Past literature suggests that CEOs could gain power and become entrenched through tenure (e.g., Hermalin and Weisbach, 1998; Berger, Ofek, and Yermack, 1997; Ryan and Wiggins, 2004; Harford and Li, 2007) and that independent boards are less likely to collude with the CEO (e.g., Weisbach, 1988; Brickley, Coles and Terry, 1994; Borokhovich, Parrino and Trapani, 1996). Thus, we include these two proxies to investigate if firms with powerful CEOs and entrenched boards are more likely to grant MAP plans.

Not supporting this view, Table 3 shows that CEO tenure is not correlated with MAP plan uses, and boards with lower percentages of inside directors are more likely to grant MAP plans.<sup>19</sup> In untabulated

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<sup>19</sup> Some studies suggest that insider dominated boards can be optimal for large and complex firms since they provide more expertise in the advisory role (Coles, Daniel, and Naveen (2008)). In untabulated test, we investigate whether

results, we use the factor analysis method to compute a factor score of CEO power based on board independence, CEO tenure and CEO ownership for each firm-year observation. We include CEO ownership as Denis, Denis and Sarin (1997) suggest that board monitoring is weaker when the CEO has higher ownership. When we replace the three individual variables with the CEO power factor score, the regression coefficient is negative and statistically significant at the 1% level, which again is inconsistent with the argument that MAP plans are a rent-seeking tool for powerful CEOs. We also find that the probability of granting a MAP plan is 6.4% lower for firm with retiring CEOs than firms without, as these CEOs may not stay till the end of the long-term performance period. The coefficient of new CEO dummy is negative and significant at the 10% level, suggesting MAP grants are not driven by turnover events.

Models (2) to (4) in Table 3 present the results of several robustness checks. In model (2), we exclude 62 firms that grant their CEOs MAP plans only once in the sample period to control for the possibility that significant corporate events, such as mergers and acquisitions, had driven these one-time grants. As shown in Figure 3, the largest annual increase in the percentage of firms that adopt MAP plans is from 2005 to 2006, with an increase of 6.59%. This increase coincides with the 2006 SEC requirements of enhanced disclosure of executive compensation contracts.<sup>20</sup> To make sure that our results are not driven by changes in disclosure requirements, we repeat our regression in the sub-period of 1996 to 2005 and present the result in model (3). The target payouts of MAP grants vary across firms and may contain information on the importance of the contracts. In model (4), we use the target MAP payout as a

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our result on board independence is driven by corporate governance or firm complexity. We first regress the inside director ratio on proxies for firm complexity, firm size and the number of business segments, and use the regression residual to replace inside director percentage in the probit regression. The coefficient on the residual remains negative and highly significant ( $p$ -value=0.000), suggesting that the negative coefficient on the board insider percentage is unlikely to be driven by complex firms.

<sup>20</sup> In October 1992, the SEC adopted amendments to disclosure rules that require companies to disclose all elements of compensation in formatted tables, including the element's relation to firm performance. In 2006, the SEC further enhanced disclosure rules to request that firms disclose performance plans under the "Grants of Plan-Based Awards" table. It is possible that a small percentage of firms neglected to report MAP plans prior to 2006 and subsequently improved disclosure under the new rules. However, we believe that such reporting violation should be rare given that our sample mainly consists of S&P 500 firms. Moreover, the discussion from SEC staff on compensation disclosure showed that the agency was not concerned about firms' neglecting to disclose performance-based plans under the 1992 rules (<http://www.sec.gov/news/speech/spch102004alb.htm>).

percentage of total compensation as the dependent variable, and estimate a Tobit regression using the same set of explanatory variables. Results in models (2) to (4) are similar to those in the baseline model.

## **5. Design of MAP plans**

In this section we examine four features of MAP plans: the choice of a specific accounting performance measure, the length of the performance period, the decision to use relative performance evaluation against a peer group, and the award type (cash vs. stock). We develop hypotheses based on predictions from contracting theories, which suggest that contract features should reflect each firm's characteristics, strategic imperatives, and shareholder preferences. When applicable, we also examine whether powerful CEOs would tweak the contract design to benefit themselves. We summarize the hypotheses discussed in this section in panel A of Table 4.

### *5.1. Selection of performance criteria*

As shown in Panel D of Table 1, firms use a variety of accounting measures in MAP plans. In this section, we examine the determinants of the four most widely-used types of performance measures that MAP plans based on: (1) earnings, (2) sales, (3) cash-flow, and (4) EVA. The literature suggests that the selection of performance criteria is affected by the informativeness (signal quality) of each measure and the firm's strategic imperatives (e.g., Holmstrom, 1979; Lambert and Larcker, 1987; Ittner, Larcker, and Rajan, 1997). Firms are less likely to use a volatile performance measure because of its low signal quality (e.g., Holmstrom, 1979; Lambert and Larcker, 1987). A firm may also choose a performance measure to implement important corporate strategies and improve long-term survival (e.g., Salter, 1973; Ittner et al., 1997). More specifically, companies that spend heavily on advertising and sales may care more about revenue growth and include it as a performance criterion. Firms with higher bankruptcy risk would pay more attention to cash flow measures to maintain sufficient liquidity. EVA related criteria can better assess the efficiency of a firm's capital investment decisions. We thus expect capital-intensive firms to be more likely to use EVA-based measures as they may be more concerned about investment efficiency.

Panel B of Table 4 presents the probit regression results for the determinants of choosing the four performance criteria respectively. We run the regressions for firm-year observations with a MAP grant. In column (1) to (4), the dependent variable is a binary variable that equals one if the MAP plan uses the performance measure specified in the column head and zero otherwise. Performance volatility is the standard deviation of the respective performance values over the past five years scaled by previous year's performance. More specifically, we use ROAs for earnings-based plans, sales for sales-based plans, operating cash-flow for cash flow based plans, and return on invested capital (ROIC) for EVA-based plans. Supporting the "signal quality" hypothesis, the coefficients on performance volatility are negative and statistically significant for all four performance measures.

We then examine whether firms choose certain performance criterion to match their strategic imperatives. Column (2) of Panel B shows that firms spending heavily on advertising and SG&A are more likely to include sales-based performance measures in MAP contracts. In column (3), we find that firms with higher Ohlson's O-Score, a proxy for bankruptcy risk, are more likely to use cash-flow measures in MAP plans.<sup>21</sup> We use the value of net property, plant and equipment divided by total asset to measure a company's capital intensity and separate firms into top and bottom quartiles based on their capital intensities. Column (4) shows that the coefficient on the bottom quartile dummy is negative and statistically significant, indicating that firms with relatively low levels of fixed investments are less likely to choose EVA measures in MAP plans. We do not find that capital intensive firms use more EVA measures, as the coefficient on the top quartile dummy is not statistically different from zero.

For each accounting measure, we include the firm's past year performance percentile rank in the firm's Fama-French 48 industry and the interaction between the performance rank and CEO power as additional independent variables in the regressions. The predictions on past performance ranks are ambiguous: A firm may prefer a measure with poor past performance because the area needs improvement, or it may choose a measure with good past performance as it is the firm's long-term

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<sup>21</sup> We find similar results when using the Altman Z-Score and interest coverage ratio as alternative proxies for bankruptcy risk.

strategic focus. Panel B shows that, for all four measures, the coefficients on the past performance ranks are insignificant. We next examine if powerful CEOs try to “time” a measure based on past performance. When interacting the performance ranks with the CEO power factor, the coefficient on the interaction term is negative for earnings- and EVA-based MAP plans, but is positive for sales- and cash flow based plans. None of the coefficients is statistically significant at the conventional level. Thus, we do not find evidence that powerful CEOs choose a measure based on its past performance.

## 5.2. *Performance benchmark*

In this section, we investigate firms’ choice between relative vs. absolute performance benchmarks. Panel C of Table 1 shows that within firms that explicitly disclose MAP plan performance benchmarks, 1,224 plans use an absolute value and 311 plans use at least one relative measure, where the accounting performance is benchmarked against that of peer companies or an index. We draw our hypothesis from the literature studying relative performance evaluation (RPE) to examine whether the design of MAP plans is consistent with predictions of contracting theories.

Like the choice of performance criteria, the likelihood of using RPE also depends on whether RPE provides a better signal of managerial efforts and is consistent with firms’ strategic imperatives. Gibbons and Murphy (1992) argue that RPE would insulate executives from common exogenous risk and provide a more informative evaluation of their efforts. Based on the argument, we expect that RPE would be more useful when firm performance is heavily influenced by common factors. Next, we investigate the relation between industry competition and the likelihood of including RPE in MAP contracts. Aggarwal and Samwick (1999) and Joh (1999) argue that RPE could induce harmful competitive behavior in highly competitive industries. On the other hand, DeFond and Park (1999) and Gong, Li and Shin (2011) suggest that there are greater benefits of using RPE in competitive industries because of a higher degree of common risk in these industries. Thus, whether firms are more or less likely to use RPE in MAP contracts in competitive industries becomes an empirical question. Lastly, we examine if powerful CEOs are less likely to include RPE in MAP contracts as benchmarking would eliminate the benefit of positive exogenous shock (e.g. Bertrand and Mullainathan, 2001).



Panel C of Table 4 presents the probit regression results on the decision to use RPE. The dependent variable is set to one if the MAP plan contains at least one accounting criterion with RPE. We use the correlation between a firm's return on asset (ROA) and the industry's asset weighted average ROA over the past five years to measure the impact of common industry shock. The significant positive coefficient in column (1) confirms that firms which co-move more with the industry are more likely to use RPE to filter out common shocks. Inside director ratio and CEO tenure are unrelated to the use of RPE in MAP plans. In column (2), we find weak evidence that powerful CEOs are less likely to receive MAP plans with RPE, where the coefficient on the CEO power factor is negative and statistically significant at the 10% level. We use the Herfindahl index based on the Fama-French 48 industries to measure industry competitiveness. Since the index is an industry-level variable, we present the regression models without industry dummies in column (3) and (4). Consistent with the argument in DeFond and Park (1999) and Gong et al. (2011), the coefficient on the Herfindahl index is negative and statistically significant at the 1% level.

### 5.3. *Performance evaluation period*

While the majority of MAP plans evaluate CEO performance over a three-year performance period, there is still some degree of variation in the length, ranging from 1.5 years to 10 years. In this section, we explore factors that may influence the length of the performance evaluation period. Firstly, we expect firms with volatile performance to prefer longer periods to more accurately evaluate CEOs. Secondly, firms with more long-term shareholders may prefer longer evaluation periods to align the horizon of CEOs with that of shareholders (e.g., Stein, 1996; Bolton, et al., 2006). Thirdly, firms with more long-term investment projects that take years to bear results may prefer longer periods (Larcker, 1983).

We present the Tobit regression results on the determinants of the length of the performance period in column (1) of Panel D. The dependent variable is the number of performance years specified in MAP plans. As expected, firms are more likely to choose longer performance periods as earnings volatility, measured as the standard deviation of ROA in the past five years, increases. The coefficient on the bottom quartile turnover dummy is positive and significant at the 1% level, suggesting that firms prefer a longer

evaluation period when there are more long-term shareholders. The coefficient on the top quartile turnover dummy is negative as predicted, but not statistically significant. Firms with high capital expenditure to asset ratios are more likely to choose longer evaluation periods, while the coefficient on the R&D to asset ratio is insignificant. Overall, our results show that the length of the performance period is influenced by performance volatility and capital expenditures.

#### 5.4. *MAP award type*

The expected contingent payment from a MAP plan can be expressed as a fixed-value cash award (41.5%), a fixed-share stock award (55.3%), or a mixture of both (3.2%). In proxy statements, companies often claim that they choose stock-based MAP awards to ensure that CEOs will own a required amount of company stocks. Thus, we expect that firms are more likely to use stock-based MAP contracts when the CEO's equity ownership is low. We also expect that financially constrained firms and firms that grant MAP plans with a large target payment would prefer stock-based grants over cash-based ones, as the latter could impose significant liability on the firm's cash balance.

We present the probit regression results on the determinants of firm's choice of the award type in the second column of Panel D in Table 4. The dependent variable is a binary variable that equals one if the expected award is stock-based. The coefficient on CEO stock ownership at the beginning of the year is negative and statistically significant at the 1% level, suggesting an increased probability of granting stock-based MAP plans when the CEO's stock ownership is low. We define a firm as financially unconstrained if the firm has non-default bond ratings and has a payout ratio in the top quartile within our sample (e.g., Almeida, Campello, and Weisbach, 2004; Denis and Sibikov, 2010). As expected, the coefficient on the financially unconstrained dummy is negative and statistically significant at the 5% level. Supporting the argument that firms would prefer stock-based grants when the target payment is large, we find a positive coefficient on the ratio of target payout to total assets.

In summary, we find that the MAP contract design is generally consistent with predictions from contracting theories. Firms design different aspects of MAP plans based on the signal quality of performance measures, firms' strategic imperatives, and shareholder preferences. Our analysis on MAP

design is done for firm-year observations with MAP grants. Theoretically, some unobservable firm characteristics may influence a firm's decision to grant a plan as well as the specific features of MAP contracts, resulting in a self-selection bias in the analysis. Even though it is unlikely that certain factor could bias all our findings in a systematic way that exactly fit our hypotheses, the results should be interpreted with caution as the analysis is conditional on firms choosing MAP plans.<sup>22</sup>

## **6. The time series trend of MAP incentives**

Figure 3.A shows that the percentage of firms that adopt MAP plans does not vary much from 1998 to 2001, but increases monotonically afterward. This kink in MAP adoptions coincides with several major events: (1) the burst of the stock bubble that raised investors' awareness of the signal quality of stock performance, (2) firms' starting to expense stock options, and (3) option backdating scandals that further changed investors' views unfavorably towards option grants. Firms could rationally adjust their incentive design in response to changes in contracting environment, or blindly follow the trend regardless of their characteristics and shareholder preferences. To better understand the motivations behind the time series trend of MAP plans, we compare the determinants of granting MAP incentives before and after 2002, study the characteristics of the firms that initiate MAP plans after 2002, and assess factors that may have motivated these firms to adopt MAP incentives.

