



9-2009

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Recommended Citation

Carter, M., Ittner, C. D., & Zechman, S. C. (2009). Explicit Relative Performance Evaluation in Performance-Vested Equity Grants. *Review of Accounting Studies*, 14 (2), 269-306. <http://dx.doi.org/10.1007/s11142-009-9085-8>

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Explicit Relative Performance Evaluation in Performance-Vested Equity Grants

Abstract

Using data from FTSE 350 firms, we examine factors influencing explicit relative performance evaluation (RPE) conditions in performance-vested equity grants. We provide exploratory evidence on whether the use or characteristics of RPE are associated with efforts to improve incentives by removing common risk, other economic factors discussed in the RPE literature, or external pressure to implement RPE. We find that many of these economic factors, including common risk reduction, are more closely related to specific relative performance conditions than to the firm-level decision to use RPE in some or all of their equity grants. We also find that greater external monitoring by institutional investors or others is associated with plans with tougher overall RPE conditions. The relative performance conditions are binding in most RPE plans, with nearly two-thirds of the grants vesting only partially or not vesting at all. Further, we find evidence that vesting percentages vary in RPE and non-RPE plans.

Keywords

restricted stock grant, equity plan, dividend payout ratio, stock option grant, compensation risk, RPE, equity-based pay, dividend yield, executive compensation contract, equity incentive, institutional investor, stock return volatility, London stock exchange, stock market performance, share price performance

Disciplines

Accounting

**Explicit Relative Performance
Evaluation in Performance-Vested Equity Grants**

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Current Version: June 2007

Abstract

Using data from FTSE 350 firms, we examine the factors influencing the explicit use of relative performance evaluation (RPE) in performance-vested equity grants, and whether RPE is used to improve incentives or to opportunistically increase vesting and/or placate external parties calling for its use. We find little evidence that the simple decision to use or not use RPE is associated with the economic factors identified in RPE theories. Instead, these factors are associated with specific RPE performance conditions. The relative performance conditions are binding in most RPE plans, with nearly two-thirds of the grants vesting only partially or not vesting at all. However, we find no evidence that vesting percentages are higher in RPE plans than in non-RPE plans, and no evidence that RPE is used opportunistically to increase vesting and compensation.

We thank Stan Baiman, Gavin Cassar, Dave Larcker, Rick Lambert, and seminar participants at the University of Pennsylvania for their comments. The financial support of The Wharton School, Ernst & Young, and the Deloitte Foundation is gratefully acknowledged.

Explicit Relative Performance Evaluation in Performance-Vested Equity Grants

1. Introduction

A major result in agency theory is that relative performance evaluation (RPE) can improve incentive contracting by insulating managers' compensation from random shocks that also affect the performance of other managers in the same industry or market (Murphy, 1999; Prendergast, 1999). Despite this result, empirical studies find relatively little explicit use of RPE in US executive compensation contracts, and only mixed evidence on its implicit use (Murphy, 1999). The limited evidence on the use of relative performance evaluation has led researchers to develop a variety of theories to explain this limited use.¹ A significant shortcoming of empirical tests of these theories is the limited disclosure on the use of performance targets in US executive compensation contracts. As a result, most studies have been forced to infer the use of RPE, causing a number of empirical specification problems (Murphy, 1999; Bannister and Newman, 2003). In contrast, many companies in the United Kingdom employ *explicit* RPE in their equity incentive plans (i.e., restricted stock and stock option grants). These "performance-vested" equity plans link the vesting of equity grants to the firm's performance relative to a company-defined "comparator" group or market index. UK executive compensation disclosure rules lead the vast majority of these firms' Annual Reports to provide the specific comparator groups used to evaluate relative performance, together with information on other important vesting criteria and the extent to which the firms have met their performance targets.

Using information from the 2002 Annual Reports and Accounts of FTSE 350 firms, we examine the use and strength of relative performance evaluation in UK firms. This information, together with data on the achievement of performance targets reported in the firms' 2005 Annual Reports, is used to investigate three broad research questions: (1) Do the hypothesized determinants of RPE adoption identified in theoretical models explain the use or non-use of RPE in performance-vested equity plans?;

¹ See, for example, Dye (1984), Janikiraman, Lambert, and Larcker (1992), Aggarwal and Samwick, (1999), and Garvey and Milbourn (2003), among others.

(2) Do these same factors explain the use of *specific* relative vesting conditions (such as vesting hurdles versus ranges, required performance rankings, and choice of comparator groups) that have received little attention in RPE models?; and (3) Is the achievement of relative performance targets related to the selective choice of comparator firms or other RPE plan characteristics?

In addition to allowing us to avoid the empirical problems encountered when inferring the use of RPE, the UK sample offers a number of advantages for our study. First, the disclosures provide detailed information on the specific relations between RPE and equity grant vesting. Although agency theory predicts that companies using RPE will measure performance relative to a peer group mean or median, many of the RPE relations in our sample are much more complex.² For example, considerable variation exists in the minimum percentile ranking needed for vesting, the use of performance hurdles versus performance payout ranges, and the spread between the performance ranking needed for minimum and maximum vesting. These variations are due (at least partially) to differences in RPE plans designed to remove common risk versus plans designed to provide greater incentives to outperform competitors. Indeed, the use of relative performance evaluation in these firms' equity plans is significantly different than the compensation elements examined in nearly all RPE models. Taking all of these factors into account allows us to contribute to the limited research on compensation contract complexity (e.g., Kole, 1997) and target setting (e.g., Merchant and Manzoni, 1989; Indjejikian and Nanda, 1999, 2002; Murphy, 2001; Leone and Rock, 2002).

Second, the detailed data on the specific comparator groups used for RPE and the subsequent achievement of equity plan performance conditions provide the opportunity for more direct tests of claims that firms selectively choose peer groups to enhance their relative standing and increase compensation (e.g., Morgenson, 2006; Lewellen, Park, and Ro, 1996). Third, performance-vested equity grants are already widely used by firms outside the United States and are being adopted by a growing

² Murphy's (1999) survey evidence identifies similar complexity in US firms using RPE in annual bonus plans. Also see Matsumura and Shin (2006) for a study of an RPE incentive plan in which bonus payouts increase the greater the organization's ranking versus its peer group.

number of US firms (Towers Perrin, 2005). Consequently, our analyses investigate an increasingly important compensation component and highlight opportunities for future research.

Finally, this research setting allows us to extend the literature on the influence of institutional investors and external monitoring on compensation contract design. UK institutional investors are among the strongest proponents of RPE use in performance-vested equity grants. Some argue that external pressure such as this can improve governance and compensation practices. However, others charge that firms respond to external pressure by implementing the external parties' recommendations in order to minimize challenges to their compensation practices, while making performance targets easily achievable in order to limit their actual effect on pay (e.g., Westphal and Zajac, 1994, 1998; Zajac and Westphal, 1995). The available data allow us to provide further evidence on whether firms adopt external parties' recommended compensation components to improve incentives or to placate the external parties while shielding actual compensation from the recommended components' impact.

Our results suggest that examining the simple use or non-use of RPE provides relatively little insight into the determinants of RPE in performance-vested equity grants. Instead, the hypothesized determinants are more strongly associated with the specific characteristics of the relative performance conditions. When RPE is used to remove common risk to evaluate executive performance, firms are more likely to use performance hurdles rather than payout ranges and to require lower relative rankings for minimum vesting to occur. The use of performance relative to market indices (rather than performance relative to self-selected comparator groups) is more likely when the correlation between firm and market returns is higher, consistent with economic theories which argue that the choice of RPE targets should reflect the extent to which the relative peer group removes common noise from performance measure. Equity grants to executives with greater firm-specific wealth are associated with plans that do not use RPE or that use relative performance conditions that are less stringent. We also find some evidence that more stringent relative performance conditions are used to increase risk-taking incentives. However, we find little or no evidence that RPE use or performance conditions are associated with past relative financial performance or competition.

Our results do not support claims that firms opportunistically use RPE to increase vesting probabilities and/or to placate external monitors. In contrast to studies using peer group performance graphs in US proxy statements (Lewellen et al., 1996; Porac et al., 1999), we find no evidence that firms use self-selected comparator groups (rather than pre-defined indices) to provide easier performance targets. *Ex ante* selection biases (based on prior firm returns relative to the chosen comparator group) are not statistically different in plans using self-selected comparator groups and those using pre-defined indices. In addition, the past returns of self-selected comparator groups are significantly greater than those in the firms' relevant FTSE market or industry indices, suggesting that self-selected groups generally provide more difficult performance targets. Actual vesting percentages following the typical three year vesting period provide further evidence that RPE use tends to be economically motivated. Nearly 30% of the RPE plans do not vest after three years, and 38% of those that do vest do not vest fully, indicating that the performance conditions are binding in most plans. Moreover, actual vesting percentages are not statistically higher in RPE plans than in non-RPE plans, again suggesting that RPE plans are not being used opportunistically to increase vesting probability and compensation.

Greater external monitoring is associated with plans having stringent RPE performance conditions, consistent with external monitors providing better governance and increasing incentives to improve firm performance. We find no evidence that greater external monitoring leads to greater use of simple payout hurdles, lower relative rankings for minimum vesting, self-selected (and potentially biased) comparator groups, or greater *ex ante* selection biases or actual vesting percentages. This evidence suggests that RPE plans do not provide easily achievable "window-dressing" to placate institutional investors and other external monitors.

The remainder of the paper is organized as follows. Section 2 provides an overview of performance-vested option grants in the UK and develops our hypotheses. Section 3 discusses our sample and variables. Empirical results are provided in Section 4. Section 5 offers our conclusions.

2. Background and Hypotheses

2.1 Performance Conditions in UK Equity Compensation Contracts

The vast majority of long-term incentive plans in large UK companies link the vesting of stock option or restricted stock grants to performance relative to a chosen comparator group and/or other performance targets. The increasing use of “performance-vested” equity grants dates from the issuance of the UK government’s 1995 Greenbury Report on best practices for directors’ remuneration (Greenbury, 1995). With respect to equity incentive plans, the Greenbury committee sought to prevent executives from benefiting from upward movements in stock prices that related more to general market gains than to improvements in firm performance. Their report recommended that vesting requirements in equity plans include the achievement of “challenging performance criteria,” and encouraged remuneration committees to consider “criteria which measure company performance relative to a group of comparator companies in some variable, or set of variables, reflecting the company’s objective.” The use of relative total shareholder returns was prominently recommended, with the use of absolute share price or other absolute performance measures reflecting general inflation, market, or industry movements strongly frowned upon. The recommendations in the Greenbury Report, together with recommendations by other British corporate governance committees and pressure from institutional investors such as the Association of British Insurers and the National Association of Pension Funds, provided considerable impetus for the widespread, voluntary adoption of performance conditions in equity incentive plans for UK executives.³

The performance conditions in these plans take a variety of forms. The two most common performance targets are earnings per share (EPS) growth above the change in the retail price index (thereby controlling for inflation), and total shareholder returns (TSR) relative to a comparator group.

