An Analysis of CEO Pay Arrangements and Value Creation for FTSE-350 Companies

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1. Executive summary

This report aims to inform the development of guidelines on the design and administration of executive remuneration arrangements among UK listed companies via an analysis of Chief Executive Officer (CEO) pay structures and their alignment with corporate value creation for FTSE-350 companies over the period 2003-2014/15.

The research is a response to a CFA Society of the United Kingdom (CFA UK) invitation to assess the link between executive compensation and corporate performance. The CFA UK's interest in this area stems from the report of the Kay Review (2012) that sought to assess how well equity markets are achieving their core purposes of enhancing UK company performance and enabling investors to benefit from this performance via returns on their investments.

Both the Kay Review and CFA UK's response to the report highlighted serious concerns over the ability of widely used performance metrics such as earnings per share (EPS) growth and total shareholder return (TSR) to reflect fundamental value creation for all capital providers (equity and non-equity), and hence to serve as a reliable basis for incentivizing and rewarding senior executives. This report addresses and extends these concerns by examining the following three questions:

1. What performance metrics do FTSE-350 companies use as the basis for determining CEO pay?
2. How do commonly used performance metrics such as EPS and TSR correlate with established measures of long-term value creation to all capital providers?
3. What is the strength of the association between realized CEO pay and company performance, where performance is measured using both traditional metrics and established measures of long-term value creation?

The full suite of performance measures examined in the research includes traditional accounting- and market-based measures [EPS growth, TSR, sales growth, and return on assets (ROA)], as well as more sophisticated value-based metrics whose theoretical roots lie in discounted cash flow technology [economic profit (EP), residual income (RI), economic value added (EVA®), and return on invested capital benchmarked against the cost of capital (ROIC – WACC)].

Pay in our analysis is the amount realized by the CEO over a defined performance window (e.g., one year). Analyses are reported for total pay (comprising salary short-term bonus payments, deferred bonuses, long-term remuneration, pensions, and benefits in kind) and for individual performance-related components.

Headline results from the research are as follows:

- Total annual realized pay for the median FTSE-350 CEO during the sample period is £1.5 million measured at 2014 prices. Total pay for the median CEO has increased by 82% in real terms over the period, with an otherwise linear trend halted only by the financial crisis in 2008-2009 when pay levels slipped back to 2006 levels (see Figure ES1);
- The level of value creation over the same period has been low in absolute terms and erratic from year to year. The median FTSE-350 company generated little in the way of a meaningful economic profit over the period 2003-2009 (i.e., after adjusting for the full cost of funds) and although performance improved from 2010 onwards, the median firm generated less than 1% economic

return on invested capital per year (see Figure ES1). The compound growth in annual mean ROIC – WACC over the 12-year sample period is less than 8.5%;

- ➢ Simplistic metrics of short-term performance such as EPS growth and TSR are the dominant means of measuring performance in CEO remuneration contracts. Worryingly, these metrics correlate poorly with theoretically more robust measures of value creation that relate performance to the cost of capital. For example, the association between ROIC – WACC and both EPS growth and TSR is essentially flat when measured over 3-year rolling performance windows (see Figure ES2);
- ➢ Pay is correlated with value generation at a primitive level: CEOs generating positive economic profits receive 30% higher median total pay than their counterparts generating negative economic profits. Pay outcomes also distinguish between value creation realized in share prices and value creation that remains unrealized.
- ➢ However, despite relentless pressure from regulators and governance reformers over the last two decades to ensure closer alignment between executive pay and performance, evidence of more granular distinction between pay outcomes and fundamental value creation remains negligible as Figure ES3 demonstrates;
- ➢ Firm size, industry, and previous year remuneration remain the primary drivers of CEO remuneration in the UK. These dimensions may correlate with aspects of value-generation; but at best they represent imperfect tools for assessing long-term corporate success. Structural concerns over pay arrangements therefore persist.

Our findings are consistent with evidence reported by the IRRC Institute for a large sample of US companies (IRRCi 2014) and with unsupported assertions about poor pay-performance alignment in the UK made by the High Pay Centre (2016). Collectively, our findings suggest a material disconnect between pay and fundamental value generation for (and returns to) capital providers.

The research suggests the need to redirect the spotlight on CEO pay away from a focus on pay levels and broad calls for more performance-related pay arrangements, towards a more refined discussion about the type of performance measures employed.

Two key themes emerging from the results are: (i) the critical nature of performance measure choice in the debate over CEO pay arrangements; and (ii) the need for future recommendations on pay to focus more attention on linking incentives and rewards more directly to performance metrics that reflect long-term value creation for capital providers.

At one level, the widespread absence of value-based metrics in CEO pay contracts is surprising given their compelling conceptual basis coupled with considerable evidence from consultants and academics on the benefits of value-based management systems. Practically, however, value-based metrics tend to be more complex to compute (particularly where cost of capital is concerned) and more difficult to implement (especially at lower levels of the organisation hierarchy).

Resolving the tensions between simplicity, line-of-sight, and measurement precision is a non-trivial problem that lies at the heart of effective performance measurement and compensation plan design. While a universal solution remains elusive, there is little doubt that prevailing arrangements represent an uncomfortable equilibrium for many corporate stakeholders.

Additional insights and themes emerging from the analysis include:

- The proportion of total pay linked to performance metrics has increased steadily over the period: salary comprised 22% of total pay for the median CEO in 2014 compared with 39% in 2003. However, as the evidence summarized above reveals, increasing the performance-related component of pay per se does not guarantee that rewards reflect fundamental value creation for capital provides;
- Value creation metrics are highly correlated (typically > 60%), suggesting they capture the underlying value generation construct reasonably well. In contrast, traditional performance measures such as EPS growth and TSR display low correlations and weak alignment with value creation metrics, suggesting they provide poor insights on periodic value generation;
- Use of non-financial performance measures is increasing, as is the total number of metrics used to incentivize and reward CEOs: the number of metrics in the typical CEO pay contract has increased from 3.1 in 2003 to 4.8 in 2014, implying moves towards a more balanced approach to specifying incentives and rewards;
- Use of deferred bonuses is also on the increase, although the median realized bonus still does not include a deferred component. For the top quartile of bonus payments, approximately 24% is deferred from previous periods;
- Despite moves designed to address concern over managerial myopia such as increasing the reliance on non-financial value drivers and deferring short-term bonus payments, the link between pay and fundamental value creation remains stubbornly low;
- While pressure to align pay and performance is leading companies to adopt ever more sophisticated compensation arrangements, the net benefits of such complexity in terms of delivering effective and direct line-of-sight between rewards and value creation are remain unclear;
- Increasing pay complexity is also evident in remuneration report disclosures, which are becoming ever-more difficult to read and understand. Relative to remuneration reports published in 2003, corresponding disclosures presented in 2014 are 50% longer and 20% less readable. The evidence suggests that transparency of CEO pay and its link with value generation is declining despite enhanced reporting requirements.

While compensation practices in the UK have come a long way since Sir Richard Greenbury published his landmark report in 1995, the journey is far from complete. The unrelenting focus on pay levels and the clamour for ever-more sophisticated ways of aligning senior executive incentives with performance risks creating the illusion of pay-for-performance while failing to deliver the reality.

Choice of performance measurement system is central to the problem of aligning CEO incentives and rewards with fundamental value generation, and as such there exists an urgent need to elevate the prominence of this issue in the pay debate. More direct links between fundamental value creation, the metrics used to measure senior executive performance, and pay realizations are required to move compensation plan design forward. The new strategic report mandate in the UK represents a potentially useful means for discussing and communicating such linkages.