### *6.1. The determinants of granting MAP incentives before and after 2002*

To investigate if companies blindly follow the trend and grant MAP plans regardless of firm characteristics after 2002, we repeat the analysis of MAP plan adoptions in Table 3 for two sub-periods: 1996 to 2001 and 2002 onward. To preserve space, we only report coefficients of the interest variables in Table 5. But all regressions include the same set of control variables as in Table 3. The first two columns in Panel A of Table 5 show that for both periods, the sign and significance of the coefficients of the

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<sup>22</sup> In untabulated robustness tests, we find similar result when using the Heckman (1979) two-stage treatment effects estimation to control for self-selection on observables. Specifically, we use the same probit model as in Table 3 to estimate the probability that a firm will grant a MAP plan in the first stage, and simultaneously estimate the design decisions conditional on the decision to grant a MAP plan. In addition, to address the possibility that these contract features are simultaneously determined, we estimate the contract design simultaneously as a system of seven equations and find qualitatively similar results.

interest variables are similar to earlier results. The key testing coefficients are not significantly different between the two sub-periods, except that the coefficient of inside director ratio is significantly more negative in the latter period. This increased significance appears to be driven by a larger difference in inside director ratios between MAP-plan adopting firms and non-adopting firms as show in Panel E of Figure 6.

Figure 3.B shows that the upward trend of MAP grants is mostly driven by the increasing usage of stock-based MAP plans, which suggests that firms do not shy away from incentives that are linked to stock performance after 2002. Instead, they are more likely to combine accounting- and stock-based incentives together in the post-bubble period. We test the motivations for granting MAP contracts with cash- or stock-based payouts for the pre- and post-2002 periods and present the results in columns (4) to (9) of Panel A in Table 5. The coefficients of the main interest variables, i.e. proxies for signal quality and shareholder horizon, remain significant for both award types in general. Firms with more independent boards are more likely to grant both cash- and stock-based MAP plans after 2002. In Panel B of Table 5, we change the dependent variable to a magnitude variable that equals the MAP plan target payout divided by total CEO compensation. We estimate the regressions using a Tobit model and find similar results as those in Panel A. Collectively, the results in Table 5 suggest that firms in general rationally consider their characteristics when granting MAP contracts both before and after 2002.

#### *6.2. Characteristics of MAP plan-adopting firms before and after 2002*

To further investigate what types of firms drive the growing popularity of MAP plans, we plot measures of performance signal quality, shareholder horizon, and board independence for firms that adopted MAP plans before 2002 and after 2002, as well as firms that have never used the plans. As Figure 6 shows, the pre-2002 “early” adopters on average have the highest stock to accounting volatility ratios, more business segments, the lowest sales growth rates, the lowest average monthly stock turnovers and the most independent boards. These firms are likely to benefit the most from using long-term accounting-based performance to evaluate executives; therefore, they adopt MAP plans first. The post-2002 “late” adopters lag behind in accounting signal quality, and they have relatively shorter shareholder

horizons and less independent boards. Meanwhile, firms that have never adopted a MAP plan in general have the shortest shareholder horizons, lowest accounting signal quality, and the least independent boards. These firms would not benefit from accounting-based incentives and their shareholders have a short-term focus, therefore they do not flock to MAP plans despite the trend.

### *6.3. Changes in the contracting environment and the growth of MAP plans*

In this section, we examine what factors have prompted the “late adopters” that were previously on the fence to start adopting MAP incentives after 2002. Following Bizjak, Lemmon and Whitby (2009), we rely on a multi-period logit regression to identify factors that contribute to the *spread* of MAP incentives in the post-2002 period. The dependent variable is set to 1 in the year that a firm grants MAP incentives for the first time in the post-2002 period. After the initial adoption, the firm will be dropped from the sample in subsequent years. The dependent variable is set to zero for firm-year observations prior to their respective MAP plan initiation year and for all firm-year observations of firms that never adopt a MAP plan. All observations of firms that have already adopted MAP plans before 2002 are not included in these logit regressions.

We consider three major events in the early 2000s which have likely changed the compensation contracting environment and contributed to the spread of MAP incentives: the burst of the stock market bubble, the trend to expense option grants, and option backdating scandals. First, the stock market bubble in the late 90’s and the subsequent burst of the bubble may have raised investors’ awareness that stock prices can deviate from fundamental values for a prolonged period of time. Firms that had elevated stock prices during the bubble period should be more likely to explore non-stock based performance measures to better evaluate CEOs. For each firm, we measure the degree of misevaluation during the bubble period as its average market to book equity ratio during the bubble period, 1997-1999, divided by the average market to book ratio in the pre-bubble period, 1994-1996. The results are presented in column (1) of Table 6. The coefficient of this bubble misevaluation measure is significantly positive with a *p*-value of 0.05, suggesting that a firm’s valuation during the 1997-1999 periods strongly predicts whether it will

start granting MAP plans in the post-bubble period.<sup>23</sup>

It is possible the CEOs may prefer accounting-based compensation incentives if they expect lower future stock returns in the post-bubble period. Not supporting this view, Figure 3.B indicates that firms do not shy away from equity-based pay after 2002 as the newly adopted MAP plans are mostly stock-based. Results presented in Section 6.1 (Table 5) also show that firms' decisions to grant stock-based MAP plans continue to depend on accounting signal quality and shareholder horizon after 2002. Together, the evidence suggests that firms with elevated valuation during the bubble period are subsequently more willing to combine accounting signal with stock performance as long-term incentives.

Next, we investigate whether the change in accounting practice on option expensing affects firms' decision to adopt MAP plans. Before 2002, firms can choose to follow APB opinion No. 25 and expense option grants at their "intrinsic value", which is normally zero as the option exercise prices are usually set to equal to the grant date market prices. However, the trend started to change from the summer of 2002. More than 150 firms chose to voluntarily expense option grants at "grant date fair value" in 2002 and early 2003 (Aboody et al., 2004). Later, FASB announced mandatory fair value expensing of option grants under the FASB ASC Topic 718, effective for fiscal years starting after June 15, 2005.<sup>24</sup> Before the accounting practice change, firms could use option grants to defer compensation costs and improve reported earnings in the current period. This expensing advantage of option grants would be especially attractive to firms that are barely profitable as any small changes in their expenses could swing profitability out of or into the negative zone. We expect these firms to start switching to other types of compensation incentives after the expensing benefit of options is gone. We identify firms that are likely to suffer "large option expensing effect" as those with an average net profit margin between -0.03 to +0.03

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<sup>23</sup> In untabulated robustness test, we re-estimate the "bubble misevaluation" variable using the "misevaluation" component of the market to book equity ratio as defined in Rhodes-Kropf, Robinson, and Viswanathan (2005) and Hertz and Li (2010) and find similar results.

<sup>24</sup> The new FASB rule also changed the expensing method of equity-based pay from "variable" accounting (under APB 25) to fair-market-value accounting. This new method is considered more advantageous than the "variable" expensing because firms do not need to record additional expenses when stock price increases (Murphy, 2012). Moreover, firms have more flexibility on how much to expense by considering the performance vesting conditions and choosing their own valuation models. Thus, the FASB rule change may have further increased the attractiveness of non-option equity pay, including stock based MAP plans.

from 2000 to 2002. As expected, results presented in column (2) of Table 6 show that these firms are more likely to initiate MAP grants after 2002. We obtain similar results if we change the average net profit margin criteria to negative or between -0.05 to +0.05. The results are also robust if we impose an additional requirement that the total value of option grants to all top executives accounts for more than 5% of the firm's net income.

Lastly, we examine if the breakout of option backdating scandals facilitates MAP plan adoptions. In July 2002, congress passed the Sarbanes-Oxley Act, which inadvertently eliminated option backdating by requiring companies to disclose new option grants within two business days. In late 2005 and early 2006, the practice of option backdating attracted wide public attention after the publication of Lie (2005) and subsequent coverage by the *Wall Street Journal*.<sup>25</sup> We first examine whether companies that potentially engaged in option backdating before 2002 would subsequently switch to MAP incentives. Following Bizjak et al. (2009), we identify an unscheduled option grant as being manipulated if the cumulative return during twenty days before and twenty days after the option grant date is higher than the cutoff points of a 95% confidence level conditional on the monthly standard deviation of returns over the two-year period preceding the option grant date.<sup>26</sup> Firms with at least one option grant identified as manipulated before 2002 would be classified as an option backdater. As shown in column 3 of Table 6, the coefficient on the option backdater dummy is positive but insignificant, suggesting that the probability of initiating MAP plans after 2002 is not significantly higher for pre-2002 option backdaters. Given that option backdating scandals are publicized in 2005 and early 2006, we next examine if firms in industries that had more publicized scandals are more likely to initiate MAP incentives after 2005. We construct a "High Glass-Lewis Industry" indicator variable that equals one if the firm's industry has more than five

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<sup>25</sup> Wall Street Journal (March 2006), "The Perfect Payday," by Forelle and Bandler.

<sup>26</sup> We use the same cutoff points for the 95% confidence level as in Bizjak et al. (2009), which is generated from a randomly selected 500,000 trading days from a sample of 5,716 firms covered by the Thomson Financial Insider Filing database. Our results are similar if we use the cutoff points of 99% or 97.5% confidence levels. We follow Lie (2005) to identify unscheduled options and their grant dates.

firms identified by the Glass-Lewis report as option backdaters.<sup>27</sup> Firms in these industries have more incentives to differentiate themselves by switching away from option grants. We rerun the multi-period logit regression from 2006 onward with the High Glass-Lewis Industry indicator variable. As shown in column (4) of Table 6, the coefficient on the “High Glass-Lewis Industry” variable is positive and significant at the 1% level, indicating that the publicity of option backdating scandal has prompted more firms to seek alternative incentives, including the MAP plans.

In columns (5) and (6) of table 6, we include in one regression the proxies related to the stock bubble, the change in option expensing, and option backdating scandals and find similar results as discussed above. Together, the findings suggest that the time-series trend of MAP incentives after 2002 is related to the changes in contracting environment that were onset since the beginning of 2000s.

#### *6.4. MAP plans’ substitution for option grants*

The expensing rule change and the unfavorable sentiment towards stock options after the uncovering of option backdating scandals have likely increased the perceived costs of using option grants and promoted more firms to adopt MAP incentives. Moreover, many firms disclose in proxy statements that they cut down stock options when adopting MAP plans to make sure that CEO total compensation is not inflated.<sup>28</sup> These arguments suggest that firms may use MAP plans to replace option grants. In this section, we empirically examine this premise.

To study the relation between MAP plans and option grants, we first conduct a baseline test by regressing option grants scaled by CEO total pay on the binary variable that equals one if firms grant a new MAP plan that year and zero otherwise. We control for firm and CEO characteristics that have been shown to relate to the percentage of option grants, as well as industry and year fixed effect. As shown in Panel A of Table 7, the results indicate a significant cross-sectional difference in option grants between

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<sup>27</sup> The Glass, Lewis & Co. Yellow Card Trend Alert Report was released on June 14, 2007. The report compiled 257 companies that have announced SEC inquiries, Justice Department subpoenas, earnings restatements, or internal reviews related to historical option grants. In total, there are 13 of 48 Fama and French industries have more than five firms identified in the Glass-Lewis report.

<sup>28</sup> For example, in 2004 Amgen Inc. initiated a three-year MAP plan contingent on EPS and revenue growth as long-term incentives. The firm also announced significant reduction in stock option grants, “such that the combination of the two grants yields an award value comparable to previous year’s grants consisting solely of stock options.”



firm-year observations with a MAP plan and those without. Column (1) shows that when there is a new MAP grant, the ratio of CEO's option grants to total pay is 5.4% lower, which is a 15.6% drop based on the median option percentage of 34.7%. In column (2) and (3), we find similar patterns of reduction in option grants when using the MAP plan coverage dummy or the magnitude of MAP plan as a percentage of total pay as independent variables. Columns (4) to (6) show that both cash- and stock-based MAP awards are negatively associated with a lower percentage of option grants in CEO pay, with firms granting stock-based MAP plans experiencing more significant reductions in options after 2002. Taken together, the evidence indicates that firms with MAP plans use significantly fewer option-based incentives.

Firms that use MAP plans could be fundamentally different from firms that do not use these plans and thus grant fewer stock options in the first place. To investigate whether firms reduce the use of stock options after granting MAP plans, we compute within-firm changes in option grants as a percentage of total pay for MAP-plan granting firms for three event windows—pre-grant year to grant year, grant year +1, and grant year +2. We focus on these three event windows because more than 80% of the MAP plans in our sample have a three-year performance period. As shown in Panel B of Table 7, the percentage of option grants increases significantly after granting MAP plans in the 1996 to 2001 period, indicating that MAP plans and stock options are complements rather than substitutes before 2002. However, the trend reversed in the post-2002 period. Firms use significantly fewer stock options after both cash- and stock-based MAP grants. The percentage of option grants reduces the most by 0.091 in the third year after granting stock-based MAP plans, a 31% reduction based on the average percentage of option grants (0.296) in the MAP-plan granting sample. When focusing on firm-year observations that grant stock-based MAP plans for the first time, i.e., initial MAP grants, the percentage of option grants reduces dramatically by 0.169 for the last event window, which is a 57% reduction.