³ Unlike the United States, where the accounting treatment of performance-vested options and traditional time-vested options differed until 2006 (with the value of performance-vested options required to be expensed), the accounting treatment of the two types of options does not differ in the UK. See Conyon, Peck, Read, and Sadler (2000), Chuhahary and Orszag (2003, 2005), and Main (2006) for empirical studies examining non-RPE performance targets in UK performance-vested option plans. Also see Bettis, Bizjak, Coles, and Kalpathy (2007) and Gerakos et al. (2007) for studies examining performance-vested equity grant adoption in the US.

When relative performance evaluation is used, the chosen comparator group can be a pre-defined index (such as the FTSE 350 index or a FTSE industry index) or a group of competitors independently picked by the firm. Vesting percentages can be based on a performance hurdle, where 100% of the equity grant vests when the firm exceeds a performance threshold (e.g., achievement of a real EPS growth target or median relative performance), or can vary within a performance range (e.g., a sliding scale from 50% vesting at median relative performance to 100% vesting when the firm tops its comparator group). The typical performance evaluation period is the three years following the grant. However, some plans include “retesting” provisions that allow the achievement of performance conditions to be reevaluated in subsequent years if they are not achieved in the initial three year period.⁴ The same performance conditions cover the entire executive team in most companies, and the chosen targets generally remain in effect over multiple years, minimizing any performance target “ratchet effect” (e.g., Indjejikian and Nanda, 1999; Leone and Rock, 2002). Examples of the performance conditions used by firms in our sample are provided in Appendix A.

2.2 Prior Literature on RPE Use

Principal-agent theory posits that RPE can improve incentive contracting by insulating the agent from common uncertainty affecting the agent’s performance (e.g., Baiman and Demski, 1980; Holmstrom, 1982). Despite this theoretical result, empirical studies find only limited use of RPE in US executive compensation contracts.⁵ One limitation in these studies is the lack of explicit information on the use of RPE. Instead, most researchers have been forced to infer RPE use by regressing executive pay on firm and industry performance. Drawbacks of this approach include identifying the appropriate performance measure (e.g., accounting results or market returns), comparator group (which can vary significantly from firm-to-firm and need not be a pre-defined industry or market index), and

⁴ Common retesting provisions allow performance to be reevaluated over cumulative three year periods that incorporate the fourth and/or fifth years following the grant. Some firms increase the performance targets when retesting is employed.

⁵ See, for example, Antle and Smith (1986), Barro and Barro (1990), Gibbons and Murphy (1990), and Janakiraman et al. (1992).

compensation component covered by RPE (Bannister and Newman, 2003). In addition, the payoff structure in RPE plans is frequently non-linear (Murphy, 1999), limiting the ability of standard regression estimates that assume linear contracts to detect RPE. Zhou and Swan (2003), for example, find that estimates of pay-performance sensitivities using regression models are downwardly biased when incentive contracts include a performance hurdle, as they often do in RPE contracts.

A smaller number of studies have examined explicit RPE in US executive incentive contracts using data from compensation consultant surveys (Murphy, 1999) or discretionary proxy statement disclosures (Byrd, Johnson, and Porter, 1998; Bannister and Newman, 2003). These studies generally find greater (though still modest) use of RPE compared to studies examining implicit RPE use. More importantly, Murphy (1999) finds that inferences from implicit tests of RPE use at odds with survey data on explicit use in the same firms, raising questions regarding the validity of tests employing indirect measures of RPE. By focusing on explicit RPE in UK equity grants, we avoid the need to infer its use.

2.3 Hypotheses

2.3.1 Economic Determinants of RPE Use

Prior literature suggests a number of reasons why firms may or may not incorporate RPE into compensation contracts. Agency theory indicates that RPE will be more beneficial in settings where a risk-averse agent is subject to performance shocks unrelated to effort, and where these shocks are common across peer groups (Holmstrom, 1982). In these settings, relative performance evaluation allows the firm to improve contracting by filtering out this common risk when assessing performance. The empirical implication is that the degree of RPE should increase in the extent of common risk (Janakiraman et al., 1992; Murphy, 1999; Prendergast, 1999). Thus, our first hypothesis:

H1: The use of RPE in equity plans is positively related to the extent of common risk experienced by the firm and its peer group.

Two factors that may reduce the benefits from RPE are strategic competition and the ability of executives to filter out market-wide shocks on their own by accessing capital markets. Aggrawal and

Samwick (1999) and Joh (1999), for example, argue that firms operating in concentrated industries may limit the use of RPE to avoid aggressive competition or collusive behavior that harms shareholders. Their studies provide empirical support for this theory, finding negative associations between implicit RPE use and industry concentration in the US and Japan, respectively. Garvey and Milbourn's (2003) model predicts that RPE is also less valuable when executives can hedge market risk on their own, which they argue is associated with the executives' wealth. RPE studies by Garvey and Milbourn (2003) and Rajgopal, Shevlin and Zamora (2006) provide empirical support for this prediction. These results lead to the following hypotheses:

H2: The use of RPE in equity plans is negatively related to industry concentration.

H3: The use of RPE in equity plans is negatively related to executive wealth.

In one of the few theoretical models examining the use of RPE in performance-vested equity plans, Câmara (2001) compares the valuation of equity grants with RPE-based performance conditions to those with absolute performance conditions. Holding the Black-Scholes value of the grant constant, he finds that plans that link vesting to a comparator group provide stronger incentives to increase risk and dividend payouts, but do not provide stronger incentives for improving shareholder wealth. In contrast, Johnson and Tian's (2000) model indicates that performance-vested options also provide stronger incentives to increase share price, but they do not examine the use of relative versus absolute vesting conditions. Both the Johnson and Tian (2000) and Câmara (2001) studies focus on option valuation, and neither addresses principal-agent problems. Hvide (2002), on the other hand, develops an agency model that examines the impact of tournament rewards on risk-taking. He shows that tournament-based RPE can lead executives to undertake overly risky investments to maximize their chance of winning the tournament while minimizing effort levels. As a result, his model suggests that RPE will be lower in situations where the firm does *not* want to promote greater risk-taking. The implications of these results for our cross-sectional tests are unclear. If firms with lower than desired risk-taking, dividend payouts, and stock returns *in the past* use RPE to *increase* these attributes in the

future, past risk-taking, dividend payouts, and stock returns should be negatively associated with current RPE use. In contrast, if firms use RPE to provide incentives to *maintain* already high risk-taking, dividends, and stock returns, the associations should be positive. Given these contrasting predictions, we examine the following non-directional hypothesis:

H4: The use of RPE in equity plans is related to *past* risk-taking, dividend payout ratios, and firm stock market performance.

2.3.2 Opportunistic RPE Use

The preceding hypotheses assume that firms adopt RPE to minimize principal-agent problems. An alternative explanation is that firms opportunistically use RPE to increase the probability that the equity grants will vest, thereby increasing compensation. Various academic researchers and business writers contend that the ability of firms to choose their own comparator groups or to set low relative performance hurdles allow executives to minimize RPE's impact on compensation by making the performance conditions easy to achieve (e.g., Dye, 1984; Morgenson, 2006; Lewellen et al., 1996; Porac et al., 1999). Studies using the required peer group performance graphs in US proxy statements support the contention that firms opportunistically select peer groups to enhance their relative performance. Lewellen et al. (1996), for example, find that companies exploit reporting discretion allowed by the SEC to choose peer groups that underperform the industry or broad market indices for the firm. The authors interpret these results as reflecting a downward bias in the firms' choice of performance benchmarks.

A limitation of these studies is that the peer groups disclosed in US proxy statements are not required to be the firms used to make compensation decisions. As a result, Byrd et al. (1998) examine the small subset of firms that report using the disclosed peer group for determining executive pay (typically for benchmarking purposes rather than relative performance evaluation). They find that compensation levels in the chosen peer groups exceed those of companies in the firms' S&P industry indices, but conclude that this difference reflects the self-chosen peer groups being more appropriate

compensation benchmarks than firms in the relevant industry indices, and is not due to peer groups being selectively chosen to increase compensation.

The potential for opportunistic use of RPE leads to the following hypothesis:

H5: RPE plans are associated more easily achievable performance conditions and higher vesting percentages than non-RPE plans.

2.3.3 External Monitoring

UK institutional investors are among the strongest proponents of RPE conditions in executive equity grants, and studies suggest that the widespread adoption of performance-vested equity plans in UK firms is a direct result of this external pressure (e.g., Main, 2006). If true, we expect the use of RPE to be positively associated with institutional holdings and external monitoring. Thus, the following hypothesis:

H6: The use of RPE is positively associated with the extent of external monitoring.

Even if firms adopt RPE in response to external pressure, the form of the RPE conditions is unclear. On one hand, greater external monitoring may improve corporate governance and thus improve incentive contracting. Institutional investors contend that greater external pressure and improved governance should lead firms to adopt relative performance conditions that are more stringent (e.g., Association of British Insurers, 2004). On the other hand, symbolic management and institutional theories argue that firms often adopt token compensation elements (or “window-dressing”) that are desired by external stakeholder groups such as institutional investors in order to protect the organization from having its compensation decisions questioned while insulating managers’ compensation from the recommended practices (e.g., Meyer and Rowan, 1977; Westphal and Zajac, 1994, 1998; Zajac and Westphal, 1995).

Related studies provide some support for window-dressing claims. Gerakos et al. (2007) find that US firms with greater institutional holdings are more likely to adopt performance-vested options (which are actively promoted by US pension funds), but that in most cases these options are simply

“add-ons” to large traditional option grants, thereby limiting their influence on the firms’ compensation practices. Porac et al. (1999) find that firms select more tailored (and potentially more biased) peer groups when firms perform poorly, CEOs are highly paid, and shareholders are powerful and active.