Figure ES1: Median realized total inflation-adjusted CEO pay and economic profit (EP) by calendar year for FTSE-350 companies

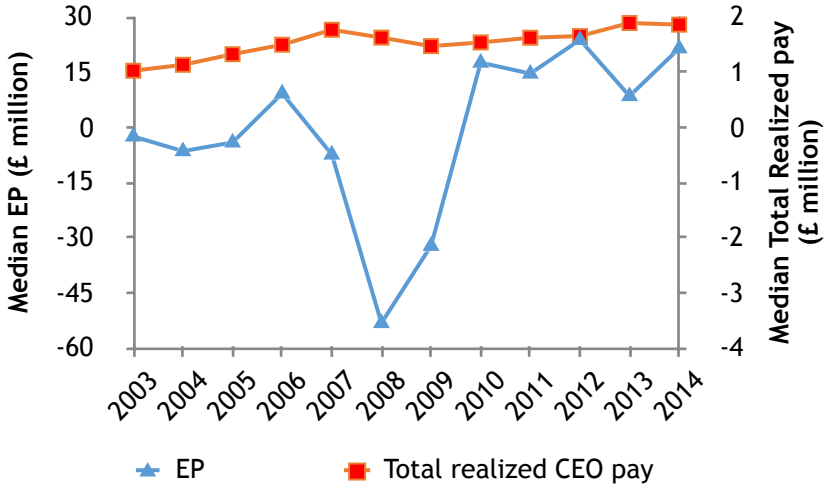
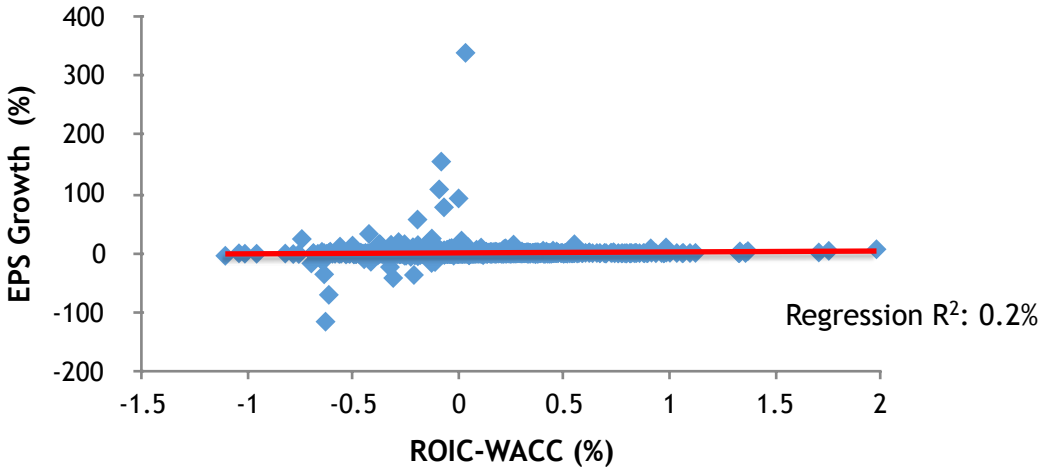


Figure ES1: Scatter plots of cumulative 3-year performance for FTSE-350 companies measured over rolling 3-year windows during the period 2003 to 2014/15

Panel A: 3-year EPS Growth versus 3-year ROIC-WACC



Panel B: 3-year TSR versus 3-year ROIC-WACC

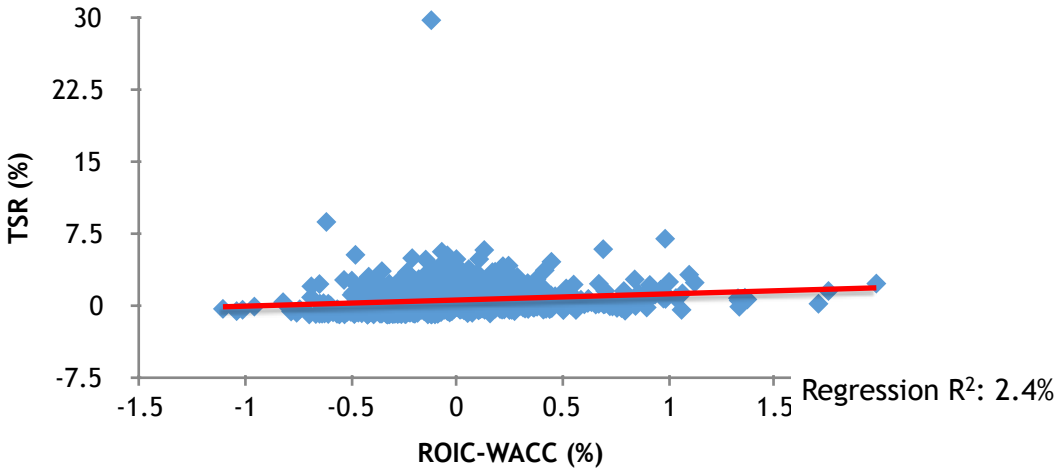
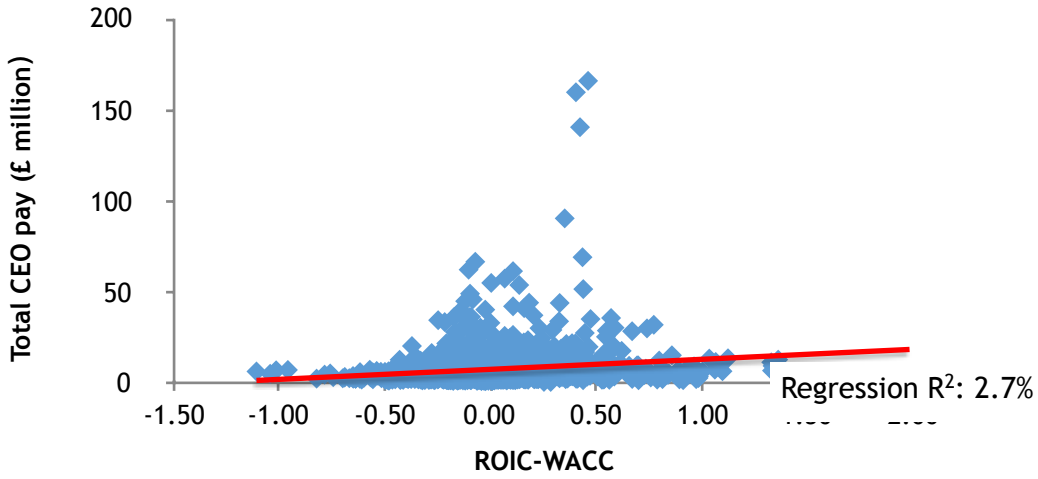


Figure ES3: Scatter plot of 3-year aggregate realized inflation-adjusted total CEO pay versus cumulative 3-year ROIC-WACC for FTSE-350 companies measured over rolling 3-year windows during the period 2003 to 2014/15



2. Introduction/overview

This report provides evidence on Chief Executive Officer (CEO) compensation structures and their alignment with corporate value creation for FTSE-350 companies, with the aim of informing the development of guidelines on the design and administration of senior executive remuneration arrangements among UK listed companies.

The research is a response to a CFA Society of the United Kingdom (CFA UK) invitation to assess the link between executive compensation and corporate performance, the results of which can be used by interested parties (e.g., Boards and capital providers) to determine the degree of alignment between current executive pay structures and value generation.

The CFA UK's current interest in this issue stems from the report of the Kay Review (2012), which sought to assess how well equity markets are achieving their core purposes: to enhance the performance of UK companies (by facilitating investment and enabling effective governance and decision making in support of long-term profitability and growth); and to enable investors to benefit from this corporate activity in the form of returns from equity investment.