The univariate comparisons in Panel B cannot control for an overall declining trend of option grants for all U.S. public firms. To address this issue, we use a difference in difference approach to control for the general trend in option grants and isolate the changes that are more relevant to MAP grants. For each

MAP-plan granting firm-year observation, we identify a matching observation from the *Execucomp* universe using a propensity score matching approach. We use the probit model in Table 3 to estimate the propensity score for each firm year. For each MAP plan-granting firm-year observation, we identify a matching firm in the same year and Fama-French 12 industry, has the closest propensity score, and is not in our sample of MAP-plan granting firms. We find matching firms for 1,597 MAP plan-granting firm-year observations.<sup>29</sup> To ensure the match quality of the propensity score approach, we compare firm characteristics between MAP plan-granting firm years and matched peers and find no statistically significant difference between the two groups.

After identifying the matched peers, we subtract the within-firm changes in the percentage of option grants of matching firms from those of the MAP-plan granting firms for the same event window. Panel C of Table 7 reports the diff-in-diff results for both the whole MAP plan-granting sample and for subsamples separated by award type and sample period. Compared with matching peers, firms experience significantly post-grant drop in option grants after granting stock-based MAP plans in the post-2002 period. However, firms granting cash-based MAP plans experience similar post-grant changes in option awards as matched firms. Consistent with the trend documented in Panel B of Figure 3, firms increasingly use stock-based MAP plans to replace option grants. Firms do not flock to cash-based MAP plans even though cash-based contracts with pure accounting criteria generally have more favorable accounting treatment after 2002. Instead, more companies choose to use stock-based MAP plans that combine accounting criteria with stock performance to provide more balanced long-term incentives.<sup>30</sup>

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<sup>29</sup> Out of the 1,936 MAP plans, we lost 34 plans due to missing compensation information and 216 plans due to CEO turnovers that result in incomplete compensation information to calculate the changes in compensation from pre-grant year to post-grant years. We further exclude 55 plans that do not have enough firm information to generate the propensity score and another 34 plans whose propensity score deviates more than +/- 20% from that of the MAP-plan granting observation. Thus, the final sample for the propensity score matched comparison of option grants is 1,597 pairs.

<sup>30</sup> The propensity score matching results are robust if we (i) estimate the diff-in-diff using three matches with the closest propensity scores to MAP plan-granting firms or (ii) use a caliper match approach where the control firms' propensity scores are within the range of +/- 5% of the firms with MAP grants. We also obtain similar results when we identify control firms using a characteristic matching method, where, for each firm-year observation with a new MAP grant, we obtain a control firm-year observation in the same year and Fama and French 12 industry, the same option% decile and with the closet market capitalization. One potential caveat of our matching method is that when the control firm is not in our sample of S&P 500 firms, we do not know whether the control firm has granted a MAP

## 7. MAP plans and total compensation

Both the cross-sectional and time-series analyses on the decision to grant MAP plans are largely consistent with the view that firms use MAP plans to improve incentive alignment between CEOs and shareholder. Powerful executives, however, may use MAP plans to extract rents by setting low performance hurdles and/or lucrative payoffs on top of their already competitive pay packages. To assess this agency problem based explanation, we investigate whether CEOs with MAP plans receive higher pay.

To investigate whether the usage of MAP plans relates to CEO total pay, we first regress CEO total compensation on a binary variable that equals one if the firm grants a new MAP plan that year. To control for unobservable firm characteristics, we include firm fixed effects in the regression. We also control for CEO characteristics, corporate governance, firm's current and lagged stock and accounting performances, year fixed effects, as well as firm size in a non-parametric manner using decile dummy variables. Panel A of Table 8 present the regressions results. The coefficient on MAP grant dummy is insignificant (p-value = 0.97), suggesting that changes in pay are comparable between CEOs receiving MAP grants and those do not. When separating MAP grants based on time periods and award type, we confirm that CEOs with either cash- or stock- based MAP grants do not earn more than their counterparts in both pre- and post-2002 periods.

Next we directly compare within-firm changes in CEO total pay after receiving a MAP plan between plan-granting firms and a group of matched firms. We identify matched peers using the same propensity score matching method as described in Section 6.4. As shown in Panel B of Table 8, the changes in CEO total compensation are not different between MAP plan-granting firms and control firms for all event windows and for both cash- and stock-based plans in both the pre- and post-2002 periods. This evidence suggests that the growing popularity of MAP plans is unlikely to be an outcome of CEOs' rent-seeking behavior.

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plan. The benefit of drawing control firms from Execucomp is that doing so allows better match quality on firm characteristics. Nevertheless, we repeat the tests by drawing control firms within our sample firms and obtain qualitatively similar results.

We conduct several robustness checks in untabulated tests. Because CEO total compensation is strongly related to firm performance and size, we repeat tests in Panel B by replacing CEO total pay with excess pay, measured as the residual from regressing total compensation on the firm's current and lagged accounting and stock performances, size and other characteristics, and find similar results as those presented in Panel B of Table 8. To address the possibility that the impact of MAP grants may not be fully captured in the grant year's total compensation, we replace the MAP grant dummy with a cover dummy that equals one for all performance years covered by a MAP grant and obtain similar results. In addition, the results are also robust if we use a characteristic matching approach to select matched firms from same industry and with the closest market capitalization and pre-grant compensation level.

Overall, our analysis on post-grant changes in compensation suggests that MAP-plan granting firms do not pay their CEOs more than their matched peers. Unlike the earlier regime shift in compensation design towards stock options in the '90s, the current shift towards MAP incentives is accompanied by a simultaneous reduction in stock options, resulting in changes in the structure of CEO ex-ante incentives, but not in target pay level. Collectively, these results are more consistent with the view that MAP incentives are adopted to improve incentive alignment instead of extract rents.

## **8. Conclusion**

While MAP plans have become one of the most significant components of CEO expected pay, they have not been systematically studied. We know little about the contract details of MAP plans, the motivations for using them, their growing importance in incentive design, and whether they are a rational choice made by firms or just another trendy tool for CEOs to extract rent. Our paper provides first sets of evidence on these issues.

We document the richness of the MAP contract design and study why firms use MAP incentives. Our results suggest that the grant decision and the design of MAP incentives are shaped by the reliability of stock and accounting performances to reflect managerial efforts, shareholder preferences and firm characteristics. Independent boards are more likely to grant MAP incentives, while CEO power does not

increase the likelihood of adopting MAP incentives or relate much to the plan design. CEOs with MAP plans do not receive higher pay than their matched peers. These results suggest that firms use MAP plans to better align managerial incentives with shareholders' rather than enrich powerful CEOs.

The stock market bubble, accounting rule change in option expensing, and option backdating scandals changed investors' view on the signal quality of stock prices, the perceived costs of option grants, and market sentiment towards option grants. In response to these external changes in the contracting environment, more firms start to use stock-based MAP plans in place of option grants so as to combine both stock and accounting performance signals to better evaluate CEOs. Our findings also show that firms do not blindly cater to the trend of using MAP plans, they consider their own characteristics and grant MAP plans when doing so is mostly likely to improve incentive alignment between CEOs and shareholders.

Future research on MAP incentives could further our understanding of these plans and their impact. For example, how firms set performance hurdles, the actual plan payouts, and policy implications of using MAP incentives. Moreover, MAP plans, together with other performance plans, have significantly changed the ex-ante incentives faced by CEOs. Omitting these imbedded performance provisions would result in a biased estimate of executive pay sensitivity to firm performance and volatility. It challenges researchers to development more comprehensive ex-ante incentive measures that could adequately capture performance incentives' sensitivity to both accounting and stock performances. Moreover, it could also be potentially fruitful for researchers to consider all four spectrums of compensation contracts as shown in Figure 1, because more and more firms are combining them to improve overall compensation design.

## Appendix A. An example of MAP plans - Boeing Co<sup>31</sup>

Starting in 2006, Boeing Co initiated a new long-term incentive program based on three-year economic profits. Boeing Co's proxy statement stated that the new performance plan, together with stock options, "is designed to promote sustained shareholder value creation and provide a balanced focus on driving internal and external performance through the achievement of internal goals relative to our long-range business plan and long-term stock price appreciation."

The details of the features of the plan are as follows:

"Performance Awards reward executives based on the achievement of long-term financial goals at the end of a three-year performance period. For the 2006–2008 performance period, economic profit goals were set based on the Company's long-range business plan. Individual target awards are based on a multiple of base salary (set for each pay grade), which is then converted into a number of units.

- Each unit has an initial value of \$100;
- The amount payable at the end of the three-year performance period may be anywhere from \$0 to \$200 per unit, depending on our performance against plan for the period ending on December 31, 2008;
- As a result, final awards may range from 0% to 200% of an individual's target; and
- Payment may be made in cash or stock (at the Committee's discretion).

Performance Awards are designed to pay out 100% of target at the end of the three-year performance cycle if the economic profit goals are achieved at the end of the performance period. Final awards can range from 25% of target for threshold performance to 200% of target for maximum performance. If the threshold level of performance is not achieved, no awards will be paid. For levels of performance between threshold and target, and target and maximum, there will be a linear relationship."

Executive Name	Performance Period	Estimated Future Payouts Under Plan		
		Threshold	Target	Maximum
W. James McNerney, Jr. (CEO)	3 Years	\$1,421,875	\$5,687,500	\$11,375,000

We record the 2006 plan of Boeing Co as follows:

- Length of performance period: 3 years (1/1/2006 to 12/31/2008).
- Award type: Cash.
- Performance criteria: EVA based (economic profit).
- Performance hurdle used: Unknown.
- Award size: Threshold (\$1,421,875); target (\$5,687,500); maximum (\$11,375,000).

<sup>31</sup> <http://sec.gov/Archives/edgar/data/12927/000119312507062748/ddef14a.htm>

## Appendix B. Variable definitions and data sources

Variables	Sources	Definitions
Total Compensation	ExecuComp	Sum of cash compensation, restricted stock grants and option grants, long-term incentive payouts, and all other compensation (TDC1).
Salary	ExecuComp	Base salary of the CEO during the fiscal year.
Bonus	ExecuComp	Bonus earned by the CEO during the fiscal year.
Option Grants	ExecuComp	The aggregate Black–Scholes value of stock options granted the executive during the year.
Restricted Stock Grants	ExecuComp	The value of restricted stock granted during the year (determined as of the date of the grant).
Stock Volatility/Earnings Volatility	Compustat/CRSP	Standard deviation of the past 60 months of stock returns divided by the standard deviation of the past five years' earnings. Earnings are measured as income before extraordinary items, scaled by book assets.
# Business Segments	Compustat Segment	Number of segments that the firm operates in each fiscal year.
Sales Growth	Compustat	Annual sales growth rate.
Average Monthly Stock Turnover	CRSP	The monthly trading volume divided by the number of shares outstanding.
Inside Director Ratio	RiskMetrics and Proxy Statements	The percentage of inside directors to the total number of directors on the board.
CEO Tenure	ExecuComp	Number of years served as the CEO.
CEO Ownership	ExecuComp	The percentage of firm shares owned by the CEO.
CEO Power Factor	ExecuComp, RiskMetrics and Proxy Statements	CEO power is a factor score computed from a factor analysis of board independence, CEO tenure and CEO ownership.
Retire Age (0/1)	ExecuComp	Dummy variable that equals 1 if CEO age $\geq 65$ and zero otherwise.
New CEO (0/1)	ExecuComp	Dummy variable that equals 1 if CEO tenure is no more than 2 years and zero otherwise.
Board Size	RiskMetrics and Proxy Statements	The total number of directors on the board.
Fiscal Year Stock Return	CRSP	Annual stock return in the fiscal year.
ROA	Compustat	EBITDA divided by total assets.
R&D/Total Assets	Compustat	R&D expenditures to book asset; set to zero if missing.
ADV/Total Assets	Compustat	Advertising expenditures to book assets; set to zero if missing.
CapEx/Total Assets	Compustat	Capital expenditures to book assets.
PPENT/Total Assets	Compustat	The net total value of Property, plant and equipment divided by total assets.
Institutional Holding	Thomson Financial 13-f filings	The sum of institutional ownerships
Market Cap (\$ billions)	Compustat	Market capitalization is measured as the number of shares outstanding multiplied by the stock price at the fiscal year-end.
Daily Return Volatility	CRSP	The standard deviation of daily stock returns in the fiscal year multiplies the square root of 254.

(continued)

## Appendix B. Continued

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Performance Volatility	Compustat	To calculate performance volatility, we use the standard deviation of past five years' ROAs for earnings-based plans, past sales for sales-based plans, past cash-flow for cash flow based plans, and return on invested capital (ROIC) for EVA-based plans. ROIC is calculated as $EBIT(1-tax\%)/Beginning\ of\ Year\ Total\ Invested\ Capital$ .
(SG&A + Advertising)/ Total Assets	Compustat	Selling, general and administrative cost plus advertising expenditures to book assets; set to zero if missing.
O-score	Compustat	Ohlson (1980) measure of the likelihood of bankruptcy.
Performance Rank	Compustat	The percentile rank of the firm's past year performance in the firm's Fama-French 48 industry. We use past ROA for earnings-based plans, past sales for sales-based plans, past cash-flow for cash flow based plans, and return on invested capital (ROIC) for EVA-based plans.
Earnings Volatility	Compustat	The standard deviation of ROA in the past five years.
Correlation (ROA, INDROA)	Compustat	The correlation between the firm's ROA and the industry's asset weighted average ROA over the past five years.