If RPE represents opportunistic “window-dressing” in response to institutional pressure, we expect RPE use to be greater in firms with more external pressure, but the RPE conditions to be less binding due to the choice of weaker comparator firms and/or lower performance thresholds, thereby increasing vesting probability. In contrast, if RPE adoption in response to external pressure represents stronger governance, we expect RPE to be associated with greater external influence, but should not find weaker performance conditions in these plans. We test whether RPE is used as window-dressing to placate external parties by examining the following joint hypothesis:

H7: The use of RPE in equity plans is positively related both to the extent of external monitoring *and* to the inclusion of more easily achievable performance conditions.

3. Sample and Variables

3.1 Sample selection and data sources

Our initial sample consists of constituents of the Financial Times Stock Exchange (FTSE) 350 index as of December 2004. These companies represent the 350 largest firms by market capitalization on the London Stock Exchange. We obtain each company’s Annual Reports and Accounts for the 2002 fiscal year from the company’s website or the Thompson Research database.⁶ Details on the executive directors’ equity compensation plans are then obtained from the Remuneration Committee report and/or the footnotes to the financial statements.⁷ Appendix A provides examples of these disclosures. If the

⁶ We use data from 2002 Annual Reports to allow comparisons of firms’ performance versus their chosen RPE comparator groups in the years following the equity grant. Most of the plans incorporate a three-year vesting schedule, giving us an interval long enough to obtain actual payout data. Annual Reports for a handful of companies could not be located from these sources. These companies are excluded from the sample.

⁷ The Directors’ Remuneration Report Regulations 2002 (DRRR) formally require each UK firm to include a detailed remuneration report in the Annual Report and Accounts for all fiscal years ending on or after December 31, 2002. Since some of the companies in our sample do not have December 31 fiscal year ends, their 2002 reports fell under the 1998 Combined Code, which contained similar compensation disclosure requirements as the DRRR. While compliance with the Combined Code was not mandatory, it was appended to the listing rules for the London Stock Exchange such that any instance of non-compliance was required to be justified to shareholders. Consequently, differences in disclosure requirements should not have a significant effect on our data.

company operates more than one equity plan, each plan is included in the sample since individual plan characteristics tend to be significantly different. We exclude plans that were not active in 2002, plans that involve share-save (i.e., savings plan) schemes, or plans that match executives' equity purchases. Our initial sample includes 391 equity plans offered by 272 companies. We subsequently exclude 21 plans where the performance conditions relate to the grant, 16 plans with no performance conditions, and 13 with undisclosed performance conditions. The final sample for our analyses consists of 341 plans in 252 firms.⁸

Sample selection criteria and descriptive statistics on RPE characteristics are provided in Table 1. Relative performance evaluation is used more frequently in long-term incentive plans (LTIPs) that grant restricted stock than in stock option plans (73.5% of LTIPs vs. 27.3% of stock option plans). Most firms have one (67.1%) or two (31.0%) equity compensation plans. Total shareholder returns (TSR) relative to peers is the most common RPE target (91.7% of RPE plans use TSR), with the remainder using earnings per share (EPS) or some other performance measure. Seventy-seven RPE plans include a hand-selected comparator group, and 60 utilize a pre-defined market group such as a FTSE index (Annual Reports did not provide details on the comparator groups used in the remaining 8 plans).⁹ Of the RPE plans with available data, the vast majority (76.2%) set a payout range, within which greater vesting is obtained with higher performance, while the remaining RPE plans set a minimum hurdle (e.g., performance at or above the industry median) to obtain full payout or vesting. Finally, 34 RPE plans allow for performance to be "retested" over longer time periods if the company does not reach its performance targets during the initial performance period.

We obtain data from a variety of sources to examine the hypothesized determinants of RPE use and characteristics. Financial statement information, institutional holdings, and segment data are obtained from Worldscope, board of directors' information from the company's Annual Reports and

⁸ One firm has an undisclosed contingency. We assume that this contingency is on vesting since vesting conditions dominate our sample.

⁹ We find no significant mean or median differences in our independent variables between firms disclosing their specific comparator groups and those not disclosing this information. We also find no significant differences in firms disclosing or not disclosing their performance conditions.

Accounts or 2003 Hemscoff's Directory of Directors, stock return information from Datastream, and FTSE index returns from Bloomberg.

3.2 Research Design

3.2.1 Variables capturing economic determinants

We use the following variables to examine the hypothesized economic determinants of RPE use and strength.

Common Risk. RPE use is expected to be greater when the common risk experienced by the firm and its peers is higher (Hypothesis 1). We use two variables to proxy for common risk. Similar to Janakiraman et al. (1992), our first variable uses coefficients from regressions of firm stock market returns on broad market or industry returns over the prior four years, and captures the extent to which the firm's returns experience similar shocks as those of their peers. We focus on stock returns due to the dominant use of shareholder returns as the performance target in UK RPE plans. Two separate measures are employed to reflect the market or industry indices typically used in these plans. CORR_RET (BRD) equals the absolute value of the coefficient on returns to the broad FTSE 350 index and CORR_RET (IND) equals the absolute value of the coefficient on returns to the firm's FTSE industry index.¹⁰ Each variable is rescaled to range from 0 (lowest correlation) to 1 (highest correlation).

Our second variable captures settings where the correlation between firm and peer returns is higher *and* there is more noise in performance measures that needs to be removed. Even if firm returns are highly correlated with peers' returns, RPE may provide few benefits if performance measures have little noise. Consistent with prior compensation studies, we measure noise using the volatility in stock return measures. We measure volatility using the standard deviation of monthly stock returns over the 24 months preceding fiscal year end 2001, rescaled to range from 0 (lowest volatility) to 1 (highest

¹⁰ An obvious limitation of using these two measures is the implicit assumption that pre-defined indices are the appropriate peer groups. We address this issue later in the paper by examining the determinants of whether a firm chooses a pre-defined index or a self-selected set of firms as its peer group.

volatility). The variable COMMONRISK equals the interaction between CORR_RET and the volatility measure, with separate COMMONRISK measures computed using FTSE market and industry indices.

Market Concentration. We capture the extent to which the firm is a significant player in a concentrated market (Hypothesis 2) using two variables: (1) the 2001 Herfindahl index (based on sales) for the firm's industry (an industry concentration measure), and (2) the firm's 2001 share of sales by companies in its FTSE industry group (a measure of the firm's standing in the industry). The two variables load on a single factor, with the construct CONCENT equal to the average standardized value of the two.

Executive Wealth. Garvey and Milbourn's (2003) model predicts that RPE is less valuable when executives can hedge market risk on their own, which they argue is associated with executives' wealth (Hypothesis 3). RPE studies by Garvey and Milbourn (2003) and Rajgopal et al. (2006) proxy for CEO wealth using data on compensation and equity holdings in the firm. Similarly, we proxy for the executive team's wealth using the log of the value of the executives' equity holdings, calculated as the number of shares held multiplied by share price at the end of 2001.¹¹

RPE Incentives. Three variables are used to test whether equity grants with relative performance conditions are associated with incentives to increase share price, dividends, and risk (Hypothesis 4). ADJ_RET equals cumulative stock returns over the *prior* four years less cumulative returns over this period for two peer groups: the FTSE 350 (ADJ_RET (BRD)) or the firm's FTSE industry (ADJ_RET (IND)).¹² DIVYLD is annual dividend per share divided by price per share, averaged over the *prior* three years. BOOKMKT is the *prior* ratio of the book value of equity to the market value of equity (measured at the end of 2001), and proxies for the need for increased risk-taking (Gerakos et al., 2007).

¹¹ Garvey and Milbourn (2003) and Rajgopal et al. (2006) use CEO equity holdings and CEO age to proxy for the executive's ability to hedge market risk. We include a proxy for the wealth of the entire executive team because nearly all of the equity plans in our sample cover the whole executive team, not just the CEO. For similar reasons, we do not include the CEO's age as a proxy for hedging ability. Clearly, firm-specific wealth is an imperfect proxy for total wealth, and may also reflect an undiversified portfolio (which may lead to greater need for RPE to protect undiversified executives from firm-specific risk) and the need for incentives to improve firm performance (which may already be high given extensive executive stock holdings, reducing the need for RPE). Results using LN_WLTH should be interpreted accordingly.

¹² Although we use industry-adjusted returns to proxy for the need for RPE incentives, Rajgopal et al. (2006) use this measure to proxy for managerial quality, which they argue should be inversely related to the need for RPE.

3.2.1 Variables capturing opportunism

We use several proxies for greater *ex-ante* and *ex-post* vesting likelihood to examine whether the use of RPE reflects opportunism and/or window-dressing. First, we consider whether the choice of comparator groups is associated with economic factors or opportunism. Firms can pick a pre-defined index (such as the FTSE 350 or FTSE industry group) as their comparator group or can choose their own comparator group. Agency theory suggests that self-selected comparator groups are appropriate if pre-defined indices do not adequately remove random shocks from performance measures. However, firms may also opportunistically self-select a comparator group of under-performing firms in order to improve relative performance comparisons. We begin examining this issue using an indicator variable (denoted INDEX) that equals one if the firm selects a pre-defined index and zero if the firm selects its own group. If the choice of comparator groups is driven by the peer groups' ability to remove random shocks from performance measures, then the correlation of the firms' returns with those of pre-defined indices should be positively related to the use of market or industry indices for performance comparisons.