Responding to the Kay Review, CFA UK argued that an opportunity had been missed to examine the structural matters that impact capital market operations, value generation by companies, and the generation of returns to investors. One such structural issue is executive remuneration and in particular the lack of debate on the metrics used to align executive pay with performance. Both CFA UK and the Kay Review highlighted serious concerns over the ability of widely used performance metrics such as earnings per share (EPS) growth and total shareholder return (TSR) to reflect fundamental value creation for all capital providers (equity and non-equity), and hence to serve as a reliable basis for incentivizing and rewarding senior executives.

This report extends an earlier pilot study commissioned by CFA UK that sought to examine value creation and its link with executive pay arrangements among a representative sample of 30 firms drawn from the FTSE-100 index as at September 2013 (Hass et al., 2014). Results presented by Hass et al. (2014) highlight EPS growth and TSR as the most commonly used performance metrics in executive compensation contracts of FSTE-100 firms over the period 2003-2013. More importantly, their findings highlight weak correlation between CEO total pay and a suite of metrics designed to capture long-run value creation (rather than short-run accounting profits and stock price changes). These worrying findings suggested the need for further analysis to establish whether such patterns are representative of UK-listed firms more generally.

We build on the work of Hass et al. (2014) by employing a more representative sample of large UK companies (FTSE-350), more recent data (including 2014/15 year-ends), and additional analyses including the way companies present information on remuneration arrangements. Our analysis addresses the following three fundamental questions regarding executive pay arrangements:

- What metrics do UK companies use to link CEO pay with performance (section 6)?
- How do commonly used performance metrics such as EPS and TSR correlate with established measures of long-term value creation to all capital providers (section 9)?
- What is the strength of the association between realized CEO pay and company performance, where performance is measured using both traditional metrics and established measures of long-term value creation (section 10)?

As such, our focus contrasts with much of the media and policy debate surrounding CEO pay, which focuses either on absolute pay levels or on pay-performance linkages without consideration of which specific performance measures are most appropriate (e.g., Income Data Services 2013, High Pay Centre 2016).

Our analysis provides the following insights: simplistic measures of short-term performance such as EPS and TSR are the dominant metrics used to determine the variable component of CEO pay in the UK; commonly used metrics correlate poorly with theoretically more robust measures of value creation that relate performance to the cost of capital; and both the explicit link (through contracted performance measure choice) and the implicit association (as reflected in observed correlations) between CEO pay and returns to capital providers in the UK is weak in absolute terms despite continual pressure from regulators and governance reformers to ensure closer alignment. These findings are consistent with evidence reported by the IRRC Institute for a large sample of US companies (IRRCi 2014) and with unsupported assertions about poor pay-performance alignment in the UK made by the High Pay Centre (2016).

Our analysis and findings suggest the need to move the spotlight on CEO pay away from a focus on pay levels and broad calls for more performance-related pay arrangements, towards a more refined discussion about the type of performance measures employed. Accordingly, the distinct policy-relevant themes permeating our findings and conclusions are: (i) the critical nature of performance measure choice in the debate over CEO pay arrangements; and (ii) the need for future recommendations on pay to focus more closely on encouraging contracts that link compensation outcomes directly to metrics that reflect long-term value creation for capital providers.

3. Value creation and periodic performance measurement

Companies create value when they generate economic profits, defined as returns to all capital providers in excess of the weighted average cost of raising funds. Economic profits differ from accounting profits and share returns because the latter metrics do not include a charge for the full cost of invested capital.

Central to the problem of measuring company outcomes and rewarding executive performance is the need to capture whether management have generated adequate returns on the resources at their disposal. This is turn means distinguishing between decisions that create value by generating economic profits and actions that destroy value because returns fall below the cost of raising funds. Failure to benchmark performance against the opportunity cost of funds can lead to misleading signals regarding the degree of value creation during the measurement period.

An effective single-period performance metric captures whether management are generating economic profits on the resources at their disposal, while also ensuring they face appropriate investment incentives (i.e., investing in additional resources only when such investments generate economic profits in the long term and divesting existing assets that are not yielding an adequate return). More generally, effective short-run performance measures are able to discriminate between long-term value-increasing actions and value-destroying behaviour, and by doing so help to focus management attention on “good growth” rather than just growth per se.

Research demonstrates that no single-period performance measure exists that guarantees alignment with the net present value (NPV) rule in all circumstances

and that as a result the choice of which short-term performance measure(s) to use inevitably involves a search among second best options.

We present evidence in section 6 on the performance measures used to incentivize and reward FTSE 350 CEOs. Section 7 provides an evaluation of both the theoretical and practical advantages and disadvantages of various performance measures, including those commonly used by FTSE-350 companies. Finally, in sections 8-10 we examine the correlation between a broad set of periodic performance measures, and the degree to which CEO pay varies with these metrics. The suite of performance measures includes simple accounting- and market-based measures such as EPS growth and TSR, as well as more sophisticated metrics such as economic profit (EP) and residual income (RI) whose theoretical roots lie in discounted cash flow technology and which explicitly acknowledge the costs of both equity and debt finance, thereby incorporating financing risk-return trade-offs into the performance measurement problem.

4. Sample and data

Our analysis draws on corporate performance data and CEO pay arrangements for large UK companies in calendar years 2003 through 2014/2015. The start of the sample window coincides with the introduction of enhanced transparency requirements on executive pay structures following incorporation of the Directors' Remuneration Reporting Regulations into UK company law for reporting periods ending on or after 31 December 2002. Since the majority of data relating to CEO pay structures is hand-collected from companies' published annual reports, we include information for the latest report available at the time of sampling (January 2016), which for most companies is fiscal year 2014.

Sample companies (exclusive of investment trusts) are drawn from FTSE-350 index constituents at the beginning of July 2007, which represents the mid-point of our sample window. CEO pay and performance data are collected for each company for all available years from 2003 through 2014/15 regardless of whether or not that company is included in the FTSE-350 index at any other date during the sample window. Allowing companies to enter the index before 2007 and exit after 2007 helps maximise the time-series available for each firm while also reducing risk of survivorship bias.

Our sampling approach yields an initial population of 319 companies after excluding investment trusts. Value-based performance metrics described in section 8 require a complex set of accounting and market data that are not available for all company-year combinations. These variables therefore impose an additional constraint on the final sample used in our empirical analyses. Applying the least restrictive definitions to compute key variables including the weighted average cost of capital, economic profit, residual income, and economic value added yields a final sample of 2,594 company-year observations (relating to 295 companies) with at least one year of data for all value-based and traditional performance metrics analysed.

The final dataset comprises 113 firms (38.3%) with 12 years of performance data and 256 companies (86.8%) with at least five years of data (Figure 1). Some of the tests reported in sections 9 and 10 utilize multi-year windows (e.g., performance measured over three years). Figure 2 displays the number of rolling 3-year performance windows by company. Most companies (95.3%) have at least one 3-year window, with 197 companies (66.8%) having five or more rolling 3-year windows.

Figure 3 reports the distribution of observations by calendar year. Annual sample sizes remain reasonably constant over the sample window, ranging from a

low of 200 (7.7%) in 2003 to a high of 232 (8.9%) in 2006. The sample consists of firms drawn from 19 Datastream level-3 industrial groups (Figure 4), with Industrial Goods & Services displaying the highest representation (63 companies), followed by Transport & Leisure (27 firms), Retail (23 companies), and Real Estate (23 companies). Comparing the industry composition of our performance sample with the composition of FTSE-350 as of July 2007 reveals no industry group is disproportionately under- or overrepresented, with the exception of Financial Services which has lower representation due to the exclusion of investment trusts.