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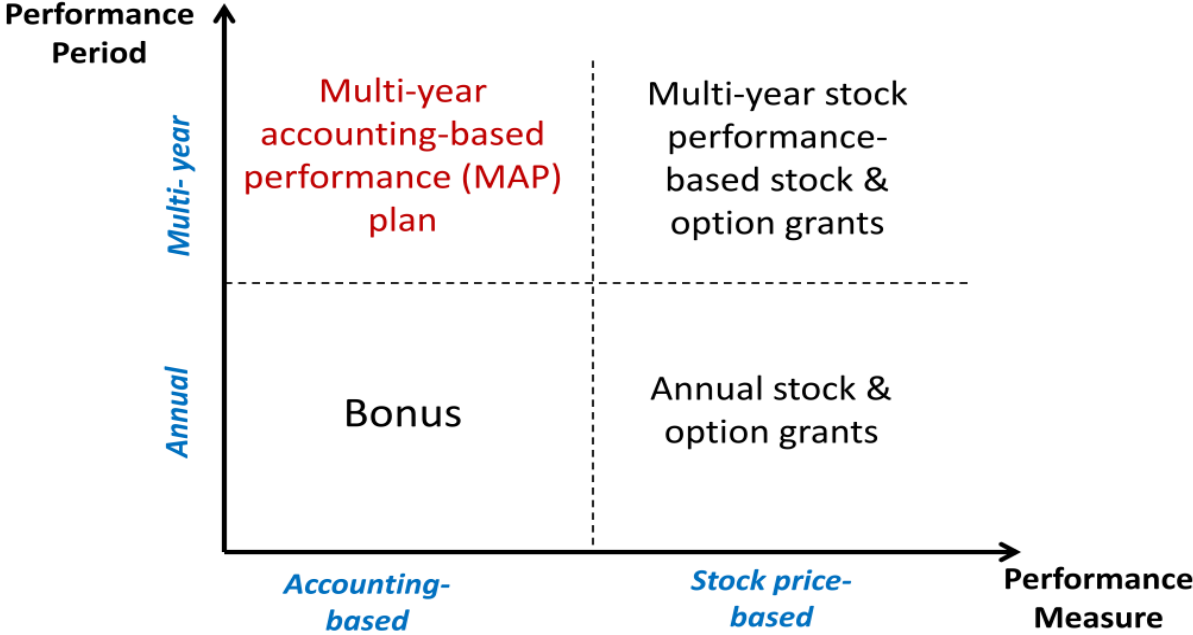
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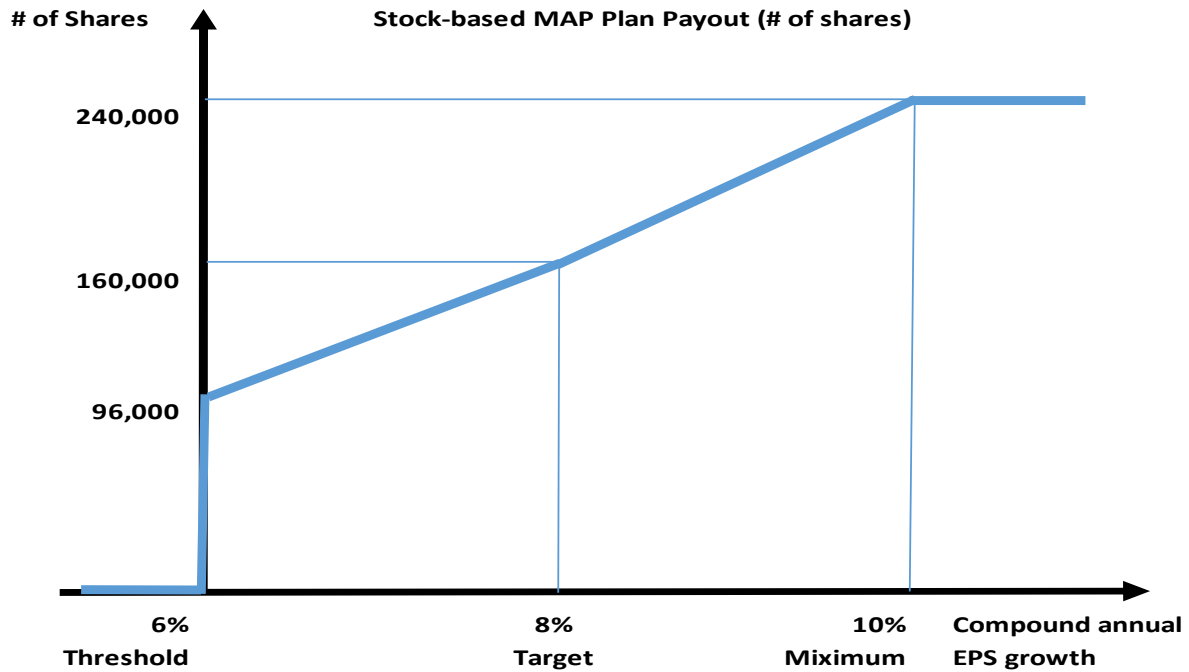
Figure 1. The Executive Incentive Compensation Design



**Figure 2. An Example: The Coca-Cola Company 2006 Stock-based MAP Plan**

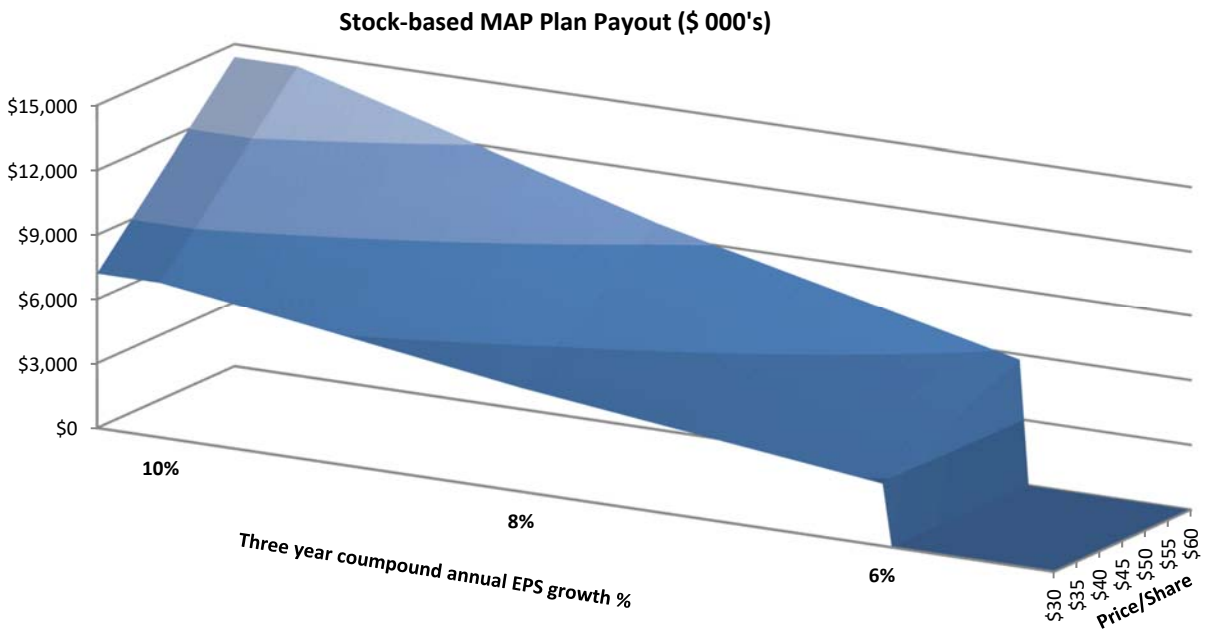
Panel A. MAP Plan Payout in Shares

This figure presents the performance hurdles and the expected payout for each performance hurdle.



Panel B. MAP Plan Payout in Dollars

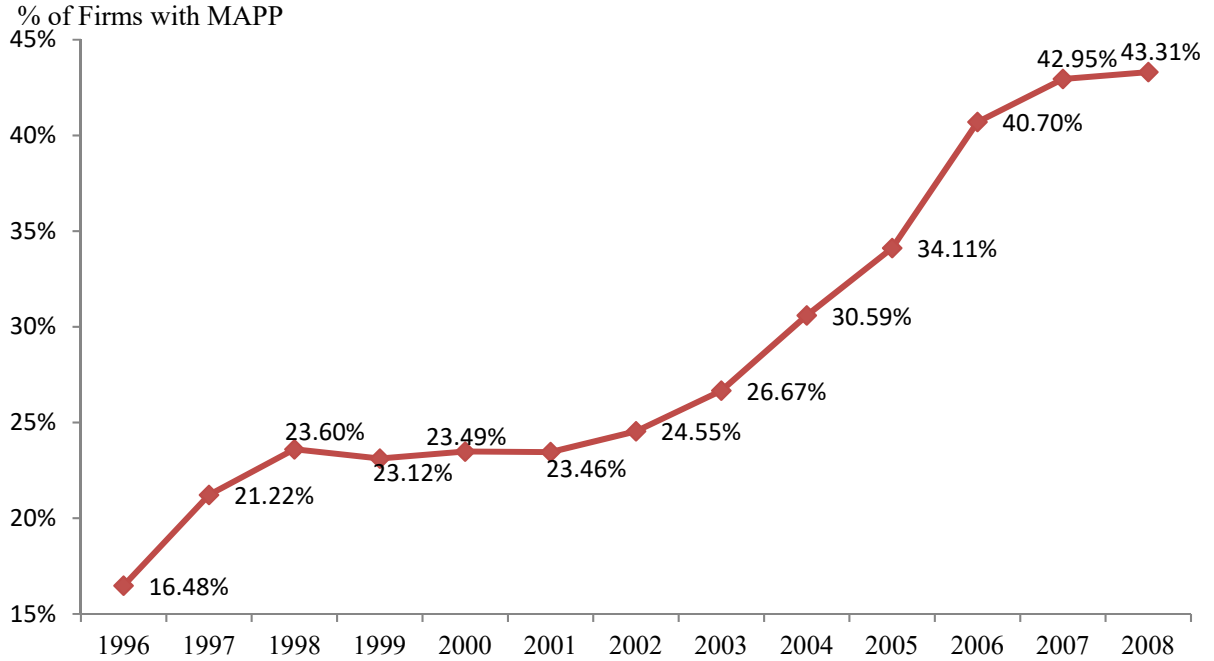
This figure presents how the expected payout from a stock-based MAP plan changes with the EPS growth rate and stock price.



**Figure 3. Time Series Trend of MAP Incentives**

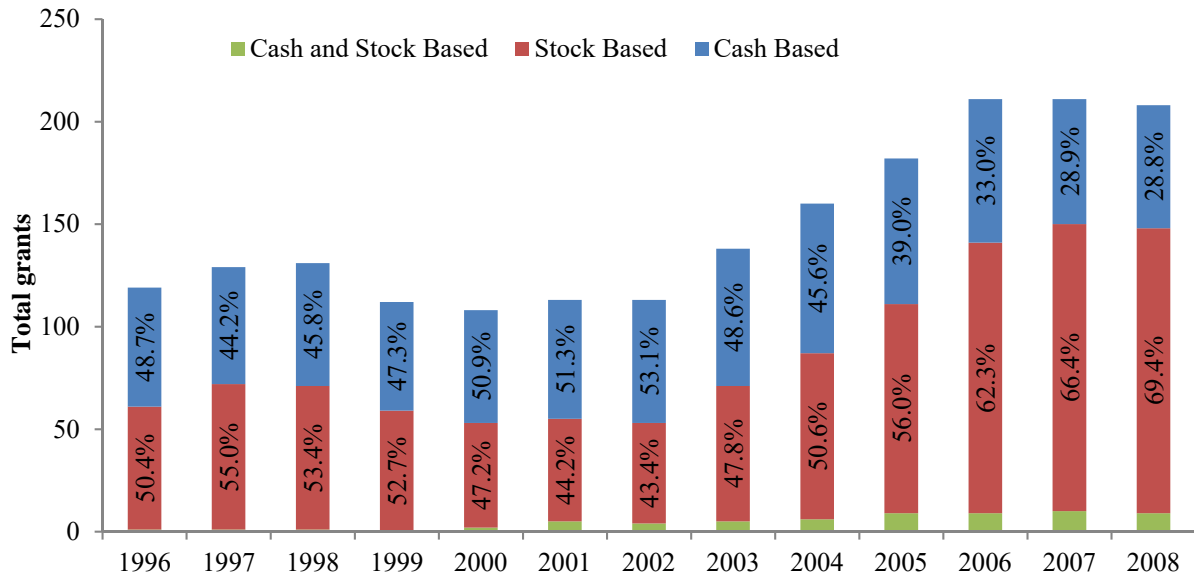
Panel A. MAP Incentives Coverage from 1996 to 2008

This graph presents the percentage of firms covered by a MAP plan from 1996 to 2008. The sample includes 8,683 firm-year observations that cover all S&P 500 firms from 1996 to 2008.