Second, we consider whether firms pick comparator groups they expect to outperform based on past performance. Similar to Lewellen et al. (1996), we examine whether firm stock returns in the three years ending fiscal 2001 exceeded the chosen comparator groups' returns over the same period (PRE_BIAS). We also examine whether the market returns of self-selected comparator firms over these three years are lower than the returns to the FTSE 350 or the firms' FTSE industry index (denoted BIAS_RET_350 and BIAS_RET_IND, respectively), under the assumption that lower returns in self-selected comparators groups (relative to alternative pre-defined indices) are indicative of the biased choice of peers that the firm expects to outperform in the future (Lewellen et al., 1996).¹³

Finally, we use two variables to examine the extent to which the plans actually met their performance conditions and vested, with opportunism expected to be associated with higher actual

¹³ The most commonly used pre-defined indices in UK RPE plans are the FTSE 350, size-adjusted FTSE indices (FTSE 100 or FTSE 250), and FTSE industry indices. Correlations between the FTSE 350 returns and the FTSE size-adjusted indices exceed 0.90 and produce nearly identical results to those using the FTSE 350 index. Consequently, we do not report results using the size-adjusted indices to simplify presentation.

vesting and payouts. First, we use the variable %VEST to measure the percentage of the grant that actually vested after three years (the performance evaluation period used in most of our sample). Second, we multiply the vesting percentage by the maximum value of the grant as a percent of salary (%PAYOUT). If firms use easily achievable performance conditions to increase compensation, then the actual value of the vested grants (and not just the vesting percentage) should be higher. Where possible, we use firm disclosures on actual vesting percentages to compute these variables. When these percentages are not disclosed, we compute payoff percentages using information on the plans' performance conditions and the firms' actual performance with respect to these conditions.¹⁴

3.2.3 External Monitoring

To capture the influence of external pressure and monitoring on RPE use (Hypothesis 7), we use three variables measured in fiscal year 2002: (1) the percent of shares held by institutions; (2) the percent of board seats held by outside directors; and (3) an indicator for whether the board chairman is an outside director. Principal components analysis reveals that the variables load on one underlying factor. We therefore compute the construct EXT_MNTR as the equally-weighted standardized value for these three variables.

3.2.3 Control Variables

We include three control variables in our tests. The first variable (LTIP) is an indicator that equals one for long-term incentive plans that make restricted stock grants, and zero for stock option plans. In contrast to non-tradable, at-the-money stock option grants that have no value if stock price declines, restricted stock grants have value even if the company's stock price falls. As a result, the need for RPE (which is typically based on total shareholder returns) to ensure that executives are only

¹⁴ The actual equity grant vesting percentage was disclosed for 69.5% of the plans, and we were able to determine the payout for an additional 14.4% of the plans using publicly-available data. If firms had three year performance testing periods but allowed retesting if the performance conditions were not met after this period, we determine the extent to which the grants vested in the initial three year period. Some of the plans (12.0%) were operated by firms that ceased being publicly traded during the three year performance period (due to mergers or going private). Finally, vesting percentages for 4.1% of the plans could not be determined because the performance period was longer than three years, or information on the comparator group, pre-defined index, or performance measure was not publicly-available.

rewarded when firm stock market performance is superior to competitors may be greater in LTIPs than in stock option plans.¹⁵

Second, we include the natural log of total firm sales (LN_SALES) to control for organizational complexity (which can make the selection of a comparable peer group more difficult) and other potential omitted factors related to firm size. Himmelberg and Hubbard's (2000) model, for example, argues that RPE use is less necessary when the CEO is more talented (due to labor market considerations). Their empirical tests proxy for CEO talent with firm size. Bannister and Newman's (2003) RPE study, in turn, uses size as a proxy for external monitoring and stakeholder concerns about pay and performance.

Third, in tests examining *ex ante* and *ex post* vesting likelihood, we include the log of CEO salary as a control variable. Choudhary and Orszag (2007) argue that target difficulty in performance-vested option grants will be negatively related to CEO salary in order to protect the executive from the compensation risk arising from tougher targets. Their examination of EPS vesting targets in non-RPE option plans in the UK supports this hypothesis.

Definitions for all of the variables used in our tests are provided in Appendix B.

4. Results

4.1 The Use of RPE

We begin testing our hypotheses by examining the simple use or non-use of RPE in performance-vested equity grants. Our dependent variable is PLAN_RPE, which equals one if the plan utilizes relative performance evaluation, and zero otherwise. We estimate the model using logit, and use Huber/White standard errors to compute test statistics because many firms have more than one executive equity plan. Huber/White standard errors, which cluster observations within firms, allow us to relax the

¹⁵ For example, the BBA Group's 2002 Remuneration Committee report notes that:

The Committee selected earnings per share as the measure for the [non-RPE] share option scheme as it is accepted as being a good indicator of long-term corporate performance. TSR is not used as a performance condition for the share option scheme, as it is with the [RPE-based] Long-Term Incentive Plan, as the Committee is of the view that options have an inherent share price performance measure, being the condition that before any reward is given the share price must increase.

assumption of independence among plans. Separate models are estimated using FTSE 350 stock market returns (CORR_RET (BRD) and ADJ_RET (BRD)) and FTSE industry returns (CORR_RET (IND) and ADJ_RET (IND)) since prior studies examining implicit RPE use find different results depending upon whether an industry or broad market index is used as the peer group (e.g., Gibbons and Murphy, 1990).

The results from these tests are presented in Table 2. We find little evidence that the use or non-use of RPE in performance-vested equity grants is associated with the economic factors discussed in the RPE literature. Contrary to our hypotheses, the coefficients on the CORR_RET and COMMONRISK variables are not significant. These results provide no evidence that the simple choice to include or not include RPE is related to the ability of pre-defined market indices to remove noise from performance measures. The associations between RPE use and industry concentration and executive wealth are also insignificant, as are the coefficients on the RPE incentive variables. In contrast, we find that firms adopt RPE in response to external pressure, with the coefficients on EXT_MNTR positive and significant. We examine whether the external monitoring result reflects improved governance and contracting or opportunism in subsequent tests.

The strongest determinant of RPE inclusion is whether the plan makes restricted stock or stock option grants. The coefficients on LTIP are positive and significant in both models, indicating that equity incentive plans that pay in restricted stock are more likely to include RPE features. This result is consistent with claims by some British firms that relative performance conditions are more beneficial in LTIPs because restricted stock always retains positive value for executives regardless of firm performance, whereas stock options require stock price to increase above the exercise price. As a result, the perceived need for relative performance conditions to ensure that the firm outperforms competitors before executives receive equity payouts may be greater in LTIPs.

4.2 RPE Use and Payoff Structure

Although the results in Table 2 provide little evidence that the hypothesized economic factors explain RPE use in this setting, the dichotomous PLAN_RPE variable ignores the considerable

differences in the extent to which firm performance must exceed that of the comparator group for vesting to occur. As noted earlier, plans vary in the minimum ranking needed for vesting, whether full vesting occurs when the firm reaches a minimum performance hurdle or continues to increase as the firm's relative performance ranking improves, and the spread between the relative ranking needed for minimum and maximum vesting. For example, the minimum relative ranking needed for initial vesting to occur ranges from the 25th percentile to the 100th percentile (median = 50th) and the spread between the percentile rankings needed for minimum and full vesting ranges from 0 to 75 (median = 25). Ignoring these differences provides a simplistic view of RPE use.

We begin examining the differences in payoff structures in Table 3. Existing RPE theories provide little guidance on the determinants of these specific practices. Consequently, we estimate the models using the independent variables from Table 2, and make no predictions regarding the signs of the relations between these variables and the specific performance conditions. We first investigate the use of vesting hurdles (rather than payout ranges) and the minimum percentile ranking needed for initial vesting. Low performance hurdles have been highly controversial in the UK. Institutional investors claim that low relative performance requirements and simple hurdles that allow all grants to vest when meeting a low minimum performance hurdle break the link between performance and equity plan payout, and call for the elimination of these characteristics. The Association of British Insurers' (2004: 11) remuneration guidelines, for example, state that, "Sliding scales that correlate the reward potential with a performance scale ... are a useful way of ensuring that performance conditions are genuinely stretching. They generally provide a better motivator for improving corporate performance than a 'single hurdle'." The latter claim is consistent with theoretical work by Brisley (2007), which shows that option vesting that is an increasing function of stock price can improve risk-taking incentives relative to vesting at a single point, as well as Brennan's (2001) comment that the use of hurdles in relative performance-vested options is unlikely to be optimal.

Panels A and B of Table 3 report results for the use of performance hurdles and minimum relative performance levels, respectively. Greater COMMONRISK is positively associated with the use

of hurdles and negatively associated with the minimum ranking needed for initial vesting to occur, particularly using industry indices. These results suggest that firms facing greater common risk use RPE to remove common industry shocks from performance evaluations, rather than to increase incentives to achieve significantly higher performance rankings relative to competitors. In contrast, neither CORR_RET measure is statistically significant, indicating that greater correlation in stock returns has little effect on the use of RPE unless it is also accompanied by greater noise in performance measures.¹⁶ Performance hurdles are positively associated with dividend yield and executive wealth, and negatively associated with book-to-market ratios and firm size. With the exception of COMMONRISK, executive wealth is the only variable that is significant in the minimum performance rank model. The negative coefficients on LN_WLTH in Panel B, together with the significant positive associations between this variable and the use of hurdles in Panel A, indicate that RPE plans for executives with more firm-related wealth incorporate performance conditions that critics charge are less challenging. External monitoring is not significantly associated with the use of hurdles or minimum relative performance conditions, indicating that external pressure has had little influence on either of these controversial choices. LTIPs are less likely to include performance hurdles, but tend to incorporate minimum performance thresholds that are not significantly different than stock option plans.

The various payout structure characteristics are not necessarily independent. We therefore draw on discussions in the UK executive compensation literature to classify the RPE plans into three groups based on the claimed strength of the relationship between vesting requirements and relative performance. The first group (denoted WEAK) consists of 18 plans with low minimum ranking requirements (mean = 32nd percentile) and little or no spread between the percentiles need for minimum and maximum vesting (mean = 5.11). The second group (denoted MID) contains 50 plans requiring median (50th percentile) performance for initial vesting and having larger spreads between relative rankings for initial and

¹⁶ We estimate separate models using CORR_RET and COMMONRISK because these variables are highly correlated ($r > 0.60$), raising concerns about multicollinearity. We also estimated models using the CORR_RET and stock return volatility main effects as well as the COMMONRISK interaction. Despite the large correlations between the main and interaction effects, the signs and significance levels on COMMONRISK are similar to those reported in the tables, suggesting that the reported results for this variable are not driven by the main effects.

maximum vesting (mean = 18.5). The 26 plans in the third group (denoted STRONG) require performance to *exceed* the comparator group median for minimum vesting (mean = 54th percentile) and contain payout ranges with substantial spreads between the rankings needed for minimum and maximum vesting (mean = 40.5).