5. Pay levels and structures

This section presents summary evidence on the structure of CEO pay arrangements in the UK and the compensation outcomes that result from applying these arrangements. Unless otherwise stated, CEO pay in this report is defined as realized annual compensation from the following sources: salary, annual bonuses, long-term incentives (defined as all arrangements greater than one year), pension contributions, and benefits-in-kind such as health insurance, company cars, etc. Realized bonus payments are equal to annual cash bonuses paid plus cash receipts from deferred bonuses earned in prior periods. Realized long-term compensation comprises the aggregate value of performance shares vesting during the year, gains on share options exercised during the year, and cash payments from any other LTIP component.

Data on pay levels and structures are collected by the research team from companies' remuneration reports. Data are supplemented with information from BoardEx on CEO changes and maximum share grants associated with options and long-term incentive plans (LTIPs).

To ensure pay data are time-series comparable and that conclusions are not impacted by inflation, we convert realized nominal amounts into real values by expressing all pay outcomes in terms of January 2014 pounds using appropriate price indices (Thompson 2009).

Pay realizations are difficult to interpret in years where a change in CEO occurs. We measure CEO pay in turnover years using the following procedure. Where the outgoing CEO serves for at least the first six months of the fiscal year we use pay structures for the departing CEO and define compensation for the year as the annualized amount received by the outgoing CEO (excluding termination payments). Conversely, where the ongoing CEO serves for less than the first six months of the fiscal year, pay structures are based on arrangements for the incoming CEO and compensation for the year is set equal to the annualized amount paid to the new CEO (excluding golden hello payments).

5.1 How much pay?

Total annual realized pay for the median FTSE-350 CEO during the sample period is £1.5 million measured at 2014 prices. Total compensation varies dramatically in any given year. For example, in 2014 the highest paid CEO (Martin Sorrell, WPP) realized £28.3 million, which represented 189-times more than the lowest paid CEO (Mike Ashley, Sports Direct International).

Median inflation-adjusted salary for the period is £574,000, accounting for approximately 38% of realised annual pay. Significant variation in salary levels is evident across companies, ranging from a high of £2.6 million to a low of less than £33,000.

Realized price-adjusted annual bonuses range from zero to £8 million, with a median payout of £439,000. The median realized bonus does not include a deferred component; for top quartile bonus payments, approximately 24% is deferred from previous periods.

Realized long-term compensation is heavily skewed towards a relatively small number of large payouts. Median realized long-term pay is £54,000, compared with £769,000 at the top quartile and over £3.7 million at the 95th percentile.

Figures 5 and 6 report median CEO realized pay by year and sector. An upward trend in total compensation is evident in Figure 5 over the sample period even after adjusting for inflation, with the linear trend halted only by the financial crisis in 2008-2009 when pay levels fell back slightly before increasing steadily again from 2010 onwards. Median total realized compensation has increased by 82% in real terms over the period from approximately £1 million in 2003 to £1.9 million in 2014.

CEOs of companies in the Health Care sector receive the highest average pay, with the median boss realizing £2.9 million per year (Figure 6). Other sectors with high median pay levels include Basic Materials and Oil & Gas (£2.2 million) and Telecommunications (£2.1 million). Sectors with the lowest paid CEOs include Technology (£1.3 million) and Industrials (£1.1 million): hardly trivial amounts but significantly lower nonetheless.

5.2 What form does pay take?

The level of compensation paid to CEOs is only part of the pay story; the structure of arrangements producing those pay outcomes also matters. In other words, *how* CEOs are paid is at least as important as *how much* they are paid (Jensen and Murphy 1990). Pay structures cover issues such as the proportions of guaranteed compensation (i.e., salary) versus at-risk (i.e., performance-related) pay, and the relative mix of payments linked to short-term results versus longer-term performance.

The average FTSE-350 CEO received 27% of annual realized remuneration in the form of salary during the sample period. Of the remainder, the majority (65%) comes from at-risk sources, with the residual 8% relating to pensions and benefits-in-kind (Figure 7). Results highlight the impact of pressure from policymakers and shareholder groups over the last two decades directed at increasing the fraction of total CEO pay that is performance related.

Annual bonuses account for 38% of mean total pay and 58% of total variable pay. In most cases realized bonus payments relate to contemporaneous performance: deferred bonus arrangements are still not employed by the majority of companies although the proportion of cases has increased substantially during the period: only 18% of CEOs realized any deferred bonus in 2003 whereas the equivalent fraction in 2014 was 47%.

Most annual bonus plans provide for maximum payments of between one- and two-times salary (median 1.15 times),while the mean (median) realized bonus represents 100% (76%) of annual salary, further highlighting the significant contribution to total pay made by short-term performance-related arrangements.

Long-term performance-related pay accounts for 27% of realized mean total pay and 42% of average variable pay. The long-term element of pay is typically derived from one or more of the following three sources: share option plans, share matching plans or share appreciation rights, and performance share plans. All three elements involve explicit performance vesting conditions designed to reward additional aspects of performance beyond share price appreciation.

The typical vesting period for long-term pay is 3-years, although vesting periods up to 5 years do occur. In most cases, therefore, pay elements classified as long term (i.e., greater than one year) actually relate to performance measured over the medium term. However, since the average tenure period for FTSE-350 CEOs is approximately six years (Higgs and Rejchrt 2014), one can argue that vesting

periods of three or more years represent the longer-run for CEO horizons even if this is not the case for shareholders.

Figures 8 and 9 report mean inflation-adjusted pay levels by calendar year and industry, respectively, decomposed by pay component. Results reveal variation in structures across both dimensions. Figure 8 suggests a general move away from fixed salary toward performance-related pay over the sample period, consistent with continuing pressure for more variable pay. Note that the majority of temporal variation in mean realized pay is driven by the long-term component: average salary and bonus levels are relatively static across the period.

Fixed salary remains an economically important fraction (approx. 24% excluding benefits and pensions) of total pay as of 2014. Salary levels are also critical because they determine performance-related payouts: maximum bonus and LTIPs awards are often expressed as a multiple of base salary.

Further (untabulated) analysis of the long-term pay component reveals a move away from share options towards other LTIP arrangements such as performance share plans, share matching plans and share appreciation rights.

The relative mix of compensation components also varies across industries (Figure 9). For example, whereas fixed salary accounts for only 20% of mean total compensation in the Oil & Gas sector, CEOs of Utility companies receive almost double that fraction at 41%.

Collectively, the evidence suggests a continuing drive toward increasing the variable component of CEO pay and as such these results highlight the central importance of performance measure choice in determining CEO incentives and rewards.

6. Metrics used to determine CEO pay

Information on the performance metrics that determine CEO pay for our sample of 2,594 company-year observations is collected directly from remuneration reports. Performance measures are classified into three broad categories: accounting-based measures, market-based measures, and non-financial measures including.

6.1 Preliminary evidence

Companies link CEO pay with multiple performance measures (Table 1). The median CEO compensation contract evaluates and rewards performance based on four distinct metrics. (Note that a metric used in multiple components of the same plan is counted only once for the purposes of this analysis.) Bonus plans and long-term incentive arrangements typically employ two metrics each, although at least 25% of bonus plans use three or more metrics. CEO pay is therefore often determined by a suite of performance measures; a key question is whether the selected group of measures yields a balanced and complementary assessment of long-term value creation when considered collectively.

Figure 10 indicates that all three broad performance categories feature prominently in CEO compensation contracts. Almost all companies (98%) link some element of pay to at least one accounting-based measure and the majority (72%) also employ at least one market-based measure, which is almost always TSR (usually benchmarked against peer group or index performance). Non-financial measures feature in 61% of contracts.