Panel B. Award Types of MAP Plans from 1996 to 2008

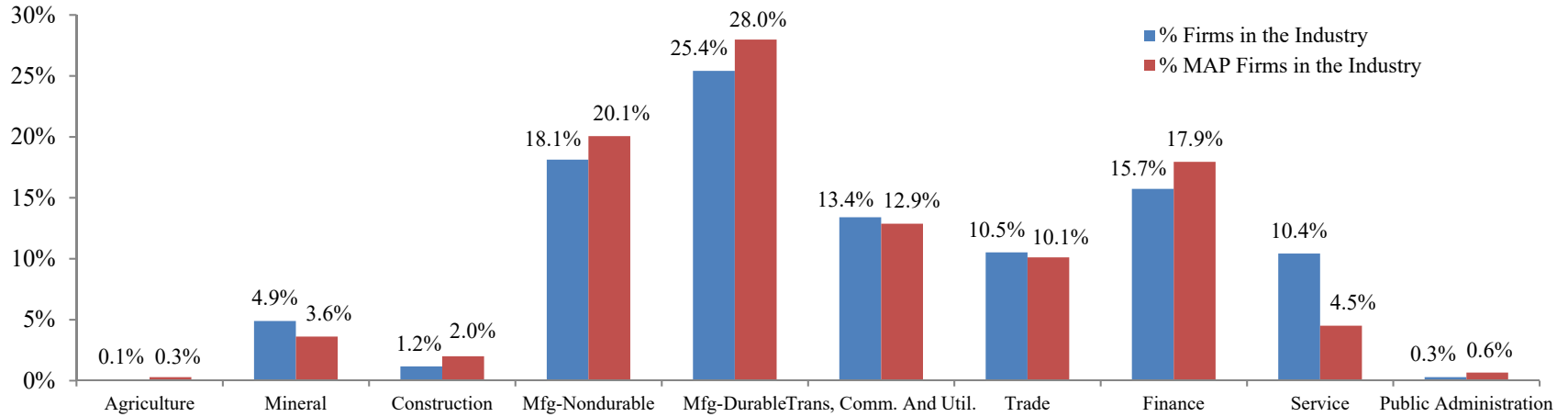
This graph presents the distribution of MAP plans by award types from 1996 to 2008. The sample includes 8,683 firm-year observations that cover all S&P 500 firms from 1996 to 2008.



**Figure 4. Industry Distributions of MAP Incentives**

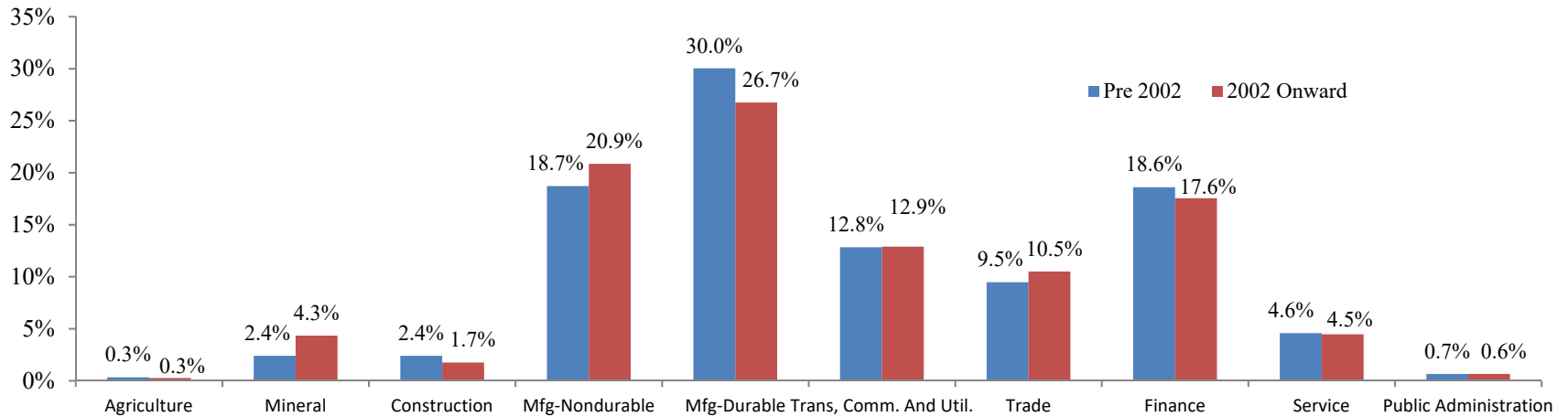
Panel A. The Industry Distribution of MAP Incentives

This graph presents, across different industries, the distribution of all 8,683 firm-years in our sample and the distribution of 2,463 firm-years covered by MAP plans from 1996 to 2008.



Panel B. The Industry Distribution of MAP Incentives Before and After 2002

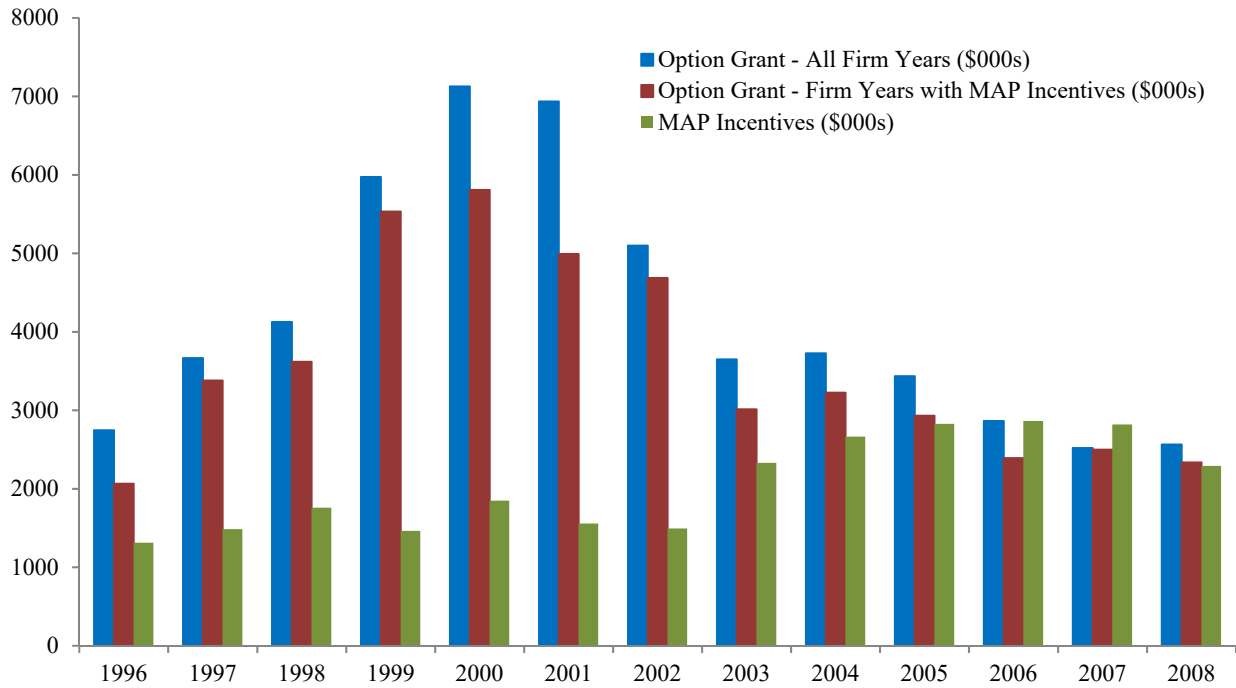
This graph presents the industry distribution of 2,463 firm-years covered by MAP plans for two periods: 1996 to 2001, and from 2002 onward.



**Figure 5. Comparison of the Magnitudes of MAP Incentives and Option Grants**

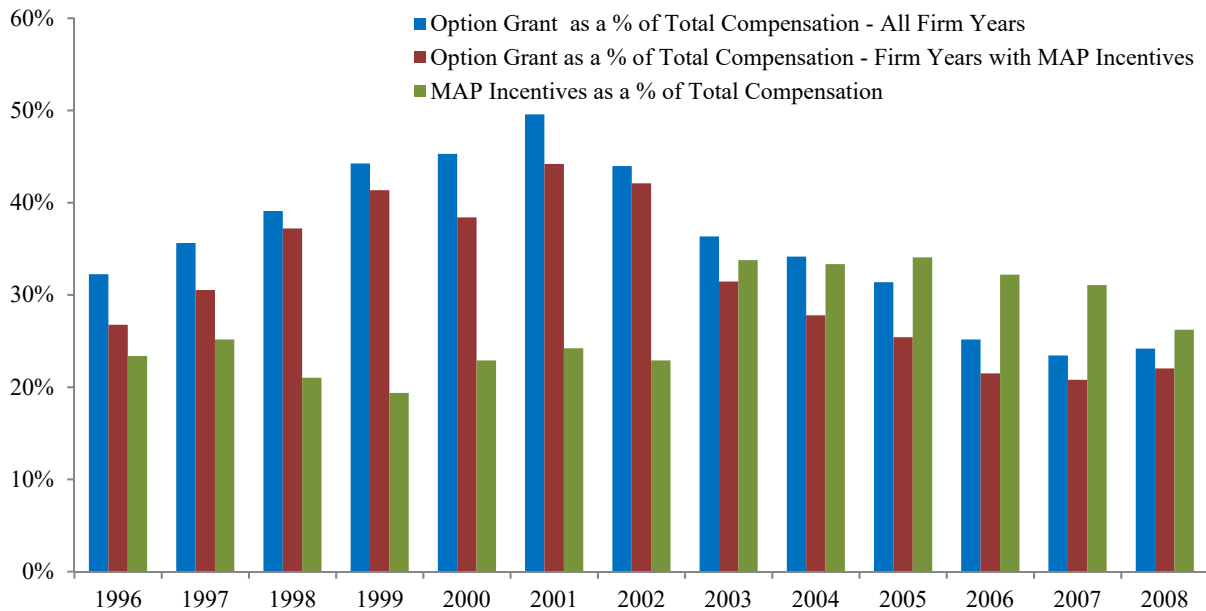
Panel A. The Time Series Trend of MAP Incentives and Option Grants (\$)

This graph compares the annual averages of the expected target payouts of MAP plans to the annual averages of option grants from 1996 to 2008. The sample includes 8,418 firm-year observations that cover all firms that once appeared in the S&P 500 index from 1996 to 2008 and have related compensation data from the *ExecuComp*. All values are in 2007 dollars.



Panel B. The Time Series Trend of MAP Incentives and Option Grants (%)

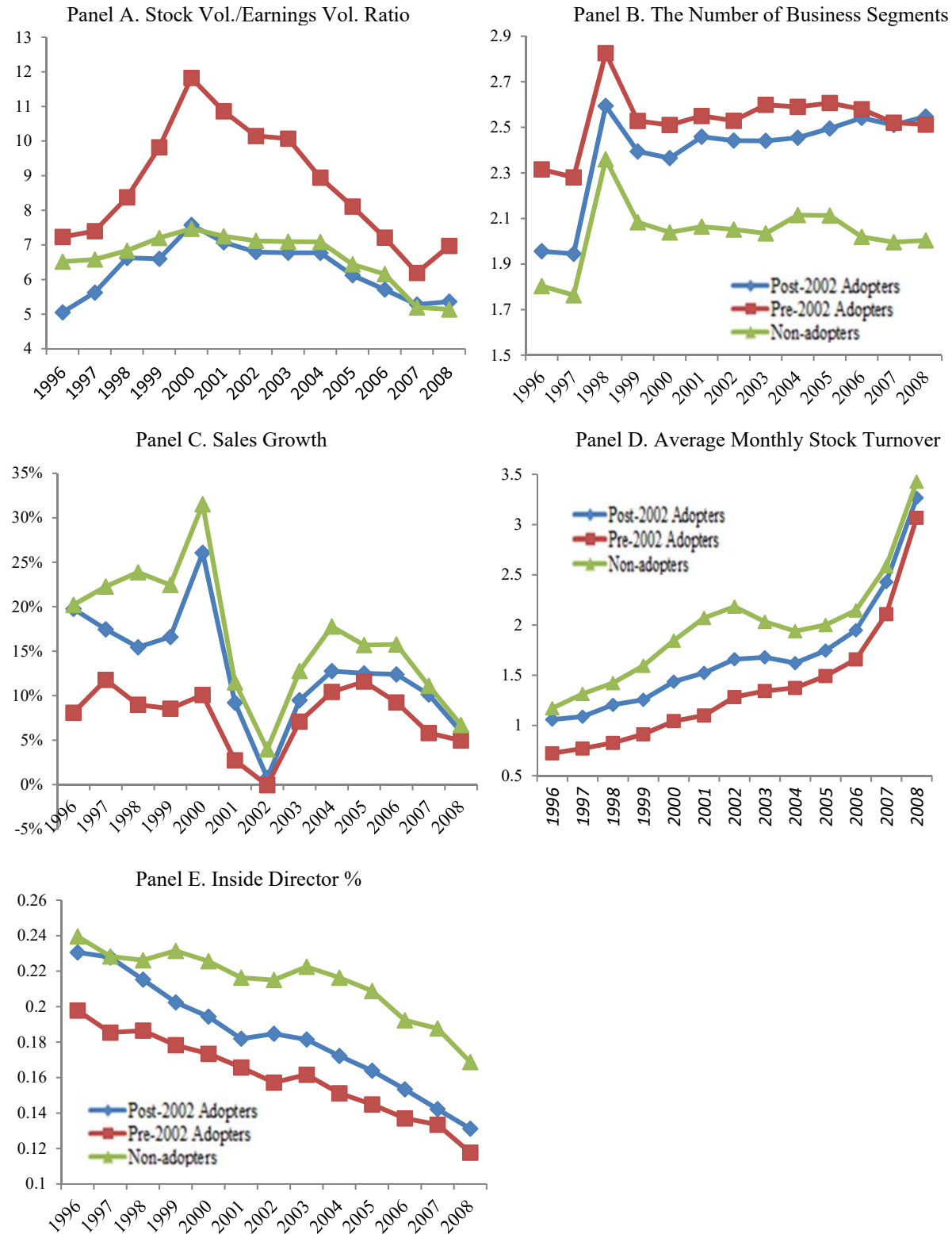
This graph compares the annual averages between MAP target payout as a percentage of total compensation and option grant as a percentage total compensation.