We use these groupings to examine whether the hypothesized determinants of RPE use are associated more with the stringency of the relative performance conditions than with the simple inclusion or exclusion of RPE conditions. We estimate a multinomial logit model with four RPE categories (none, WEAK, MID, and STRONG) to examine the choice to use or not use RPE, as well as the choice to use one form of RPE payout structure over another. The exploratory results (not reported in the tables) indicate that the correlation between firm and FTSE 350 *market* returns is positively associated with the probability that the plan uses WEAK relative performance evaluation rather than not using RPE. This result provides additional evidence that firms facing greater common risk use RPE to remove noise in performance measures rather than to provide greater incentives to increase the firms' relative performance ranking. In contrast, COMMONRISK increases the probability that the firm uses WEAK *or* STRONG RPE instead of MID RPE conditions, suggesting that some firms facing greater common risk use RPE to remove common noise while others use RPE to increase incentives to outperform competitors.

LN_WLTH is negatively associated with the use of STRONG RPE relative to no RPE, indicating that executives with greater firm-specific wealth are less likely to face stringent RPE conditions. Firms with higher book-to-market ratios (an inverse measure of growth opportunities) tend to use plans with STRONG RPE rather than no RPE or less stringent forms of RPE. Gerakos et al. (2007) argue that firms with low growth opportunities are more likely to adopt performance-vested options in order to increase risk-taking incentives. If true, this evidence suggests that these firms are using plans with strong relative performance conditions to achieve this objective. External pressure and monitoring is positively related to the use of STRONG (and to a lesser extent MID) RPE versus not using RPE. These relations suggest that UK firms with stronger external monitoring have responded to

institutional investors' and other external parties' recommendations to adopt more stringent relative performance conditions, but is inconsistent with firms adopting RPE conditions to placate these external parties while incorporating payout structures that *ex ante* are more likely to be achievable. Larger firms are also associated with the use of STRONG RPE, while plans without RPE are more likely in larger firms than plans with WEAK RPE. LTIPs are more likely to incorporate all forms of RPE than to use non-RPE conditions. Moreover, conditional on RPE being used, the probability of STRONG RPE is higher in LTIPs than is the probability of less stringent forms of relative performance evaluation.

Overall, our analyses indicate that RPE is associated with at least some of the economic factors discussed in the agency literature. However, these factors are primarily related to the specific characteristics of the RPE plans, rather than to the simple decision to use or not use RPE. This evidence, together with the nearly non-existent theoretical work addressing complex performance-vested RPE contracts such as those seen in our sample, highlights an important opportunity for future theoretical research. We find that RPE characteristics are associated with the removal of common risk as well as the provision of incentives to outperform competitors. Though firms with greater external monitoring are more likely to implement RPE, higher levels of external pressure are associated with more stringent performance conditions, not weaker. This result is more consistent with external monitors providing better governance than it is to opportunistic use of RPE to placate external parties.

4.3 Choice of Comparator Group

Another important, and controversial, RPE characteristic is the comparator group used to evaluate relative performance. Critics charge that many firms use self-selected comparator groups, rather than pre-defined indices, to opportunistically choose under-performing peers in order to improve relative performance comparisons. We conduct a number of tests to examine these claims. Table 4, Panel A begins by investigating the extent to which the choice between a pre-defined or self-selected comparator group is driven by the factors examined earlier. The dependent variable in these logit models (denoted INDEX) equals one if a pre-defined index is used for performance comparisons, and zero if a self-

selected comparator group is used. We find that equity plans are more likely to include a pre-defined index if the firms' stock returns are more highly correlated with that index or experience greater common risk with other firms in the index. This evidence is consistent with theoretical predictions that firms use pre-defined indices when these indices do a better job removing common shocks from performance evaluations.¹⁷

The only other statistically significant variable is LTIP. The use of a pre-defined index is negatively related to LTIPs, indicating that stock option plans that incorporate RPE are more likely to use a self-selected comparator group. Even though the use of RPE is positively associated with external pressure and monitoring, we find no evidence that external monitoring is related to the use of self-selected comparator groups, which critics charge are more susceptible to opportunistic choice that allows executives to maximize compensation. This result, together with the significant, positive coefficients on CORR_RET and COMMONRISK, is more consistent with the choice between pre-defined and self-selected comparator groups being driven (on average) by economic factors rather than opportunism.

Table 4, Panel B extends the analysis by providing univariate tests of differences between firm stock returns in the three years ending fiscal 2001 and those of their chosen comparator groups over the same period (PRE_BIAS). Both mean and median firm returns exceeded those in the firms' chosen comparator groups in previous years. However, there are no significant differences in mean or median PRE_BIAS between firms using pre-defined indices and those choosing their own comparator groups. While these results may reflect firms picking comparator groups they expect to outperform, the performance differences do not appear to be related to the type of comparator group included in the plan.¹⁸

¹⁷ To provide further evidence on this conclusion, we compared the correlations between stock returns in firms using self-selected comparator group and returns in these firms' FTSE indices and the self-chosen comparators. Firm returns were statistically more correlated with those in their self-selected peer groups than with returns to the FTSE indices. These results again suggest that the choice between pre-defined and self-selected comparator groups is driven by the peer groups' ability to remove common noise.

¹⁸ Since the same comparator group typically is used for multiple years, these results are also consistent with stickiness in the choice of peer firms. That is, the incentives provided by the RPE conditions may have motivated the firm to outperform its peer group.

Table 4, Panel C reports multivariate analyses of the determinants of PRE_BIAS. We examine whether the choice of potentially easier comparator targets is related to firm characteristics (external monitoring and firm size) or characteristics of the RPE plan. We find no evidence that the three firm-level variables are associated with PRE_BIAS. Importantly, the insignificant relations do not support the hypothesis that firms with greater external pressure implement RPE to placate the external parties while making the performance conditions easy to achieve. When we estimate the model using four specific RPE plan characteristics (the use of a pre-defined index, the minimum percentile ranking needed for initial vesting, the use of a performance hurdle, and the presence of a retesting provision), only the minimum ranking needed for initial vesting is statistically significant. The significant negative coefficient on MIN indicates that plans with lower minimum percentile payout levels have larger bias in prior returns relative to their comparator groups. Thus, firms that require low minimum rankings for vesting to begin also tend to choose comparator firms they have outperformed in the past.

We also estimate the model after replacing minimum payout percentiles and the use of hurdles with the variable STRENGTH_RPE, which ranges from 1 (WEAK RPE) to 3 (STRONG RPE) using the classifications defined earlier. STRENGTH_RPE is negatively associated with PRE_BIAS, implying that plans with stronger performance conditions have lower prior bias in returns relative to their chosen comparator groups.¹⁹ In no case is INDEX statistically significant, providing no support for claims that firms self-select comparator groups that they expect to out-perform in the future.

Finally, we replicate Lewellen et al.'s (1996) analysis of whether the prior market returns of self-selected comparator firms were lower than the returns to alternative pre-defined indices that the firm could have chosen (in our case the FTSE 350 (BIAS_RET_350) or the firms' FTSE industry (BIAS_RET_IND)). Lewellen et al. (1996) argue that lower returns in self-selected comparator groups (relative to alternative pre-defined indices) are indicative of the biased choice of peers that the firm

¹⁹ We also repeated the analysis using separate indicators for the MID and STRONG RPE groups. Only the coefficient on STRONG is statistically significant, implying that plans with more stringent performance conditions also have lower PRE_BIAS. This finding provides some validation that STRONG plans are less likely to be used for opportunistic purposes.

expects to outperform. The evidence in Table 4, Panel D does not support this conjecture in our sample. Mean and median tests using either FTSE 350 or FTSE industry returns indicate that the prior returns of self-selected comparator groups *exceeded* those of the alternative pre-defined comparator groups, again providing no evidence that firms opportunistically self-select comparator groups they expect to outperform.

Taken together, the evidence in Table 4 suggests that the use of a self-selected comparator group is not related to opportunism. As predicted by economic models, firms are more likely to use a pre-defined index when their returns are more highly correlated with market or industry returns. Prior stock returns relative to chosen comparator groups were not significantly different in firms using pre-defined indices and those choosing their own comparator groups. In addition, the prior returns of hand-selected comparator groups are significantly greater than the returns of either the broad market (FTSE 350) or the respective industry sector. These results stand in contrast to the findings in prior studies using peer group performance graphs in US proxy statements (Lewellen et al., 1996; Porac et al., 1999), and provide no evidence that firms in this setting opportunistically select peer groups to enhance their relative performance. Finally, we find no evidence that the level of external monitoring leads to either a greater likelihood of hand-selecting a comparator group or a greater bias in selection. These results are inconsistent with institutional and symbolic management theories which suggest that firms adopt the compensation recommendations of external parties but make the performance conditions easily achievable.

4.4 Actual Plan Payouts

The preceding tests looked at the *ex ante* likelihood that firm performance would exceed that of its mean or median comparator firm. But the stronger test is whether the plans actually vested after the typical three year performance period, especially given the fact that many plans do not fully vest at mean or median performance rankings. We therefore provide further evidence on vesting probability using data on actual payout percentages in both RPE and non-RPE plans. In the 286 RPE and non-RPE plans

with available vesting data (excluding the 41 plans that no longer have publicly disclosed information and the 14 plans where the vesting percentage cannot be determined after three years), only 52.8% fully vested and 30.8% made no payout. In the subset of RPE plans, 58.1% did not fully vest and 32.3% made no payout. The mean (median) vesting percentage in plans making partial payouts is 60% (55%). The relatively low vesting percentages indicate that firms are not selectively choosing performance conditions to improve vesting probabilities in performance-vested equity grants.

Plans with RPE conditions have statistically lower payout percentages (mean = 57% in RPE plans versus 67% in non-RPE plans), inconsistent with claims that firms (in general) use RPE instead of absolute performance standards in order to enhance vesting percentages while appearing to set challenging performance conditions. We also find no evidence that firms that outperformed their comparator groups in the past have higher payout percentages. Although firms may have selected comparator groups they expected to outperform during the subsequent performance evaluation period, in most cases these expectations did not translate into greater vesting percentages.