Accounting-based metrics are further decomposed by subgroup in Figure 11. Earnings-based measures are by far the most popular accounting metric, featuring in 89% of contracts. The next most popular accounting metrics are cash flows (27%) and accounting returns (24%). Measures relating to margins, cost reduction and capital structure are used infrequently. A notable feature of Figure 11 is the

absence of value-based metrics such as economic profit (EP), residual income (RI), and economic value added (EVA®) that benchmark profit against the weighted average cost of capital (WACC), despite their theoretical superiority.

Decomposing the accounting category further reveals that EPS-based measures are most popular earnings-based measure (68% of plans), followed closely by unscaled profit-based metrics such as earnings before interest, taxes, depreciation and amortisation (EBITDA), earnings before interest and taxes (EBIT), operating profit and non-GAAP income. Sales-based targets are least popular. The cash flow category includes 7% of plans that refer explicitly to free cash flow, although formal definitions are rarely provided. Within the accounting return category, return on assets (ROA) and return on equity (ROE) dominate: only 3% of plans refer to return on invested capital (ROIC).

Figure 12 disaggregates non-financial metrics into five subgroups: employees, customer satisfaction, environment, ethics, and a general catch-all group comprising company- or CEO-specific targets (other). Company- and CEO-specific metrics are the most popular non-financial measure by far: 53% of all contracts (88% of those where at least one non-financial metric is employed) use an idiosyncratic metric tied to company-specific strategic priorities. Employee-related non-financial metrics are the most common generic category (9% of all plans and 15% of plans with at least one non-financial measure) followed by customer satisfaction.

6.2 Ex ante compensation weights

Findings highlight EPS and TSR as the most common metrics used to align CEO pay with firm performance. To shed further light on the relative importance of these two measures, we follow De Angelis and Grinstein (2014) and estimate the proportion of total *available* performance-related pay associated directly with each metric. Specifically, we measure the maximum fraction of potential performance-related payments linked to a given metric (based on the maximum awards that could be paid out if the most challenging performance targets are achieved).

Approximately 14% of the maximum value of variable pay awardable is linked directly to EPS growth in the average CEO contract. However, the mean effect masks considerable variation, with approximately a quarter of companies attaching very high weights to EPS growth (>25%) and a larger group of companies attaching much lower weights (close to zero). Findings suggest that while the incidence of EPS growth targets is widespread, the total value of awardable (ex ante) pay linked to EPS performance is much more variable. A large fraction of EPS targets are associated with annual bonus plans, which account for a modest proportion of total ex ante performance-related pay incentives on average.

The mean CEO contract is associated with a 15% percent compensation weight on TSR, although again this average masks substantial variation in the sample similar to that documented for EPS. The weights on both metrics have increased significantly during the period, consistent with increasing pressures to link pay to performance. Whether these metrics provide the *most appropriate* way of measuring performance and determining CEO pay is an open question that we examine directly in sections 7-9 below.

6.3 Time trends

Figure 13 plots the evolution of performance metric usage over time. The percentage of companies using accounting- and market-based measures has remained reasonably stable throughout the period. The major area of change involves non-financial measures: only 43% of companies used such a metric in 2004

whereas 71% of the sample employed a non-financial measure in 2014. The number of companies using non-financial measures in CEO pay contracts is now equivalent to the number using market-based measures.

Although the overall popularity of accounting-based metrics has remained broadly constant over time, notable trends are evident among particular subcategories (Figure 14). Sales-based measures have gone from featuring in just 9% of contracts in 2003 to 26% of contracts in 2014. Similarly, accounting returns (cash flows) now feature in 35% (38%) of CEO pay contracts compared with only 15% in 2003. Margins and cost reduction also show a steady upward trend although their popularity remains low in absolute terms.

Increases over time in sales, accounting returns, and cash flow metrics have not occurred at the expense of a reduction in the popularity of income-based measures. Rather, companies have expanded the suite of metrics employed: the average number of metrics used to determine CEO pay has increased from 3.1 in 2003 to 4.8 in 2014, suggesting more focus on a balanced approach to incentives and rewards.

6.4 Sector variation

Value-generating strategies vary widely across sectors and CEO pay arrangements are in large part about incentivizing and rewarding strategy identification and implementation. Performance measurement is central to effective strategic planning and management, and accordingly one should expect to observe variation in performance measure usage across sectors.

Almost all companies except those in Basic Materials link CEO pay to accounting performance (Figure 15). Nevertheless, considerable industry variation exists in the type of accounting-based measures employed. For example, Oil & Gas companies place less reliance on income-based metrics, favouring cash flow and more idiosyncratic (Other) categories instead. Income measures also feature less prominently among Financial Services companies, where accounting returns and Other metrics tend to be preferred. Telecoms is notable for its focus on sales and cash flow measures, while Health Care companies place the highest reliance on margins.

Slightly more variation is evident in Figure 15 for market-based metrics, with Oil & Gas, Utilities, and Telecoms making proportionately more use of these metrics, while Financial and Consumer Services companies are less reliant on them.

Not surprisingly given their alignment with strategic priorities, non-financial metrics display the highest degree of sector variation in Figure 15. Utilities companies are most likely to link CEO pay with non-financial measures (94%) whereas Consumer Goods companies (49%) are least reliant on them. Other sectors where non-financial metrics are commonplace include Oil & Gas (79%) and Telecoms (73%).

Conditional on the decision to link CEO compensation to one or more non-financial outcomes, choice of specific metric also varies substantially across sectors (Figure 16). For example, employee-related measures are more commonly used Oil & Gas (47%), Basic Materials (36%), and Financial Services (36%). Financial Services companies are also more likely to use customer satisfaction metrics (53%), as are Customer Services companies (37%). Environmental metrics are largely restricted to Oil & Gas (24%) and Basic Materials (23%), while ethical metrics are limited to Financial Services (17%).

6.5 Variation across incentive components

This section reports patterns in performance measure usage across bonus plan, deferred compensation and long-term compensation (options and LTIPs) components. Figure 17 shows that accounting-based measures are ubiquitous in annual bonus plans and commonplace in long-term arrangements (81%). In contrast, only 58% of deferred bonus plans employ accounting measures. Further analysis, however, reveals that use of accounting measures in deferred bonus plans and long-term arrangements is on the increase: up from 44% in 2003 to 56% in 2014 for deferred bonus plans and from 78% to 87% for long-term arrangements over the comparable period.

A diverse set of accounting-based metrics feature in bonus plans, reflecting variation across companies and time in the emphasis placed on key aspects of operations including profitability and margins, cash flows, sales and costs. Long-term arrangements are much more homogeneous with respect to the choice of accounting metrics: EPS Growth dominates, which is surprising given the misleading insights that this measure may provide about long-term value creation.

Market-based measures are used rarely in annual bonus plans (2%), moderately used in deferred bonus plans (23%), and frequently applied in long-term arrangements (74%). Conversely, non-financial metrics feature rarely in long-term arrangements (3%); their use is restricted to bonus plans generally and annual bonuses in particular. Since many non-financial metrics capture factors that drive future value, their popularity in annual bonus plans may reflect an attempt to counterbalance myopia risks associated with accounting measures.

6.6 Regression analysis

To further understand the factors associated with performance measure choice we estimated multivariate regressions relating the probability of using non-financial metrics and value-based measures to company characteristics, time and industry membership. Untabulated results confirm a significant rise in the use of non-financial metrics over time. There is also evidence of a significant uptake in ROIC over the sample period after controlling for other factors. Industry membership also explains use of value-based metrics.

Of the company characteristics examined, size is the dominant explanatory factor: larger firms are more likely to use both non-financial and value-based metrics. There is also evidence that growth firms (low book-to-market ratio) and intangibles rich firms (high R&D) are more likely to use value-based metrics, although endogeneity problems prevent us drawing strong conclusions about causality.