**Figure 6. Firm Characteristics of MAP Adopters and Non-adopters**

These graphs presents the time-series values of firm characteristics for firms that adopted MAP plans before 2002 (Pre-2002 Adopters), after 2002 (Post-2002 Adopters), and for firms that never adopted a MAP plan (Non-adopters) during the sample period.



**Table 1. Descriptive Statistics of MAP Incentives**

This table presents descriptive statistics for the 1,936 MAP grants of all S&P 500 firms from 1996 to 2008. All values are in 2007 dollar values.

*Panel A. The Length of Performance Period*

	Obs.	% of Total MAP Grants
1<#Years<2	4	0.21
2≤#Years<3	152	7.85
#Years=3	1,604	82.85
#Years=4	110	5.68
#Years≥5	57	2.94
Unknown	9	0.46

*Panel B. Award Types*

	Obs.	% of Total MAP Grants
Cash	803	41.48
Shares	1,070	55.27
Option	1	0.05
Mixed Cash/Shares/Options	62	3.20

*Panel C. Performance Benchmark*

	Obs.	% of Total MAP Grants
Absolute Measures	1,224	63.22
Relative Measures	311	16.06
Unknown	401	20.71

*Panel D. Performance Criteria*

	% of MAP Grants Using the Measure	% of MAP Grants Using the Measure Only	% of MAP Grants with Stock Performance Requirements
Earnings	83.42	56.15	16.84
Sales	16.12	0.62	3.62
Cash Flow	8.83	4.08	1.19
EVA	8.21	2.17	2.17
Other Accounting	10.80	2.53	3.10
Unknown	1.45	0.62	0.26

*Panel E. MAP Grants Award Size and Other Compensation Components (in \$000's)*

Variable	Obs.	Mean	Median	Maximum	Minimum	Std Dev
<i>Firm-year Observations with MAP Incentives</i>						
MAP Award (Target)	1,864	2,154.903	1,406.081	18,614.650	64.898	2,508.276
MAP Award (Max)	1,736	3,891.453	2,653.588	31,292.630	129.795	4,316.385
MAP Award (Threshold)	1,150	729.098	471.383	5,804.110	1.120	890.481
Total Compensation	1,921	9646.139	7252.427	54,891.550	322.880	8318.194
Salary	1,921	1117.975	1061.410	2,584.620	0.001	348.477
Bonus	1,921	1227.655	782.113	9,465.060	0.000	1582.699
Option Grant	1,921	3342.306	1976.099	38,904.750	0.000	5039.926
Restricted Stock Grant	1,921	1848.256	63.655	15,465.380	0.000	3053.697
<i>Whole Sample</i>						
Total Compensation	8,418	9,261.560	6,098.620	54,891.550	322.880	9,866.750
SALARY	8,418	977.457	970.425	2,584.620	0.001	410.157
BONUS	8,418	1,206.160	673.379	9,465.060	0.000	1,709.960
Option Grant	8,418	4,194.040	1,969.390	38,904.750	0.000	6,739.200
Restricted Stock Grant	8,418	1,389.580	0.000	15,465.380	0.000	2,889.940

**Table 2. Summary Statistics of Firm Characteristics**

This table presents summary statistics for 8,418 firm-year observations of all S&P 500 firms that have compensation information from 1996 to 2008. The binary variable, MAP Grant, equals one if the firm grants a new MAP plan in that year and zero otherwise. The right part of the table presents summary statistics for 2,440 firm-year observations that are covered by MAP grants and 5,978 firm-year observations that are not covered by any MAP grant. The  $p$ -values for the differences in means are based on  $t$ -tests for the two sample means and the  $p$ -values for the differences in the medians are based on non-parametric Wilcoxon rank sum tests. See Appendix B for variable definitions.

Variable	N	Mean	Median	10%	90%	Std. Dev.	<u>Firm Years w/ MAP</u>			<u>Firm Years w/o MAP</u>			<u>Mean Diff</u>	<u>Median Diff</u>	
							N	Mean	Median	N	Mean	Median	( $p$ -value)	( $p$ -value)	
MAP Grant (0/1) (%)	8,418	22.820													
MAP Cover (0/1) (%)	8,418	28.986													
Stock Vol./Earnings Vol.	8,133	7.174	4.184	1.734	14.734	9.090	2,368	8.338	4.466	5,765	6.696	4.054	0.000	0.000	
# Business Segments	8,418	2.294	2.000	1.000	5.000	1.538	2,440	2.639	2.000	5,978	2.153	1.000	0.000	0.000	
Sales Growth	8,393	0.128	0.081	-0.090	0.385	0.264	2,435	0.080	0.065	5,958	0.147	0.092	0.000	0.000	
Average Monthly Stock Turnover	8,390	1.699	1.180	0.509	3.568	1.535	2,436	1.523	1.119	5,954	1.771	1.217	0.000	0.000	
Inside Director Ratio	8,342	0.190	0.167	0.083	0.333	0.110	2,436	0.155	0.125	5,906	0.205	0.167	0.000	0.000	
CEO Tenure	8,418	7.368	5.000	2.000	16.000	6.400	2,440	6.418	5.000	5,978	7.755	6.000	0.000	0.000	
CEO Ownership	8,418	0.021	0.008	0.002	0.048	0.039	2,440	0.013	0.006	5,978	0.025	0.010	0.000	0.000	
Retire Age (0/1) (%)	8,418	7.603					2,440	5.082		5,978	8.632		0.000		
New CEO (0/1) (%)	8,418	20.373					2,440	20.697		5,978	20.241		0.638		
Board Size	8,342	10.524	10.000	7.000	14.000	2.810	2,436	11.259	11.000	5,906	10.222	10.000	0.000	0.000	
Fiscal Year Stock Return	8,387	0.144	0.099	-0.363	0.650	0.470	2,435	0.089	0.082	5,952	0.166	0.108	0.000	0.000	
ROA	8,244	0.136	0.132	0.031	0.244	0.084	2,392	0.131	0.129	5,852	0.139	0.133	0.000	0.000	
R&D/Total Assets	8,418	0.024	0.000	0.000	0.089	0.044	2,440	0.017	0.000	5,978	0.027	0.000	0.000	0.376	
Adv./Total Assets	8,418	0.011	0.000	0.000	0.040	0.026	2,440	0.013	0.000	5,978	0.011	0.000	0.000	0.000	
CapEx/Total Assets	8,418	0.050	0.039	0.001	0.106	0.045	2,440	0.044	0.037	5,978	0.052	0.040	0.000	0.000	
Institutional Holdings	8,418	0.665	0.689	0.419	0.885	0.193	2,440	0.687	0.701	5,978	0.657	0.683	0.000	0.000	
Market Cap (\$ billions)	8,418	15.283	6.138	1.275	34.202	27.555	2,440	18.128	7.794	5,978	14.121	5.630	0.000	0.000	

**Table 3. The Likelihood of Granting MAP Incentives**

This table presents regression results for the likelihood of granting a MAP plan. In models (1) to (3), the dependent variable is the MAP grant dummy that equals one if firm grants a new MAP plan in year  $t$  and zero otherwise. All independent firm variables and CEO ownership are measured in the year prior to the respective MAP grant. Other CEO variables are measured in the year of the grants. In model (2), we exclude all firms with one-time grants; in model (3), we exclude all firm-year observations from 2006 onward. Except for the Tobit regression, the table reports the marginal effects estimated at the mean for continuous variables and for a change in an indicator variable from zero to one for indicator variables. Model (4) is a Tobit regression and the dependent variable is the ratio of MAP target payout to total compensation. All regressions include year and industry dummies based on the Fama-French 48 industries. See Appendix B for other variable details. We report in parentheses  $p$ -values based on robust standard errors clustered at the firm level. \*\*\*, \*\*, and \* indicate significance at the 1%, 5%, and 10% levels, respectively.

	Base (1)	No One-Time Grants (2)	Pre-2006 (3)	Tobit Regression (4)
Stock Vol./Accounting Vol.	0.004*** (0.00)	0.004*** (0.00)	0.004*** (0.00)	0.005*** (0.00)
# Business Segments	0.020*** (0.00)	0.022*** (0.00)	0.019*** (0.00)	0.025*** (0.00)
Sales Growth	-0.113*** (0.00)	-0.109*** (0.00)	-0.113*** (0.00)	-0.141*** (0.00)
Average Monthly Stock Turnover in Top Quartile	-0.065*** (0.00)	-0.073*** (0.00)	-0.068*** (0.00)	-0.081*** (0.00)
Average Monthly Stock Turnover in Bottom Quartile	0.015 (0.47)	0.013 (0.55)	0.012 (0.56)	0.013 (0.59)
Inside Director Ratio	-0.395*** (0.00)	-0.423*** (0.00)	-0.304*** (0.00)	-0.474*** (0.00)
Ln(CEO Tenure)	-0.004 (0.77)	-0.006 (0.70)	-0.006 (0.65)	-0.015 (0.37)
CEO Ownership	-0.814** (0.01)	-0.891** (0.02)	-0.613* (0.05)	-1.102** (0.01)
Retire Age (0/1)	-0.064** (0.02)	-0.069** (0.02)	-0.049* (0.07)	-0.086** (0.04)
New CEO (0/1)	-0.031* (0.09)	-0.035* (0.07)	-0.023 (0.24)	-0.062** (0.01)
Board Size	0.009** (0.02)	0.008** (0.05)	0.007* (0.05)	0.014*** (0.00)
Fiscal Year Annual Stock Return	0.015 (0.20)	0.012 (0.34)	0.007 (0.52)	0.001 (0.93)
ROA	0.223 (0.12)	0.285* (0.07)	0.258* (0.06)	0.197 (0.30)
R&D/Total Assets	-0.373 (0.26)	-0.314 (0.37)	-0.100 (0.76)	-0.685 (0.12)
Adv./Total Assets	0.988** (0.03)	0.995** (0.03)	0.883** (0.04)	0.774 (0.14)
CapEx./Total Assets	-0.155 (0.56)	-0.202 (0.49)	-0.253 (0.30)	-0.247 (0.47)
Institutional Holding	0.032 (0.61)	0.056 (0.41)	0.057 (0.36)	0.036 (0.65)
Ln(Market Cap)	0.007 (0.50)	0.009 (0.42)	0.003 (0.72)	0.006 (0.65)
Constant				-0.226 (0.13)
Yr. & Ind. Dummies	Yes	Yes	Yes	Yes
Observations	7,827	7,303	6,118	7,773
Pseudo $R^2$	0.145	0.153	0.137	0.181

**Table 4. Determinants of MAP Plan Designs**

This table presents regression results for the determinants of MAP plan designs. In Panel A, we summarize the empirical predictions of the hypotheses we discussed in Section 5. In Panel B, the dependent variable is a binary variable that equals one if the MAP plan uses the performance measure specified in the column head and zero otherwise. In Panel C, the dependent variable equals one if the MAP plan use relative performance evaluation (RPE) and zero otherwise. In Panel D, the dependent variable is the length of the performance period of a MAP plan for the tobit model estimation, and a binary variable equals one if the expected payout of a MAP plan is expressed in equities in the probit model estimation. We report the marginal effects estimated at the mean for continuous variables and for a change in an indicator variable from zero to one for indicator variables. All regressions include year and industry dummies based on the Fama-French 48 industries. See Appendix B for variable details. We report in parentheses *p*-values based on robust standard errors clustered at the firm level. \*\*\*, \*\*, and \* indicate significance at the 1%, 5%, and 10% levels, respectively.

<i>Panel A. Hypotheses Summary for the Design of MAP Plans</i>							
	Choice of Performance Criteria				Relative vs. Absolute Performance	Length of Evaluation Period	Stock (vs. Cash) Award
	Earnings	Sales	Cash Flow	EVA			
<b>Hypotheses based on the predictions of efficient contracting theories:</b>							
<i>Measures related to signal quality:</i>							
Performance Volatility	-	-	-	-		+	
Correlation (ROA, Industry ROA)					+		
<i>Measures related to strategic imperatives:</i>							
(SG&A + Advertising)/ Assets		+					
O-score			+				
PPENT/Assets				+			
CEO Ownership							-
Financially Unconstrained (0/1)							-
Target MAP Payout/Total Assets							+
HHI (Fama-French 48)					-/+		
<i>Measures related to investment horizon:</i>							
Avg. Monthly Stock Turnover							-
R&D/Total Assets							+
CapEx./Total Assets							+
<b>Hypotheses based on the CEO power view:</b>							
Inside Director Ratio							-
Ln(CEO Tenure)							-
CEO Power Factor							-

<i>Panel B. Determinants of Performance Measures</i>				
	Probit Regressions			
	(1)	(2)	(3)	(4)
	Earnings Based	Sales Based	Cash Flow Based	EVA Based
<i>Signal quality:</i>				
Performance Volatility	-0.071*** (0.01)	-0.314** (0.01)	-0.010** (0.04)	-0.002** (0.01)
<i>Strategic imperatives:</i>				
(SG&A+Adv.)/Total Assets		0.243** (0.01)		
O-score			0.011** (0.01)	

(continued.)