Table 5 provides multivariate analyses of the determinants of actual payout percentages in both RPE and non-RPE plans. Given the censored nature of the vesting percentages, we estimate the models using Tobit. Since performance hurdles and retesting provisions can be used in both RPE and non-RPE plans, we include these variables in our analyses to investigate whether these controversial characteristics influence payouts. We also include a measure of volatility as a control variable since it may affect *ex-post* payouts. We find no evidence that RPE plans have statistically different vesting percentages than non-RPE plans using either the simple PLAN_RPE or the STRENGTH_RPE variables (Panel A).²⁰ External monitoring and other plan characteristics also have no significant association with vesting percentages. The only significant variables are LN_SALARY and (in some model specifications) LTIP and STD_RET. The significant negative coefficients on LN_SALARY indicate that vesting percentages are lower when salary is higher, consistent with claims that firms offset the

²⁰ For these tests, which include both RPE and non-RPE plans, STRENGTH_RPE is coded zero for non-RPE plans and 1 to 3 for RPE plans depending on their strength. Results are similar when we use separate indicators for the three RPE groupings.

compensation risk imposed by more stringent performance targets by increasing salary (Choudhary and Orszag, 2007). Results are similar in Panel B of Table 5, which examines actual payouts as a percent of salary (%PAYOUT). In general, the results in Table 5 indicate that vesting percentages tend to be unrelated to firm and plan characteristics or to the use of RPE performance conditions, providing no support for claims that RPE is used opportunistically to increase vesting percentages and compensation.

4.5 Payouts for Firms with Multiple Plans

Our final analysis considers whether plan vesting percentages are influenced by the presence of other equity plans that compensate for the stringent nature of some relative performance targets. For example, RPE plans with difficult performance conditions may lower payout percentages, but the presence of other equity plans may be used to shield executives from the compensation risk caused by the stringent RPE targets. We examine this possibility using 129 firms that have at least one RPE plan, 58 of which have multiple equity plans. In total, these firms operate 190 RPE and non-RPE equity plans. Firm-level univariate tests indicate that companies operating a single RPE plan have higher vesting percentages than the average vesting percentages in firms operating multiple plans (at least one of which uses RPE). However, this difference is only statistically significant at the median. There are no significant mean or median differences in vesting percentages between single plan firms and the highest plan payout percentage in firms with more than one plan. Of the 58 firms with multiple plans, 44 have both RPE and non-RPE plans, of which 5 have missing vesting or payout information. When we compare mean and median vesting percentages in these firms' RPE and non-RPE plans, the non-RPE plans have statistically higher payouts. Similar results are found when we restrict the sample to the 37 firms with exactly one RPE and one non-RPE plan. These findings are consistent with firms using non-RPE plans to offset the more stringent RPE plans.²¹

²¹ We also examined payout percentages differences between firms with one plan and multiple plans using all of the firms in our sample (RPE and non-RPE users). Both mean and median payout percentages are statistically lower in firms with multiple plans, as is the payout in the plan with the lowest payout (versus the payout in the one plan of single plan firms). Payouts in the highest payout plans, however, are not significantly different.

Table 6 presents *plan-level* multivariate tests examining RPE payout percentages as a function of the presence of other plans (denoted MULTI), firm-level characteristics (external monitoring, firm size, and stock return volatility), RPE plan characteristics (the use of a pre-defined comparator index, performance hurdles versus ranges, retesting provisions, and the minimum relative ranking required for the plan to begin vesting), and our control variables. In contrast to the tests in Table 5 that included both RPE and non-RPE plans, we limit these analyses to plans using RPE. A number of RPE plan characteristics are significant using actual payout as a percent of salary, but not using actual vesting percentages. Payout as a percent of salary tends to be higher in plans with self-selected comparator groups. However, actual payouts in hurdle plans and plans with lower minimum rankings for initial vesting are lower, implying that the use of these controversial features in RPE plans did not lead to higher plan payouts. External monitoring is positively associated with payouts as a percent of salary, while stock return volatility appears to have some influence on payout percentages. Importantly, MULTI is negative and significant using either the actual payout percentage or actual payout as a percent of salary (even after controlling for RPE plan characteristics), indicating that relative performance targets, on average, are more difficult to achieve in firms with multiple plans. These results provide considerable evidence that RPE payouts are lower when other equity plans are in place, suggesting that firms compensate for difficult RPE targets through the use of other plans.

5. Conclusion

Using data on performance-vested equity grants in FTSE 350 firms, we examine the use and strength of relative performance evaluation in equity-based compensation plans. We investigate three research questions: (1) Do the hypothesized determinants of RPE adoption identified in theoretical models explain the adoption of RPE in performance-vested equity plans?; (2) Do these same factors explain the use of specific relative vesting conditions that have received little attention in RPE models?; and (3) Is the achievement of relative performance targets related to the selective choice of comparator firms or to other RPE plan characteristics?

Our results suggest that many of the economic determinants of RPE identified in analytical models are associated with the specific characteristics and strength of the relative performance conditions, but have little association with the simple use or non-use of RPE in these contracts. In fact, RPE contract design in our sample firms is frequently structured to provide greater alignment of shareholders' and managers' incentives rather than removing common risk since the payout to executives is greater only when the firm performs well and increasingly better than the comparator group. When RPE is used to remove common risk when evaluating executive performance, firms are more likely to use performance hurdles rather than payout ranges and to require lower relative rankings for minimum vesting to occur. Consistent with economic theory, the choice between self-selected and pre-defined comparator groups tends to reflect the comparator group's ability remove common noise from performance measure. Equity grants to executives with greater firm-specific wealth are associated with plans that do not use RPE or that use relative performance conditions that are less stringent. We find some evidence that more stringent relative performance conditions are used to increase risk-taking incentives, but no evidence that RPE use or characteristics are associated with competition or past relative performance.

Our results do not support the opportunistic use of RPE to increase compensation and/or placate external parties who are pushing for its adoption. Greater external monitoring is associated with stronger RPE implementation (not weaker), and is not associated with a greater use of hand-selected comparator groups (relative to pre-defined indices) or with greater *ex ante* bias in the comparator group selected (based on the prior returns of the firm relative to its comparator group). There is also less *ex ante* selection bias found in plans with strong RPE implementation or higher minimum performance thresholds. Self-selection of a comparator group is related to more difficult relative performance targets, both *ex ante* and *ex post*. Instead of being opportunistic, the evidence suggests that the use of a self-selected comparator group is more likely to reflect economic factors. Actual plan vesting percentages and payouts indicate that RPE plans do not provide greater payouts to executives than non-RPE plans, again suggesting that RPE plans are not being used opportunistically to increase vesting probability and

compensation. Finally, RPE plan payouts are lower when firms operate multiple equity grant plans, indicating that firms tend to couple more stringent RPE plans with other plans that compensate for the RPE target difficulty.

Our findings have implications for the direction of future research on RPE and performance-vested equity grants. First, the evidence suggests that RPE is implemented not only to remove common risk from performance evaluations (as characterized in most RPE models), but also to create greater effort and effort allocation incentives in equity contracts. Future modeling efforts can provide additional insight into the latter uses of RPE. Second, we document the significant heterogeneity in how RPE contracts are written, and show that research examining the simple use or non-use of RPE is likely to be ineffective in capturing the economic factors related to RPE use. Third, we find that actual vesting percentages in both RPE and non-RPE plans are substantially lower than the vesting percentages assumed in prior research on performance-vested equity grants. Research that fails to consider more realistic vesting percentages severely overstates the value of these grants. Finally, our evidence indicates that many RPE plans include performance conditions that are difficult to achieve. Although we assume that plans with more stringent relative performance conditions provide greater incentives to improve performance, analytical studies (Kuang and Suijs, 2006) and simulation analyses (Main, 2006) indicate that performance-vested equity grants with vesting conditions that are difficult to achieve impose considerable compensation risk on executives and may not be optimal. Future empirical studies can investigate the relation between the stringency of relative performance conditions and the achievement of compensation plan objectives.

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Appendix A Example Performance Requirements

Acambis: Share Option plan [choose own comparator, straight-line vesting, retesting]

Grants to be made will be subject to performance conditions relating to the performance of Acambis' total shareholder return (TSR) compared to a comparator group of other companies within the industry. These companies are: [19 companies listed]. The maximum allocation of shares would be achieved if Acambis is ranked in the upper quartile of the comparator group, being prorated down to a 30% allocation at a ranking at the median. No allocation will be made if Acambis' ranking falls below the median. The performance condition is measured initially over a three-year period beginning at the date of grant and, if not initially achieved in full, can be further measured of a four-year period measured from the same fixed base point. Options granted from September 2001 until the end of 2002 also allow for re-testing over a five-year period.

TBI: Executive Share Option Scheme [index comparator, hurdle, retesting]

For grants during and since December 1998, The Company's total shareholder return (TSR) must fall within the top 50% of those companies which made up the FTSE 250 index on the date of grant. The TSRs of the Company and its comparator group may be measured over any three year rolling period between the date of grant and ending on the tenth anniversary of the date of grant. Measurement of TSR performance may be done every three months after the initial three year period. Provided the performance criterion has been satisfied over any three year period, an option may be exercised at any time during its life.

Unilever: Long-term Incentive Plan [choose own comparator, step vesting, no retesting]

Depending on the performance of Unilever's Total Shareholder Return (TSR) over a three-year performance cycle compared with that of its defined peer group, the awards vest following the end of the three-year performance cycle in accordance with the following table:

Ranking within TSR Peer Group	Percentage of awards that vest
Numbers 12-21	Nil
Numbers 10-11	25%
Numbers 8-9	50%
Numbers 5-7	100%
Numbers 3-4	150%
Numbers 1-2	200%

WPP Group: Performance Share Plan [choose own comparator, straight-line vesting, no retesting]

... the number of shares vesting over each three-year performance period is dependent on the growth of WPP's total shareholder return (TSR) relative to the growth of TSR of a comparator group of major publicly traded marketing services companies on the basis that this is the best indicator of value creation for share owners. At median performance, 50% of the performance shares vest, with higher percentages vesting for superior performance up to 100% if WPP ranks at least equal to the second ranking peer company. The peer companies in respect of awards made in 2002 comprise Aegis, Cordiant, Grey Global, Havas Advertising, IPG, Omnicom, Publicis and Taylor Nelson Sofres.