7. Evaluating popular arrangements

Companies create value when they generate economic profits, defined as returns that meet or exceed the entity's cost of capital. At the heart of the performance measurement problem is the requirement to discriminate between value-increasing actions and value-destroying behaviour. At least three factors complicate this task. First, realized performance likely reflects internal or external factors beyond the CEO's span of control. Metrics that ensure executives are rewarded for skill rather than luck are desirable.

Second, performance measured at any given point in time risks providing only partial evidence on value-creation because the snapshot ignores the longer-term payoffs associated with investment activity. Metrics that distinguish long-term value creation from transitory gains are therefore critical.

Third, it is well established that when incentives are sufficiently strong, management game (manipulate) performance measures to achieve favourable outcomes. Metrics that limit manipulation opportunities, particularly when gaming

promotes short-term results ahead of long-term value generation, are therefore a central feature of effective and efficient compensation plan design.

A key question is how the prevailing CEO pay structures and metrics described above address these performance measurement challenges.

7.1 Traditional accounting metrics

Accounting metrics have long formed a cornerstone of performance-related pay arrangements and our results suggest no let-up in their popularity. Several factors help to justify their widespread adoption. Research shows that accounting data in general and earnings in particular correlate with periodic performance as reflected in share prices. Earnings generally outperform cash flows as a measure of periodic performance (especially over short intervals such as a quarter or a year) because the accrual process reflects the economic impact of transactions and events in the period they occur rather than as cash is realized.

Relative to share prices, accounting results are also less responsive to factors beyond managers' influence, thereby limiting the risk of rewarding or penalizing executives for performance outside their control. Accounting data also provide a common financial language that is well understood by management and investors. In particular, executives have a clear understanding of how their actions impact realized performance. Finally, because companies must prepare accounting data for external reporting purposes, the incremental cost of linking pay to financial statement information is very low.

Despite the considerable attractions, using accounting data as a basis for determining pay outcomes raises several concerns. First, it is well established that short-term earnings growth is imperfectly correlated with long-term value creation. Rewarding earnings growth is consistent with rewarding value generation when return on capital exceeds the cost of capital. However, positive earnings growth destroys value when return on capital is lower than the cost of funds, and it has no effect on value where return on capital equals the cost of capital (Mauboussin 2006).

Accounting also creates opportunities for manipulation because executives exercise discretion over estimates and assumptions underpinning the accrual process. Although the double-entry system restricts scope for repeatedly inflating earnings year-on-year (because income-boosting accruals must reverse at some point), research indicates that earnings manipulation is commonplace when the incentives to do so are strong. Stock markets typically see through such manipulations in all but the very short term.

Even more problematic than accounting manipulation is the practice of real earnings management. Since the accounting system often treats investment in intangible assets and future value as a period expense (e.g., research and development, marketing, training, etc.), pressure to achieve earnings targets can lead executives to behave myopically by cutting value-increasing investment spending to boost short-term accounting performance.

Since senior management have control over the asset base, profitability measures are often scaled by a measure of invested capital to produce return on investment metrics such as ROA and ROE. The risk with such return metrics, however, is that because short-term performance improvements can be achieved by reducing the asset base, reliance on these measures can incentivise myopic decisions such as: foregoing investments that are value-increasing in the medium- to long-term in favour of reporting higher accounting performance in the short-term; retaining (depreciated) non-current assets beyond their optimal useful

economic life; and engaging in costly off-balance sheet financing arrangements such as sale-and-leaseback transactions.

A similar problem with per share metrics such as EPS growth is the incentive to boost reported performance by shrinking the denominator using share repurchases. Buybacks increase EPS mechanically as long as the earnings-to-price ratio exceeds the opportunity cost of funds. Such mechanical growth in EPS does not necessarily imply value creation, however, particularly if funds earmarked for positive NPV investments are diverted to finance repurchases. Research shows that management initiate buybacks in response to EPS-based performance incentives.

7.2 Share price and shareholder returns

Share price changes or TSR represent a potentially simple and intuitive solution to the problem of evaluating periodic performance and value creation. Since share prices reflect all factors affecting equity value in a timely manner, they arguably provide a complete picture of the economic impact of events and transactions occurring during the performance window. In particular, their forward-looking property ensures they are less prone to the myopia problems that characterize accounting measures. Benchmarking returns against an index or peer group as is commonplace in most CEO pay contracts also provides a simple means of stripping out factors beyond management's control. Market-based metrics are also hard to manipulate over extended periods.

Several factors temper the apparent attractiveness of market-based measures. First, the forward-looking virtue that constrains management myopia is problematic in a compensation setting because it leads to pay for *expected* rather than *delivered* performance.

Second, economic theory demonstrates that the task of firm valuation is not equivalent to the task of evaluating the CEO's contribution to firm value. For example, even after benchmarking against index or peer performance, market prices may still reflect the impact of factors such as monetary policy, economic shocks, weather patterns, etc. that lie beyond executives' influence. While share price therefore captures factors that are unquestionably relevant for company value, many of these events may have little to do with executives' direct contribution to value.

Third, market prices can deviate from fundamentals at both the company and market level for a variety of reasons including limitations to arbitrage and investor sentiment. Further, research concludes that markets can be slower to incorporate the full implications of periodic performance measures than traditional efficiency views might suggest. Short-run market mispricing can also occur in response to biased reporting by management.

7.3 Moves toward a more balanced approach to performance measurement?

Section 6 reveals greater use of non-financial metrics, particularly in short-term bonus plans. The increasing trend of linking CEO pay to a suite of performance metrics including non-financial metrics is consistent with a more balanced approach to performance evaluation. Furthermore, significant cross-sector variation in the choice of non-financial metrics employed is consistent with attempts to align CEO pay incentives with company- and sector-specific strategic priorities.

Evidence that non-financial metrics are particularly popular in annual bonus plans where accounting measures dominate is consistent with attempts to mitigate short-termism inherent in earnings-based metrics by incorporating measures that drive long-term value creation such as employee and customer satisfaction. This "balanced scorecard" approach to incentivizing and rewarding performance is well

established among academics and professionals but adoption in senior executive pay arrangements has been relatively slow. The trend is to be welcomed to the extent it encourages senior executives to think about value-creation in the medium- to long-term.

7.4 Pay complexity

A downside of the balanced approach to performance measurement is increased remuneration complexity, which in turn can inhibit line of sight and lead to confused decision-making. More cynically, a balanced approach could be used as a way of ensuring CEOs receive their targeted pay since the likelihood of identifying some positive aspect of performance increases as the number of aspects measured expands; and the greater complexity of such structures helps to obfuscate this effect. Non-financial and executive-specific objectives are particularly problematic in this regard given their lack of transparency and difficulty determining if the target is sufficiently demanding.

Reliance on increasing numbers of metrics to assess and reward CEO performance is not the only evidence of escalating compensation complexity among FTSE-350 firms. Relative to remuneration reports published in 2003, corresponding disclosures presented in 2014 are 50% longer (as measured by the number of words) and 20% less readable (as measured by the Fog Index of linguistic complexity).[1]

To further assess pay complexity, we evaluated the ability of moderately informed consumers of financial data to extract the following fundamental piece of information from FTSE-350 companies' remuneration reports: total realized CEO compensation the fiscal year, together with the values for deferred bonus and aggregate long-term compensation.[2] We used four Masters in Finance students as our surrogate for moderately informed users of remuneration disclosures. Each student was provided with basic training on CEO compensation and how to read a UK remuneration report; they were also walked through five examples of how to determine total CEO pay. The sample of 2,594 company-years was then distributed equally among the four participants on a randomised basis. Each student was then required to determine total CEO pay based on remuneration report disclosures for their allocated cases. Results of the data collection task were then checked against reported pay by a member of research team.