**Table 4 continued.**

PPENT/Total Assets in Bottom Quartile				-0.040*
				(0.05)
PPENT/Total Assets in Top Quartile				0.002
				(0.95)
Performance Rank	-0.001	0.002	0.001	0.000
	(0.20)	(0.36)	(0.12)	(0.69)
Performance Rank×CEO Power Factor	-0.002	0.003	0.000	-0.002
	(0.16)	(0.28)	(0.91)	(0.27)
<i>Control variables:</i>				
#Business Segments	-0.017**	-0.004	0.006	0.014***
	(0.04)	(0.67)	(0.24)	(0.00)
Board Size	0.010	-0.002	-0.011**	-0.000
	(0.11)	(0.75)	(0.02)	(0.92)
CEO Power Factor	0.077	-0.256	-0.080	0.058***
	(0.33)	(0.18)	(0.22)	(0.01)
Retire Age (0/1)	-0.005	0.093*	-0.016	-0.026
	(0.93)	(0.08)	(0.65)	(0.17)
New CEO (0/1)	-0.041*	0.016	0.006	-0.012
	(0.08)	(0.36)	(0.68)	(0.17)
Institutional Holding	-0.188*	0.040	-0.000	-0.044
	(0.06)	(0.69)	(1.00)	(0.46)
Ln(Market Cap)	0.011	0.013	0.007	-0.016**
	(0.43)	(0.47)	(0.50)	(0.03)
Yr. & Ind. Dummies	Yes	Yes	Yes	Yes
Observations	1,857	1,896	1,521	1,882
Pseudo R <sup>2</sup>	0.103	0.202	0.212	0.244

*Panel C. Determinants of the Use of RPE*

	Probit Regressions			
	(1)	(2)	(3)	(4)
<i>Signal quality:</i>				
Correlation (ROA, INDROA) Quartile	0.007**	0.007**	0.036***	0.036***
	(0.01)	(0.02)	(0.00)	(0.00)
HHI (Fama-French 48)			-1.127***	-1.193***
			(0.01)	(0.01)
<i>CEO power:</i>				
CEO Power Factor		-0.024*		-0.117*
		(0.08)		(0.06)
Inside Director Ratio	-0.041		-0.186	
	(0.31)		(0.32)	
Ln(CEO Tenure)	0.007		0.026	
	(0.20)		(0.30)	
<i>Control variables:</i>				
#Business Segments	-0.001	-0.001	0.002	0.002
	(0.48)	(0.49)	(0.86)	(0.87)
Board Size	-0.001	-0.000	-0.004	-0.003
	(0.75)	(0.85)	(0.57)	(0.69)
CEO Ownership	-0.620*		-2.996*	
	(0.07)		(0.06)	
Retire Age (0/1)	-0.011	-0.009	-0.038	-0.027
	(0.34)	(0.46)	(0.41)	(0.56)

*(continued.)*

**Table 4 continued.**

New CEO (0/1)	0.011 (0.20)	-0.004 (0.40)	0.023 (0.49)	-0.028 (0.14)
Institutional Holding	-0.014 (0.60)	-0.013 (0.62)	-0.046 (0.70)	-0.046 (0.70)
Ln(Market Cap)	0.009** (0.01)	0.009*** (0.01)	0.023 (0.10)	0.025* (0.07)
Industry Dummies	Yes	Yes		
Year Dummies	Yes	Yes	Yes	Yes
Observations	1,856	1,856	1,856	1,856
Pseudo R <sup>2</sup>	0.214	0.210	0.071	0.067

*Panel D. Determinants of Length of Evaluation Period and Award Type*

	(1)	(2)
	Length of Evaluation Period	Stock-based MAP Awards
	Tobit Regression	Probit Regression
<i>Signal quality:</i>		
Earnings Volatility	0.096*** (0.00)	
<i>Strategic imperatives:</i>		
Average Monthly Stock Turnover in Top Quartile	-0.062 (0.31)	
Average Monthly Stock Turnover in Bottom Quartile	0.094*** (0.00)	
R&D/Total Assets	-0.285 (0.82)	
CapEx/Total Assets	1.512** (0.01)	
CEO Ownership		-3.892*** (0.00)
Financially Unconstrained (0/1)		-0.091** (0.03)
Target Payout/Total Assets		171.620** (0.02)
<i>Control variables:</i>		
#Business Segments	0.020 (0.25)	0.016 (0.32)
Retire Age (0/1)	-0.154 (0.11)	-0.036 (0.27)
New CEO (0/1)	-0.093*** (0.00)	-0.142 (0.13)
Institutional Holding	-0.261** (0.04)	-0.074 (0.67)
Ln(Market Cap)	-0.012 (0.69)	0.025 (0.29)
Constant	3.281*** (0.00)	
Year and Industry Dummies	Yes	Yes
Observations	1,855	1,807
Pseudo R <sup>2</sup>	0.042	0.094

**Table 5. The Likelihood of Granting MAP Incentives before and after 2002**

The table presents regression results for the likelihood of granting MAP plans. In Panel A, regression results are based on probit estimations and the dependent variable is a binary variable that equals one if firm grants a new MAP plan in that year and zero otherwise. We report the marginal effects estimated at the mean for continuous variables and for a change in an indicator variable from zero to one for indicator variables. In Panel B, regression results are based on tobit estimations and the dependent variable is the ratio of MAP target payout to total compensation. All regressions include the same set of control variables as in Table 3, as well as year and industry dummies based on the Fama-French 48 industries. Coefficients for control variables are not reported to preserve space. See Appendix B for variable details. We report in parentheses *p*-values based on robust standard errors clustered at the firm level. \*\*\*, \*\*, and \* indicate significance at the 1%, 5%, and 10% levels, respectively.

<i>Panel A. Probit Regressions for the Grant Decision</i>									
	All			Cash-based MAP			Stock-based MAP		
	< 2002	≥2002	Diff	< 2002	≥2002	Diff	< 2002	≥2002	Diff
	(p-value)	(p-value)	(p-value)	(p-value)	(p-value)	(p-value)	(p-value)	(p-value)	(p-value)
Stock Vol./Accounting Vol.	0.004*** (0.00)	0.003* (0.08)	0.08	0.002*** (0.00)	0.001 (0.47)	0.09	0.002*** (0.01)	0.002* (0.07)	0.32
Sales Growth	-0.118*** (0.00)	-0.098** (0.02)	0.27	-0.041** (0.03)	-0.055** (0.03)	0.92	-0.053*** (0.00)	-0.059* (0.08)	0.32
# Business Segments	0.009 (0.22)	0.030*** (0.00)	0.11	0.008* (0.06)	0.007 (0.30)	0.48	0.001 (0.78)	0.022*** (0.00)	0.04
Avg. Monthly Stock Turnover in Top Quartile	-0.059** (0.01)	-0.077*** (0.01)	0.87	-0.013 (0.31)	-0.045*** (0.01)	0.20	-0.034** (0.01)	-0.045** (0.04)	0.40
Avg. Monthly Stock Turnover in Bottom Quartile	0.004 (0.86)	0.026 (0.36)	0.57	0.018 (0.19)	0.016 (0.43)	0.68	-0.011 (0.36)	-0.001 (0.95)	0.46
Inside Director Ratio	-0.151* (0.08)	-0.702*** (0.00)	0.00	-0.010 (0.86)	-0.260*** (0.00)	0.01	-0.084* (0.09)	-0.494*** (0.00)	0.01
Ln(CEO Tenure)	-0.001 (0.94)	-0.003 (0.88)	0.96	-0.018*** (0.01)	-0.000 (0.98)	0.07	0.018** (0.01)	0.007 (0.61)	0.11
CEO Ownership	-0.608* (0.07)	-1.020*** (0.01)	0.65	0.125 (0.41)	0.084 (0.65)	0.62	-1.746*** (0.00)	-1.951*** (0.00)	0.14
Observations	3,705	4,122		3,350	3,383		3,393	3,629	
Pseudo <i>R</i> <sup>2</sup>	0.128	0.170		0.189	0.191		0.161	0.190	

<i>Panel B. Tobit Regressions for the Grant Magnitude (Target Payout/Total Compensation)</i>									
	All			Cash-based MAP			Stock-based MAP		
	< 2002	≥2002	Diff	< 2002	≥2002	Diff	< 2002	≥2002	Diff
	(p-value)	(p-value)	(p-value)	(p-value)	(p-value)	(p-value)	(p-value)	(p-value)	(p-value)
Stock Vol./Accounting Vol.	0.006*** (0.00)	0.004** (0.02)	0.22	0.005*** (0.00)	0.002 (0.33)	0.29	0.008*** (0.00)	0.005** (0.03)	0.34
Sales Growth	-0.158*** (0.00)	-0.121** (0.02)	0.58	-0.133** (0.02)	-0.134** (0.02)	0.99	-0.181*** (0.00)	-0.121* (0.09)	0.54
# Business Segments	0.013 (0.23)	0.033*** (0.00)	0.10	0.023* (0.09)	0.011 (0.44)	0.47	0.004 (0.81)	0.044*** (0.00)	0.02
Avg. Monthly Stock Turnover in Top Quartile	-0.093** (0.01)	-0.077** (0.02)	0.72	-0.017 (0.68)	-0.116*** (0.01)	0.06	-0.167*** (0.00)	-0.088* (0.06)	0.28
Avg. Monthly Stock Turnover in Bottom Quartile	0.002 (0.94)	0.019 (0.53)	0.66	0.048 (0.17)	0.034 (0.42)	0.75	-0.041 (0.39)	-0.017 (0.68)	0.68
Inside Director Ratio	-0.185 (0.15)	-0.751*** (0.00)	0.00	-0.097 (0.52)	-0.604*** (0.00)	0.02	-0.213 (0.28)	-0.944*** (0.00)	0.00
Ln(CEO Tenure)	-0.015 (0.51)	-0.014 (0.55)	0.97	-0.052** (0.04)	-0.027 (0.33)	0.49	0.039 (0.24)	0.016 (0.60)	0.60
CEO Ownership	-0.849* (0.09)	-1.359*** (0.01)	0.27	0.469 (0.26)	0.145 (0.75)	0.40	-7.351*** (0.00)	-4.519*** (0.00)	0.23
Observations	3,673	4,100		3,328	3,371		3,383	3,619	
Pseudo <i>R</i> <sup>2</sup>	0.167	0.193		0.280	0.226		0.188	0.211	



**Table 6. The Spread of MAP Incentives after 2002**

This table presents multi-period logit regression results for the likelihood of initiating a MAP plan in the post-2002 period. The dependent variable is equal to 1 in the year that a firm starts granting MAP incentives for the first time. After a firm initiated a MAP plan, it is dropped from the sample in subsequent years. The dependent variable is equal to zero for all firm-year observations prior to the year the firm initiates a MAP plan and for all firm-year observations of firms that never adopted MAP incentives during our sample period. Bubble significance for a firm is measured as the average market to book equity ratio of the firm during the bubble period, 1997-1999, divided by the average market to book equity ratio of the firm during the pre-bubble period, 1994-1996. Large option expensing effect equals one if the firm's average net profit margin during 2000 to 2002 is between -0.03 to 0.03, and zero otherwise. High Glass-Lewis industry dummy equals one if the industry has more than five firms identified in the Glass Lewis report. Model (4) only includes observations from 2006 onward. All independent firm variables are measured in the year prior to the respective MAP grant. CEO variables are measured in the year of the grants except for CEO ownership. All regressions include year and industry dummies based on the Fama-French 48 industries. See Appendix B for other variable details. We report in parentheses *p*-values based on robust standard errors clustered at the firm level. \*\*\*, \*\*, and \* indicate significance at the 1%, 5%, and 10% levels, respectively.

	Bubble Effect	Option Expensing Rule Change	Option Backdating Scandals		All Together	
	(1)	(2)	(3)	(4)	(5)	(6)
Bubble Significance	0.005** (0.05)				0.005** (0.03)	0.006*** (0.00)
Large Option Expensing Effect (0/1)		0.043*** (0.00)			0.028*** (0.00)	0.011 (0.13)
Option Backdater (0/1)			0.007 (0.29)		0.010 (0.12)	
High Glass-Lewis Industry (0/1)				0.509*** (0.00)		0.602*** (0.00)
<i>Controls</i>						
Stock Vol./Accounting Vol.	0.000 (0.79)	0.000 (0.82)	0.000 (0.69)	-0.000 (0.65)	0.000 (0.71)	-0.000 (0.25)
# Business Segments	0.005** (0.01)	0.007*** (0.01)	0.006*** (0.00)	0.001 (0.21)	0.005** (0.02)	0.001 (0.32)
Sales Growth	-0.019 (0.18)	-0.026 (0.14)	-0.021* (0.10)	-0.001 (0.90)	-0.016 (0.22)	-0.002 (0.82)
Average Monthly Stock Turnover in Top Quartile	-0.005 (0.50)	-0.002 (0.85)	-0.002 (0.72)	-0.000 (0.95)	-0.005 (0.50)	-0.000 (0.93)
Average Monthly Stock Turnover in Bottom Quartile	-0.009 (0.23)	-0.012 (0.22)	-0.010 (0.13)	-0.009** (0.01)	-0.006 (0.37)	-0.009* (0.06)
Inside Director Ratio	-0.131*** (0.00)	-0.157*** (0.00)	-0.120*** (0.00)	-0.028* (0.09)	-0.118*** (0.00)	-0.026 (0.16)
Ln(CEO Tenure)	-0.007 (0.15)	-0.007 (0.29)	-0.006 (0.22)	0.001 (0.83)	-0.007 (0.15)	0.001 (0.82)
CEO Ownership	-0.076 (0.49)	-0.068 (0.66)	-0.076 (0.50)	-0.053 (0.53)	-0.062 (0.54)	-0.154 (0.10)
Retire Age (0/1)	-0.021** (0.03)	-0.025* (0.07)	-0.017* (0.06)	-0.003 (0.63)	-0.020** (0.03)	-0.004 (0.61)
New CEO (0/1)	-0.007 (0.48)	-0.008 (0.54)	-0.006 (0.46)	0.004 (0.59)	-0.007 (0.47)	0.004 (0.56)
Board Size	0.000 (0.75)	0.000 (0.91)	0.000 (0.75)	0.001 (0.36)	0.000 (0.87)	0.001 (0.35)

(continued.)