Appendix B Variable Definitions

Relative Performance Evaluation and Plan variables

RPE	= 1 if the plan utilizes RPE and 0 otherwise
STRENGTH_RPE	= 3 if the plan has strong RPE features, 2 if the plan has mid RPE features, 1 if the plan has weak RPE features and 0 if the plan has no RPE, with feature strength based on the minimum RPE payout percentile and whether the plan pays off relative to a hurdle
MULTI	= 1 if the firm has more than one performance plan and 0 if the firm has only an RPE plan
HURDLE	= 1 if the RPE component of the plan pays off relative to a hurdle and 0 if the payoff is over a range of performance
RETEST	= 1 if the RPE component of the plan allows for retesting and 0 if retesting is not allowed
RPE_MIN	= the minimum RPE payout percentile
INDEX	= 1 if the plan utilizes a pre-defined index as a comparator group, 0 if the firm hand-selects a group
TSR	= total shareholder return
EPS	= earnings per share
Other	= non-TSR and non-EPS performance metrics

Economic incentive variables

STD_RET	= standard deviation of monthly stock returns for the 24 months preceding the fiscal year end in 2001
CORR_RET (BRD)	= coefficient from a regression of firm's returns on the returns of the FTSE 350 index over the prior four years
CORR_RET (IND)	= coefficient from a regression of firm's returns on the returns of the respective FTSE industry index over the prior four years
CONCENT	= a construct representing the concentration of the firm and its industry based on the Herfindahl index and the firm's share of the industry sales
LN_WLTH	= log of value directors' equity holdings, calculated as the number of shares held multiplied by the price, at the end of 2001
BOOKMKT	= book value of equity / market value of equity at the of 2001
DIVYLD	= average dividend yield over the prior three years
ADJ_RET (IND)	= cumulative returns over prior 4 years less cumulative 4 year returns on the respective FTSE industry index
ADJ_RET (BRD)	= cumulative returns over prior 4 years less cumulative 4 year returns on the FTSE 350

Window dressing variables

EXT_MNTR	= a construct representing external monitoring based on the percent of shares held by institutions, percent of board seats held by outside directors, and whether the board chair is an outside director.
PRE_BIAS	= cumulative firms returns for 1999-2001 less the cumulative returns of selected comparator group over same period
BIAS_RET_350	= the cumulative returns of the firm's hand-selected benchmark group for 1999-2001 less the cumulative returns of FTSE 350 over the same period
BIAS_RET_IND	= the cumulative returns of the firm's hand-selected benchmark group for 1999-2001 less the cumulative returns of FTSE Industry Sector
%PAYOUT	= the actual payout percentage of the long-term compensation plan.
%PAYOUT_SAL	= the actual payout percentage of the long-term compensation plan weighted by the maximum percent of salary to be paid out by the equity plan.

Control variables

LTIP	= 1 if the plan is a long-term incentive plan, 0 otherwise
LN_SALES	= log of total sales (in 1,000's).

Table 1
Descriptive statistics on the use of performance conditions and relative performance evaluation (RPE) in long-term equity compensation plans of UK FTSE 350 companies

Panel A: Descriptive statistics on use of performance contingencies for 391 plans in 272 firms based on form of equity

	Option	LTIP	Either	Total
Contingencies				
On vesting	225	113	1	339
On grant	6	15	0	21
On both	1	0	0	1
Unknown contingency	1	0	0	1
No performance conditions	10	6	0	16
Unknown performance conditions	<u>7</u>	<u>5</u>	<u>1</u>	<u>13</u>
	250	139	2	391

Panel B: Descriptive statistics on use of relative performance evaluation for the 341 plans in 252 firms that have contingencies based on vesting, on both or unknown.

	Option	LTIP	Either	Total
Use of RPE				
RPE	62	83	0	145
Non-RPE	<u>165</u>	<u>30</u>	<u>1</u>	<u>196</u>
	227	113	1	341

Panel C: Descriptive statistics on use of relative performance evaluation (RPE) for 252 firms utilizing the 341 plans

	All RPE	No RPE	Some RPE	Total
Firms with One Plan:	71	98	0	169
Firms with Multiple Plans:				
Two	13	23	42	78
Three	1	1	2	4
Four	0	1	0	<u>1</u>
				83
Total	85	123	44	252

Table 1 (continued)
Descriptive statistics on the use of performance conditions and relative performance evaluation (RPE) in long-term equity compensation plans of UK FTSE 350 companies

Panel D: Descriptive statistics for 145 RPE plans based on form of equity

	Option	LTIP	Total
Choose own comparator group	23	54	77
Utilize a pre-defined market group	34	26	60
Unknown	<u>5</u>	<u>3</u>	<u>8</u>
	62	83	145
Allow for retesting	24	10	34
No retesting (or no mention)	<u>38</u>	<u>73</u>	<u>111</u>
	62	83	145
Hurdle	25	5	30
Performance payout range	26	70	96
Unknown	<u>11</u>	<u>8</u>	<u>19</u>
	62	83	145
TSR only	53	79	132
EPS only	6	1	7
TSR/EPS	0	1	1
Other only	<u>3</u>	<u>2</u>	<u>5</u>
	62	83	145

Table 2
Logit regression of the choice to use RPE in compensation contracts on economic and other determinants for 145 long-term equity compensation plans with RPE and 196 plans with no RPE among UK FTSE 350 companies

$$\text{Model 1: PLAN_RPE}_j = \alpha_0 + \alpha_1 \text{CORR_RET}_j + \alpha_2 \text{CONCENT}_j + \alpha_3 \text{LN_WLTH}_j + \alpha_4 \text{BOOKMKT}_j + \alpha_5 \text{DIVYLD}_j + \alpha_6 \text{ADJ_RET}_j + \alpha_7 \text{EXT_MNTR}_j + \alpha_8 \text{LTIP}_j + \alpha_9 \text{LN_SALES}_j + \varepsilon_j$$

$$\text{Model 2: PLAN_RPE}_j = \alpha_0 + \alpha_1 \text{COMMONRISK}_j + \alpha_2 \text{CONCENT}_j + \alpha_3 \text{LN_WLTH}_j + \alpha_4 \text{BOOKMKT}_j + \alpha_5 \text{DIVYLD}_j + \alpha_6 \text{ADJ_RET}_j + \alpha_7 \text{EXT_MNTR}_j + \alpha_8 \text{LTIP}_j + \alpha_9 \text{LN_SALES}_j + \varepsilon_j$$

Predictions	Model 1		Model 2	
	Broad Market (BRD)	Industry (IND)	Broad Market (BRD)	Industry (IND)
Intercept	1.046	0.907	1.207	0.923
CORR_RET +	-0.338	0.263		
COMMONRISK +			-5.587	-3.841
CONCENT -	0.058	0.064	0.047	0.049
LN_WLTH -	-0.030	0.000	-0.026	-0.001
BOOKMKT ?	0.104	-0.133	0.020	-0.171
DIVYLD ?	-8.691	-11.057	-10.255	-13.174
ADJ_RET ?	0.068	-0.025	0.039	-0.040
EXT_MNTR +	0.342*	0.361*	0.340*	0.338*
LTIP ?	1.984***	1.974***	1.976***	1.991***
LN_SALES ?	-0.087	-0.119	-0.085	-0.083
N	267	259	267	259
Pseudo R ²	0.15	0.15	0.15	0.15

Models are estimated using Logit with significance based on Huber/White standard errors. Significance levels are based on one-tailed test where there is a prediction of the coefficient's sign and two-tailed test otherwise, with *, **, and *** corresponding to 10%, 5% and 1%, respectively. The final sample size differs from 341 because of missing independent variables. CORR_RET and ADJ_RET are measured using both the FTSE350 (BRD) and the firm's FTSE Industry index (IND) with results reported under the respective heading. All variables are defined in Appendix B.

Table 3

Logit regression of the choices within RPE contracts on economic and other determinants for 145 long-term equity compensation plans with RPE among UK FTSE 350 companies

Model 1: $RPE_CHOICE_j = \alpha_0 + \alpha_1 CORR_RET_j + \alpha_2 CONCENT_j + \alpha_3 LN_WLTH_j + \alpha_4 BOOKMKT_j + \alpha_5 DIVYLD_j + \alpha_6 ADJ_RET_j + \alpha_7 EXT_MNTR_j + \alpha_8 LTIP_j + \alpha_9 LN_SALES_j + \varepsilon_j$
 Model 2: $RPE_CHOICE_j = \alpha_0 + \alpha_1 COMMONRISK_j + \alpha_2 CONCENT_j + \alpha_3 LN_WLTH_j + \alpha_4 BOOKMKT_j + \alpha_5 DIVYLD_j + \alpha_6 ADJ_RET_j + \alpha_7 EXT_MNTR_j + \alpha_8 LTIP_j + \alpha_9 LN_SALES_j + \varepsilon_j$

Panel A: RPE_CHOICE is whether the RPE plan pays in a hurdle or over a spread (HURDLE)

	Model 1		Model 2	
	Broad Market (BRD)	Industry (IND)	Broad Market (BRD)	Industry (IND)
Intercept	3.086	2.932	1.597	2.563
CORR_RET	1.240	2.149		
COMMONRISK			19.015#	23.350***
CONCENT	-0.346	-0.200	-0.447	-0.180
LN_WLTH	0.257#	0.324#	0.268#	0.318#
BOOKMKT	-2.074#	-3.115**	-1.847	-3.040**
DIVYLD	94.059***	86.212***	106.409***	97.002***
ADJ_RET	-0.128	-0.133	-0.044	-0.126
EXT_MNTR	-0.048	0.106	-0.117	-0.080
LTIP	-3.538***	-4.482***	-3.563***	-4.746***
LN_SALES	-0.678**	-0.738**	-0.654**	-0.750**
N	98	94	98	94
Pseudo R ²	0.44	0.49	0.45	0.53

Panel B: RPE_CHOICE is minimum performance level required for payout in RPE plan (RPE_MIN)

	Model 1		Model 2	
	Broad Market (BRD)	Industry (IND)	Broad Market (BRD)	Industry (IND)
Intercept	71.161***	69.850***	68.547***	69.532***
CORR_RET	0.974	-4.584		
COMMONRISK			-55.319#	-66.000**
CONCENT	0.715	0.751	0.666	0.851
LN_WLTH	-1.239#	-1.217#	-1.172#	-1.148#
BOOKMKT	8.096	8.869	7.278	8.303
DIVYLD	-40.321	0.559	-86.310	-20.826
ADJ_RET	1.205	0.877	0.915	0.839
EXT_MNTR	-0.236	-1.042	0.099	-0.625
LTIP	0.655	1.113	0.157	1.015
LN_SALES	-0.552	-0.342	-0.023	-0.211
N	71	67	71	67
R ²	0.10	0.12	0.12	0.15

Models in Panels A and B are estimated using OLS with significance based on Huber/White standard errors. Significance levels are based on one-tailed test where there is a prediction of the coefficient's sign and two-tailed test otherwise, with #, *, **, and *** corresponding to 15%, 10%, 5% and 1%, respectively. The final sample size differs from 146 because of missing data. CORR_RET and ADJ_RET are measured using both the FTSE350 (BRD) and the firm's FTSE Industry index (IND) with results reported under the respective heading. All variables are defined in Appendix B.