Despite careful prior training and the supposedly straightforward nature of the task, participants failed to determine the correct total pay figure in 22% of cases, with a median error rate across the four surrogate users of 16%. Median error rates for the deferred bonus and long-term compensation elements were also significant at 15% and 27%, respectively. In total our four surrogate disclosure users recorded at least one data error across the three compensation data elements in 46% of company-years. Further analysis reveals that the incidence of mistakes by all four participants was higher in 2014 than 2003. Collectively, these findings are consistent with high and increasing levels of complexity in CEO pay arrangements and their associated disclosures.

7.5 Value-based measures

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[1] The Fog Index captures linguistic complexity as represented by a combination of sentence length (longer sentences are viewed as being more difficult to read) and word length (words comprising more than three syllables are considered more complicated to understand).

[2] We used students about to complete a one-year Masters in Finance programme and with grades at distinction level.

Adoption of standard value-based measures of periodic performance such as EP and RI remains very low among large UK firms. The evidence could be viewed as surprising given the conceptual advantages of using value-based metrics to incentivize and reward senior executives. In particular, thee metric have their theoretical roots in discounted cash flow technology and under certain conditions yield single-period performance signals that are fully consistent with the NPV rule. Further, since these metrics explicitly acknowledge the costs of both equity and debt finance, they also incorporate financing risk-return trade-offs into the performance measurement problem. Accordingly, value-based metrics provide a theoretically robust yet parsimonious means of creating direct line of sight to long-term value generation accruing to all providers of capital.

More generally, UK management provide very little discussion in their annual report performance commentaries about the cost of capital. While the apparent failure by UK companies to benchmark periodic operating returns against WACC is hard to reconcile with the extensive academic and professional literatures on long-term value creation, findings are consistent with evidence documented in other markets such as the US (IRRCi 2014).

The failure of value-based metrics to gain widespread traction in CEO compensation contracts is puzzling at first sight. Both conceptual and practical reasons have been proposed to explain the poor uptake. From a purely theoretical perspective, metrics that benchmark operating profits against the cost of capital do not guarantee to incentivize and reward outcomes that are always perfectly aligned with the NVP rule: single-period realizations of RI and EP can still produce insights that are inconsistent with long-term value creation despite their additional computation complexity.

Some commentators have argued that computational complexity serves as a constraint on adopting value-based metrics even if perfect alignment with value generation was guaranteed. Value-based metrics such as EP and EVA® that adjust GAAP measures of profit and capital have been criticised insofar is that these modifications increase complexity, which in turn reduces line of sight and understandability (for both management and capital providers). For example, Stern Stewart have proposed up to 164 modifications to GAAP for their EVA® measure, with even the most parsimonious applications typically involving up to 15 adjustments. Cost of capital calculations add further complications, which tend to be exacerbated when these metrics are cascaded down the organisational hierarchy as recommended by value-based proponents. Using value trees or Du Pont-style decompositions of RI and its cousins provides a means of breaking down the headline measure into a small number of key operational metrics that are more directly applicable business unit managers and over which they have greater control.

The process of adjusting GAAP numbers has also been criticised for creating opportunities for management to influence performance outcomes. The same arguments have also been made in relation to discretion over the methods and assumptions used to compute WACC. Finally, as academics (Jensen 2003) and value-based consultants (e.g., Stewart 1991) have emphasised, performance measure choice alone is insufficient to solve the incentive compensation problem. Payoff structures that minimize nonlinearities in the association between pay and performance in favour of linear arrangements (with carry-forward of gains and losses via a bonus bank) are also critical to overcoming much of the dysfunctional behaviour associated with particular metrics.

Evidence also fails to demonstrate whether using value-based measures is more effective than using a menu of popular of accounting and operating metrics that

management understand and feel comfortable with. The move towards a more balanced approach to measuring and rewarding performance described above for annual bonus plans may therefore represent a pragmatic means of achieving outcomes similar to those delivered through a fully integrated value-based management system.

7.6 What you pay is what you get

Performance measurement generally and performance-related pay arrangements in particular have powerful behavioural effects on individuals' actions that can result in fixation on achieving narrowly-defined outcomes that are at odds with long-term value creation. The pitfalls of rewarding A to achieve B are well-documented in research and practice, and yet the same mistakes appear to be made repeatedly in the context of executive pay despite unequivocal evidence that what you pay is what you get.

Examples of dysfunctional behaviour caused by performance metrics that align imperfectly with long-run organisational objectives include investment myopia, earnings manipulation and gaming, excessive risk-taking, and threats to corporate culture and reputation. [See Hass et al. (2014: 21-24) for a detailed review.] Choosing a performance metric (or suite of metrics) that incentivises preferred outcomes and minimises the risk of dysfunctional behaviour is critical to the effectiveness of reward systems in general and executive compensation arrangements in particular. The problem is especially acute for CEOs given the control they exercise over financial resources and the corresponding scope for value destruction through poorly aligned decisions.

In the absence of a first-best single-period performance solution that provides short-term signals consistent with long-term value generation in all circumstances, performance metric choice inevitably involves searching for a second-best option. This in turn means trading-off positive incentive effects against possible negative unintended consequences. Understanding and counteracting the potential problems associated selected measure(s) can be as important as the selection decision itself.

8. Methodology for measuring performance and value creation

This section provides details of the metrics used in our subsequent analyses to measure periodic corporate performance and value generation, and to evaluate the nature of the association between these measures and CEO pay realizations.

We examine a broad suite of financial performance metrics that can be decomposed into two broad categories: value-based measures and traditional (accounting- and market-based) metrics. The value-based category includes the following measures drawn from the academic and practitioner literatures on value generation: free cash flows to the firm, economic profit, residual income, a proxy for Stern Stewart's EVA® metric, the current and future (implied) components of market enterprise value, and ROIC. The traditional performance measure category includes the following metrics widely used by management and financial statement analysts: EPS growth, TSR, and ROA.

All financial performance measures are initially constructed for a 12-month window aligned with the fiscal year. Annual metrics are then aggregated over rolling multi-year horizons (e.g., three years) to produce measures that provide a more stable, longer-term perspective on company performance.

The remainder of this section explains how each performance metric is constructed, along with details of the approaches used to aggregate annual measures into multi-year metrics. More granular information regarding variable

definitions and alternative measurement methods is provided in Appendix A at the end of this report.

8.1 Cost of capital estimates

Most value-based metrics measure returns to (all) capital providers against the corresponding costs associated with the source(s) of capital. The weighted average cost of capital (WACC) therefore represents a central pillar of most value-based metrics. This section summarizes our approach to measuring this key variable.

The majority of companies do not disclose their WACC and therefore researchers and other external stakeholders must estimate this figure indirectly. A variety of estimation methods exist and the evidence does not provide unanimous support for any single approach. We experimented with a range of methods for measuring both the cost of equity and the cost of debt. Results presented in the main body of this report rely on cost of equity estimates derived from the capital asset pricing model (CAPM) and cost of debt estimates generated from published accounting data.

Choice of methods used in the main analyses reflects a compromise between data availability and the marginal gains to increasingly more sophisticated refinements. Appendix A summarises alternative cost of equity measures derived using the Fama-French three-factor model and a naïve approach that adjusts a constant return of 10% by firm- and time specific beta estimates, and an alternative cost of debt measure based on firm-specific bond yield data. In addition to describing these alternative cost of equity and debt measures, Appendix A also presents summary information on alternative WACC estimates. Since correlations across methods are high, we select the most theoretically rigorous approaches that maximize sample size.