**Table 6 continued.**

Fiscal Year Stock Return	0.005 (0.53)	0.001 (0.89)	0.003 (0.65)	-0.004 (0.46)	0.003 (0.72)	-0.002 (0.73)
ROA	0.014 (0.80)	-0.009 (0.88)	-0.020 (0.66)	-0.004 (0.88)	0.026 (0.60)	-0.005 (0.87)
R&D/Total Assets	-0.333*** (0.00)	-0.456*** (0.00)	-0.324*** (0.00)	-0.187*** (0.00)	-0.310*** (0.00)	-0.199*** (0.01)
Adv./Total Assets	0.237** (0.04)	0.262 (0.10)	0.245** (0.03)	0.200** (0.03)	0.203* (0.08)	0.161 (0.15)
CapEx./Total Assets	0.017 (0.86)	0.054 (0.65)	0.032 (0.72)	-0.039 (0.53)	0.026 (0.77)	-0.030 (0.64)
Institutional Holding	-0.012 (0.55)	-0.035 (0.17)	-0.022 (0.23)	-0.010 (0.41)	-0.017 (0.36)	-0.011 (0.36)
Ln(Market Cap)	-0.003 (0.36)	-0.002 (0.52)	-0.002 (0.52)	0.000 (0.93)	-0.003 (0.38)	-0.002 (0.33)
Yr. & Ind. Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,194	2,491	2,491	858	2,194	711
Pseudo $R^2$	0.134	0.131	0.137	0.194	0.144	0.218

**Table 7. MAP Plans and Option Grants**

Panel A presents OLS regression results of stock options on MAP grants. The dependent variable is the value of annual option grants scaled by CEO total pay. The MAP grant dummy equals one if a firm grants a new MAP plan to CEO in that year and zero otherwise. MAP cover dummy equals one if there is an outstanding grant in the firm-year and zero otherwise. Cash-based (Stock-based) MAP grant dummy equals one if the granted MAP contract specifies cash (stocks) as the future payout and zero otherwise. Panel B presents within-firm post-MAP grant changes in option grants as a percentage of CEO total pay. Year 0 is the year of the MAP grant. Panel C presents the differences of changes in the percentage of option after granting MAP plans between plan-granting firms and matching firms. For each MAP grant, we identify a control observation in the same year using propensity score matching method. The propensity scores are estimated based on the firm and CEO characteristics in Table 3. See Appendix B for variable details. The superscripts \*\*\*, \*\*, and \* indicate significance at the 1%, 5%, and 10% levels, respectively.

*Panel A. Option Grants and MAP Incentives*

	Pre-2002    2002 Onward					
	(1)	(2)	(3)	(4)	(5)	(6)
MAP Grant (0/1)	-0.054*** (0.00)					
MAP Cover (0/1)		-0.062*** (0.00)				
MAP Target Payout/Total Comp.			-0.196*** (0.00)			
Cash-based MAP (0/1)				-0.035** (0.01)	-0.046** (0.02)	-0.028* (0.08)
Stock-based MAP (0/1)				-0.063*** (0.00)	-0.038** (0.01)	-0.074*** (0.00)
Ln(CEO Tenure)	-0.014** (0.01)	-0.014*** (0.01)	-0.013** (0.01)	-0.013** (0.01)	-0.023*** (0.00)	-0.005 (0.44)
CEO Ownership	-0.338* (0.07)	-0.343* (0.06)	-0.335* (0.08)	-0.348* (0.06)	-0.255 (0.23)	-0.476** (0.03)
Inside Director Ratio	-0.097** (0.04)	-0.104** (0.03)	-0.101** (0.03)	-0.096** (0.05)	-0.078 (0.20)	-0.122** (0.04)
Board Size	-0.000 (0.89)	-0.000 (1.00)	-0.001 (0.78)	-0.000 (0.87)	0.001 (0.59)	-0.002 (0.42)
Fiscal Year Stock Return	-0.009 (0.29)	-0.009 (0.25)	-0.007 (0.38)	-0.009 (0.29)	0.010 (0.34)	-0.041*** (0.00)
Fiscal Year Stock Return (Lag)	0.014* (0.08)	0.013 (0.10)	0.013* (0.09)	0.014* (0.08)	0.022** (0.04)	-0.000 (0.98)
ROA	-0.287*** (0.00)	-0.295*** (0.00)	-0.298*** (0.00)	-0.288*** (0.00)	-0.351*** (0.00)	-0.151 (0.22)
ROA (Lag)	0.304*** (0.00)	0.307*** (0.00)	0.310*** (0.00)	0.302*** (0.00)	0.391*** (0.00)	0.167 (0.17)
Institutional Holding	0.176*** (0.00)	0.177*** (0.00)	0.173*** (0.00)	0.175*** (0.00)	0.228*** (0.00)	0.118*** (0.00)
Ln(Market Cap)	0.038*** (0.00)	0.038*** (0.00)	0.038*** (0.00)	0.038*** (0.00)	0.037*** (0.00)	0.037*** (0.00)
Daily Return Volatility	0.227*** (0.00)	0.226*** (0.00)	0.223*** (0.00)	0.227*** (0.00)	0.332*** (0.00)	0.161*** (0.00)
Constant	-0.101 (0.21)	-0.096 (0.23)	-0.171*** (0.00)	-0.105 (0.24)	-0.291*** (0.00)	-0.362*** (0.00)
Yr. & Ind. Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	7,987	7,987	7,933	7,987	3,822	4,165
Adjusted $R^2$	0.212	0.215	0.217	0.212	0.202	0.211

Table 7 Continued.

<i>Panel B. Changes in the Percentage of Option Grants</i>						
All MAP Grants						
	Obs.	Mean	t-stat	Obs.	Mean	t-stat
<u>All Grants</u>						
t=-1 to t=0	1,686	-0.014	-2.682***			
t=-1 to t=1	1,466	-0.025	-3.915***			
t=-1 to t=2	1,216	-0.037	-5.149***			
<u>Before 2002</u>						
		<u>Cash Grants</u>			<u>Stock Grants</u>	
t=-1 to t=0	283	0.028	1.794*	312	0.046	3.393***
t=-1 to t=1	240	0.062	3.241***	266	0.059	4.045***
t=-1 to t=2	195	0.045	2.196**	216	0.071	3.836***
<u>2002 Onward</u>						
		<u>Cash Grants</u>			<u>Stock Grants</u>	
t=-1 to t=0	407	-0.031	-3.277***	630	-0.051	-6.664***
t=-1 to t=1	362	-0.058	-5.151***	548	-0.078	-8.700***
t=-1 to t=2	307	-0.078	-6.153***	457	-0.091	-8.729***
Initial MAP Grants						
<u>All Grants</u>						
t=-1 to t=0	314	-0.023	-1.637			
t=-1 to t=1	275	-0.027	-1.516			
t=-1 to t=2	224	-0.022	-1.176			
<u>Before 2002</u>						
		<u>Cash Grants</u>			<u>Stock Grants</u>	
t=-1 to t=0	33	0.067	1.667	45	0.095	2.614**
t=-1 to t=1	29	0.048	0.956	40	0.090	2.123**
t=-1 to t=2	22	0.021	0.327	37	0.117	2.865***
<u>2002 Onward</u>						
		<u>Cash Grants</u>			<u>Stock Grants</u>	
t=-1 to t=0	34	-0.019	-0.554	91	-0.137	-4.743***
t=-1 to t=1	29	-0.107	-2.093**	81	-0.161	-5.516***
t=-1 to t=2	27	-0.129	-2.618**	64	-0.169	-5.162***
<i>Panel C. Differences of the Changes in the Percentage of Option Grants</i>						
Diff-in-Diff = Changes <sub>MAP-granting Firm</sub> - Changes <sub>Control Firm</sub>						
	Obs.	Mean	t-stat	Obs.	Mean	t-stat
<u>All Grants</u>						
t=-1 to t=0	1,597	0.005	0.592			
t=-1 to t=1	1,391	0.003	0.322			
t=-1 to t=2	1,155	0.004	0.353			
<u>Before 2002</u>						
		<u>Cash Grants</u>			<u>Stock Grants</u>	
t=-1 to t=0	250	0.032	1.493	294	0.030	1.594
t=-1 to t=1	207	0.014	0.547	251	0.019	0.942
t=-1 to t=2	168	0.013	0.451	207	0.019	0.759
<u>2002 Onward</u>						
		<u>Cash Grants</u>			<u>Stock Grants</u>	
t=-1 to t=0	379	0.006	0.353	612	-0.036	-2.746***
t=-1 to t=1	335	0.003	0.215	535	-0.033	-2.003**
t=-1 to t=2	282	0.012	0.610	448	-0.004	-0.184

**Table 8. CEO Total Compensation and MAP plans**

Panel A presents OLS regression results of CEO total compensation (in \$MM) on MAP plan granting decisions. Regressions include year and firm fixed effects. Panel B presents the differences of post-grant changes in total compensation between MAP plan-adopting firms and matching firms. The matching firms are identified using the propensity score matching method. Year 0 is the year of the MAP grant. See Appendix B for variable definitions. We report in parentheses *p*-values based on robust standard errors clustered at the firm level. \*\*\*, \*\*, and \* indicate significance at the 1%, 5%, and 10% levels, respectively.

<i>Panel A. CEO Total Compensation and MAP Incentives</i>						
	All	<2002	≥2002	All	<2002	≥2002
	(1)	(2)	(3)	(4)	(5)	(6)
MAP Grant (0/1)	0.012 (0.97)	-1.167* (0.09)	0.106 (0.75)			
Cash-based MAP (0/1)				0.063 (0.89)	-1.308 (0.18)	-0.381 (0.45)
Stock-based MAP (0/1)				-0.051 (0.89)	-1.334 (0.12)	0.286 (0.47)
Ln(CEO Tenure)	0.073 (0.68)	-0.407 (0.14)	0.271 (0.30)	0.072 (0.68)	-0.405 (0.14)	0.275 (0.29)
CEO Ownership	2.201 (0.79)	15.201 (0.30)	-13.371 (0.18)	2.201 (0.79)	15.199 (0.30)	-13.459 (0.17)
Inside Director Ratio	1.328 (0.43)	-0.902 (0.76)	2.650 (0.27)	1.325 (0.43)	-0.914 (0.75)	2.665 (0.27)
Board Size	0.107 (0.21)	0.255* (0.06)	0.121 (0.42)	0.107 (0.21)	0.255* (0.06)	0.120 (0.42)
Fiscal Year Return	1.557*** (0.00)	1.122** (0.02)	1.141** (0.02)	1.558*** (0.00)	1.121** (0.02)	1.136** (0.02)
Fiscal Year Return (Lag)	2.234*** (0.00)	1.826*** (0.00)	1.516*** (0.00)	2.235*** (0.00)	1.825*** (0.00)	1.520*** (0.00)
ROA	2.621 (0.38)	0.645 (0.90)	6.873* (0.08)	2.618 (0.39)	0.684 (0.90)	6.963* (0.08)
ROA (Lag)	10.714*** (0.00)	10.637** (0.03)	-1.848 (0.69)	10.711*** (0.00)	10.627** (0.03)	-1.837 (0.69)
Institutional Holding	-0.514 (0.64)	0.761 (0.73)	-1.749 (0.34)	-0.509 (0.65)	0.745 (0.73)	-1.794 (0.33)
Daily Return Volatility	1.297 (0.23)	1.736 (0.46)	-0.509 (0.67)	1.295 (0.23)	1.734 (0.46)	-0.514 (0.66)
Constant	12.950*** (0.00)	7.661* (0.09)	14.069*** (0.00)	12.894*** (0.00)	36.197*** (0.00)	12.654*** (0.00)
Size Deciles	Yes	Yes	Yes	Yes	Yes	Yes
Observations	7,987	3,822	4,165	7,987	3,822	4,165
Adjusted <i>R</i> <sup>2</sup>	0.469	0.523	0.517	0.469	0.523	0.517

<i>Panel B. Difference of the Changes in CEO Total Compensation after Granting MAP Plans</i>						
	Obs.	Mean Diff-in-Diff	t-stat	Obs.	Mean Diff-in-Diff	t-stat
<i>All Grants</i>						
t=-1 to t=0	1,597	-0.116	-0.270			
t=-1 to t=1	1,391	0.002	0.003			
t=-1 to t=2	1,155	-0.071	-0.138			
<i>Cash Grants Before 2002</i>				<i>Stock Grants Before 2002</i>		
t=-1 to t=0	250	0.123	0.112	294	-0.717	-0.709
t=-1 to t=1	207	1.779	0.906	251	1.614	1.381
t=-1 to t=2	168	1.637	0.775	207	0.900	0.768
<i>Cash Grants 2002 Onward</i>				<i>Stock Grants 2002 Onward</i>		
t=-1 to t=0	379	0.642	0.921	612	0.019	0.041
t=-1 to t=1	335	0.036	0.043	535	0.311	0.578
t=-1 to t=2	282	1.195	1.216	448	0.516	0.736