Table 4
Tests of bias in selection of benchmark group at the time of contracting for 145 long-term equity compensation plans with RPE in UK FTSE 350 companies

Panel A: Multivariate analysis of the choice of pre-defined index or hand-selected comparator group (INDEX)

$$\text{Model 1: INDEX}_j = \alpha_0 + \alpha_1 \text{CORR_RET}_j + \alpha_2 \text{CONCENT}_j + \alpha_3 \text{LN_WLTH}_j + \alpha_4 \text{BOOKMKT}_j + \alpha_5 \text{DIVYLD}_j + \alpha_6 \text{ADJ_RET}_j + \alpha_7 \text{EXT_MNTR}_j + \alpha_8 \text{LTIP}_j + \alpha_9 \text{LN_SALES}_j + \varepsilon_j$$

$$\text{Model 2: INDEX}_j = \alpha_0 + \alpha_1 \text{COMMONRISK}_j + \alpha_2 \text{CONCENT}_j + \alpha_3 \text{LN_WLTH}_j + \alpha_4 \text{BOOKMKT}_j + \alpha_5 \text{DIVYLD}_j + \alpha_6 \text{ADJ_RET}_j + \alpha_7 \text{EXT_MNTR}_j + \alpha_8 \text{LTIP}_j + \alpha_9 \text{LN_SALES}_j + \varepsilon_j$$

Predictions	Model 1		Model 2	
	Broad Market (BRD)	Industry (IND)	Broad Market (BRD)	Industry (IND)
Intercept	-3.491	-1.893	-4.138	-3.258
CORR_RET +	2.948***	3.356***		
COMMONRISK +			16.384**	18.626***
EXT_MNTR -	0.304	0.319	0.236	0.240
CONCENT ?	-0.129	-0.165	-0.135	-0.165
LN_WLTH ?	0.186	0.180	0.193	0.181
BOOKMKT ?	-0.409	0.071	-0.238	0.259
DIVYLD ?	4.418	5.305	5.925	10.152
ADJ_RET ?	-0.333	-0.559#	-0.306	-0.436
LTIP ?	-1.213***	-1.548***	-1.235***	-1.518***
LN_SALES ?	-0.014	-0.162	0.053	-0.030
N	107	102	107	102
Pseudo R ²	0.15	0.17	0.14	0.17

Models are estimated using Logit with significance based on Huber/White standard errors. Significance levels are based on one-tailed test where there is a prediction of the coefficient's sign and two-tailed test otherwise, with #, *, **, and *** corresponding to 15%, 10%, 5% and 1%, respectively. The final sample size differs from 145 because of missing data. CORR_RET and ADJ_RET are measured using both the FTSE350 (BRD) and the firm's FTSE Industry index (IND) with results reported under the respective heading. All variables are defined in Appendix B.

Panel B: Univariate analysis of ex-ante return bias in the choice of the comparator group

	Count	PRE_BIAS Mean	PRE_BIAS Median
All Plans	93	0.221***	0.087***
Plans with Hand-selected comparator group	53	0.223*	0.087*
Plans using a Predefined index	40	0.218**	0.086**
T-statistic and z-statistic from test of hand-selected bias vs. index bias		0.03	0.19

Significance levels are based on t-statistic difference in means and z-statistic Wilcoxon signed-rank test of difference in medians with *, **, and *** corresponding to 15%, 10%, 5% and 1%, respectively. The final sample size differs from 145 because of missing data. PRE_BIAS defined in Appendix B.

Table 4 (continued)

Tests of bias in selection of benchmark group at the time of contracting for 145 long-term equity compensation plans with RPE in UK FTSE 350 companies

Panel C: Multivariate analysis of ex-ante return bias in the choice of the comparator group (PRE_BIAS)

$$\text{PRE_BIAS}_j = \alpha_0 + \alpha_1 \text{EXT_MNTR}_j + \alpha_2 \text{STRENGTH_RPE}_j + \alpha_3 \text{HURDLE}_j + \alpha_4 \text{RETEST}_j + \alpha_5 \text{RPE_MIN}_j + \alpha_6 \text{INDEX}_j + \alpha_7 \text{LTIP}_j + \alpha_8 \text{LN_SALES}_j + \alpha_9 \text{LN_SALARY}_j + \varepsilon_j$$

	Predictions	Firm and Plan Criteria	Firm Criteria and Plan Strength
Intercept		6.263	7.620
EXT_MNTR	+	0.176	-0.036
STRENGTH_RPE	-		-0.322**
HURDLE	+	-0.371	
RETEST	+	0.151	0.093
RPE_MIN	-	-0.022***	
INDEX	-	-0.254	-0.245
LTIP	?	0.345	0.177
LN_SALES	?	-0.025	0.023
LN_SALARY	?	-0.367	-0.545
N		50	58
Pseudo R ²		0.14	0.11

Model is estimated using OLS with significance based on Huber/White standard errors. Significance levels are based on one-tailed test where there is a prediction of the coefficient's sign and two-tailed test otherwise, with #, *, **, and *** corresponding to 15%, 10%, 5% and 1%, respectively. The final sample size differs from 145 due to 52 firms missing PRE_BIAS and 54 missing RPE_MIN, in addition to other missing independent variables. All variables are defined in Appendix B.

Panel D: Univariate tests of means (median) of bias in returns at the time of contracting for 78 plans with hand-selected comparator group relative to two alternative benchmarks: FTSE 350 and FTSE Industry Sector

	N	Mean	Median
BIAS_RET_350 (FTSE 350)	58	0.606***	0.442***
BIAS_RET_IND (Industry Sector)	54	0.460***	0.290***

Significance levels are based on t-statistic difference in means and z-statistic Wilcoxon signed-rank test of difference in medians with *** corresponding to 1%. The final sample size differs from 78 because of missing data. BIAS_RET defined in Appendix B.

Table 5
Multivariate regressions of the actual payout on the choice to use RPE in compensation contracts and on economic and other determinants within 286 long-term equity compensation plans of UK FTSE 350 companies

$$\text{PAYOUT}_j = \alpha_0 + \alpha_1 \text{PLAN_RPE}_j + \alpha_2 \text{STRENGTH_RPE}_j + \alpha_3 \text{HURDLE}_j + \alpha_4 \text{RETEST}_j + \alpha_5 \text{STD_RET}_j + \alpha_6 \text{EXT_MNTR}_j + \alpha_7 \text{LTIP}_j + \alpha_8 \text{LN_SALES}_j + \alpha_9 \text{LN_SALARY}_j + \varepsilon_j$$

Panel A: Actual percent vesting (%VEST)

Predictions		Firm and Plan Criteria	Firm Criteria and Plan Strength
Intercept		4.172**	3.723*
PLAN_RPE	?	0.043	
STRENGTH_RPE	-		0.063
HURDLE	+	0.037	0.026
RETEST	+	-0.012	-0.001
STD_RET	?	-1.872#	-1.588
EXT_MNTR	+	-0.021	-0.009
LTIP	?	-0.137	-0.200*
LN_SALES	?	0.061	0.050
LN_SALARY	?	-0.330**	-0.285#
N		222	189

Panel B: Actual percent payout weighted by maximum percent of salary eligible to be paid out (%PAYOUT)

Predictions		Firm and Plan Criteria	Firm Criteria and Plan Strength
Intercept		883.834*	906.051
PLAN_RPE	?	-8.357	
STRENGTH_RPE	-		-5.498
HURDLE	+	-52.254	-88.305
RETEST	?	0.109	8.093
STD_RET	?	-865.626***	-879.185***
EXT_MNTR	+	21.852	34.521
LTIP	?	-62.132*	-70.977**
LN_SALES	?	10.011	7.756
LN_SALARY	?	-62.786#	-60.592
N		115	93

Model is estimated using Tobit with significance based on Huber/White standard errors. Significance levels are based on one-tailed test where there is a prediction of the coefficient's sign and two-tailed test otherwise, with #, *, **, and *** corresponding to 15%, 10%, 5% and 1%, respectively. Final sample sizes are lower due to missing data. In particular, the sample size is lower in Panel B due to 131 firms missing salary eligible information. All variables are defined in Appendix B.

Table 6
Analysis of actual payouts on economic and other determinants for 145 long-term equity compensation plans with RPE among UK FTSE 350 companies

$$\text{PAYOUT}_j = \alpha_0 + \alpha_1 \text{STD_RET}_j + \alpha_2 \text{EXT_MNTR}_j + \alpha_3 \text{MULTI}_j + \alpha_4 \text{HURDLE}_j + \alpha_5 \text{RETEST}_j + \alpha_6 \text{RPE_MIN}_j + \alpha_7 \text{INDEX}_j + \alpha_8 \text{LTIP}_j + \alpha_9 \text{LN_SALES}_j + \varepsilon_j$$

Panel A: Multivariate regressions of plan payout

Predictions		Firm and Plan Criteria
Intercept		0.670
STD_RET	?	3.423**
EXT_MNTR	+	0.025
MULTI	-	-0.561***
HURDLE	+	-0.033
RETEST	+	-0.077
RPE_MIN	-	-0.006
INDEX	-	-0.151
LTIP		0.000
LN_SALES		0.007
N		58

Panel B: Multivariate regressions of actual payout as a percent of salary

Predictions		Firm and Plan Criteria
Intercept		424.279***
STD_RET	?	-3.421
EXT_MNTR	+	70.095***
MULTI	-	-101.513***
HURDLE	+	-98.053
RETEST	+	34.711
RPE_MIN	-	-6.735***
INDEX	-	-76.270***
LTIP		-36.530
LN_SALES		4.516
N		37

Model is estimated using Tobit with significance based on Huber/White standard errors. Significance levels are based on one-tailed test where there is a prediction of the coefficient's sign and two-tailed test otherwise, with #, *, **, and *** corresponding to 15%, 10%, 5% and 1%, respectively. Final sample sizes are lower than 145 due to 21 missing payout data, 40 missing salary eligible information, and 54 missing RPE_MIN, in addition to other missing independent variables. All variables are defined in Appendix B.