We compute company-specific costs of equity and debt and allow these estimates to vary over time. Specifically, our company- and time-varying cost of equity (R_e) is defined as:

$$R_e = R_f + \beta(R_i - R_m), \quad (1)$$

where R_f is the risk-free rate of return, $(R_i - R_M)$ is the equity risk premium, and β is the CAPM beta estimated using a maximum of 60 monthly returns. Risk free rates are computed using Treasury Bill rates from Datastream. The market risk premium varies annually based on average UK market risk premium rates reported in Fernandez et al. (2008, 2010, 2011, 2012, 2013, 2014); for other years the market risk premium is set equal to 5%.

Our company- and time-varying cost of debt (R_d) is defined as the interest expense on debt (as reported in the income statement) divided by average total debt (as reported in the statement of financial position).

Estimates of R_e and R_d are combined with company-specific information on capital structure to produce firm- and time-varying estimates of WACC:

$$WACC = (E \times R_e) + (D \times R_d \times [1 - T]), \quad (2)$$

where E is the proportion of equity in a company's capital structure, D is the proportion of debt in the capital structure, and T is an estimate of the company's marginal tax rate.

We opt for this approach to measuring WACC over alternative measures because it provides reliable estimates (when benchmarked against alternatives – see Appendix A) while minimizing sample attrition due to less onerous data requirements.

8.2 Value-based metrics

Free cash flow to the firm (FCFF) is defined as funds from operations plus interest expense net of interest capitalized, net funds from other operating activities, and fixed asset disposals, minus capital expenditures.

Residual income (RI) is based on the following definition:

$$RI = NOPAT - (IC \times WACC), \quad (3)$$

where NOPAT is net operating profit after tax, IC is invested capital adjusted for excess cash, and WACC is the weighted average cost of capital as defined above.

Economic profit (EP) follows a similar definition to RI in equation (3) but with the following two additional adjustments that treat net transitory losses and periodic R&D expenses as investments. First, NOPAT is adjusted by reversing the periodic impact of transitory items (extraordinary items, asset sales and discontinued operations) and R&D expenditures, and then charging amortization on pro forma capitalized transitory net losses and R&D expenditures. Second, IC net of excess cash is further adjusted by capitalizing the pro forma unamortized value of transitory net losses and periodic R&D expenditures.

Stern Stewart's EVA® metric is similar to EP insofar as it adjusts RI as presented in (3) for a series of non-GAAP accounting treatments designed to unwind the effects of conservative accounting and earnings management, and to increase financial reporting comparability across firms and time. Accordingly, NOPAT is first adjusted by reversing the period effects of R&D expenses, goodwill amortization and impairments, restructuring charges (net of tax), deferred tax, provisions (net of tax), and the implied interest portion of the rental expense on operating leases (net of the tax shield). Second, NOPAT is further adjusted to include amortization on the pro forma values of the capitalized R&D expense and the capitalized present value of future operating lease payments. Finally, IC is: increased by adding the unamortized value of capitalized R&D expense, accumulated amortization on goodwill, pro forma capitalized restructuring charges (with amortization applied), provisions, and the present value of future operating lease payments; and decreased by deducting the net deferred tax asset.

(Further details concerning the adjustments involved in computing EVA® and EP are provided in Appendix A.)

ROIC is set equal to NOPAT divided by IC, where both variables are as defined in equation (3) above.

The current value component of market enterprise value (CV_{EV}) is equal to invested capital adjusted for excess cash plus the present value (PV) of future economic profits:

$$CV_{EV} = IC + PV(EP), \quad (4)$$

where PV(EP) assumes current-period EP is a perpetuity with the discount rate equal to current-period WACC (IRRCi 2014).

Finally, the future value component of market enterprise value (FV_{EV}) is equal to difference between the market enterprise value (EV) and the current value component of market enterprise value:

$$FV_{EV} = EV - CV_{EV}, \quad (5)$$

where EV is approximated using the market value of equity plus the book value of debt. Two factors increase the risk of EV falling below CV_{EV} in equation (5). First, EV likely represents a downward biased estimate of actual enterprise value because debt is measured at book value. Second, EV fell sharply during the financial crisis as equity values plummeted. The combined effect results in a high proportion (64%) of negative FV_{EV} values in our sample. While negative FV_{EV} is possible, the high incidence of such cases is arguably implausible. We address this

issue by setting FV_{EV} equal to zero when EV < CV_{EV}, although our main conclusions are robust to using the actual estimate of FV_{EV}.

8.3 Traditional financial metrics

EPS Growth is based on earnings realizations reported on the Institutional Brokers' Estimate System (I/B/E/S). Earnings reported by I/B/E/S adjust GAAP net income from continuing operations for transitory items to create a measure that better captures sustainable operating performance. Research suggests that most large companies emphasize an adjusted (non-GAAP) earnings metric for valuation and performance measurement purposes (Young 2014). I/B/E/S EPS is typically computed on a fully diluted basis. Annual EPS growth is defined as the one-year change in I/B/E/S EPS scaled by lagged absolute I/B/E/S EPS. (Appendix A provides details of alternative EPS growth measures based on GAAP net income.)

Raw TSR is equal to the change in share price over the fiscal year plus ordinary dividends declared and reinvested at the realized return, although in sensitivity tests reported in Appendix A we expand TSR to include returns from share repurchases (open market and tender offers). Relative TSR (TSR_R) is defined as raw TSR minus the sample median TSR for the corresponding calendar year. (Using more refined TSR benchmarks based on industry did not have any material effect on the results.)

Sales Growth is measured in the same way as EPS Growth. Finally, ROA is defined as operating profit scaled by total assets.

8.4 Multi-year performance windows

Measuring performance and value-creation over a one-year window can yield unreliable insights given the lag between investment and returns, and the compounding asymmetry with which gains and losses are recorded by the accounting system. In recognition of this problem, executive compensation structures typically link a fraction of pay to performance measured over a multi-year horizon. We follow the same approach in our analysis by aggregating annual results over rolling *n*-year intervals to form longer-window measures of performance. Analyses presented in the body of the report are based 3-year rolling windows but additional tests also utilize 5-year rolling windows.

The aggregation process for unscaled measures of performance such as FCFF, RI, EP and EVA® involves aggregating annual results for consecutive years in the performance window. For return- or growth-based metrics such as ROIC, TSR, EPS Growth and ROA, we use the geometric mean (i.e., compound growth) of annual values in the performance window.

9. Company performance and value creation

This section examines the performance of FTSE-350 companies over the period 2003 through 2014/15. The aim of the analysis is twofold. First, we seek evidence on the level of fundamental value-generation and the way this varies over the sample period. Second, we compare and contrast insights provided by alternative performance metrics and in particular the extent to which commonly used measures such as EPS Growth and TSR correlate with value creation. Findings based on annual measures as well as performance computed over 3- and 5-year intervals are reported.

9.1 Weighted average cost of capital

Cost of capital is a key variable in subsequent analyses. The median company faces a WACC of 6% (based on a median cost of equity of 8% and a cost of debt of 6%). Time series plots presented in Figure 18 reveal a steady run-up in WACC to 9% prior to the onset of global financial crisis in 2008 followed by a sharp drop to 6%

and lower thereafter. Temporal variation in WACC is driven mainly by changes in the cost of equity, with the cost of debt moving within a relatively narrow range between 6-7% for most of the period.

9.2 Summary performance

A full set of summary statistics for all annual performance measures is presented in Appendix B for the pooled sample and by calendar year. In a typical year the median company generates £113 million of free cash flow to the firm and has an enterprise value of £1.9 billion, of which 90% represents current value. The median firm reports annual ROIC of 7%, ROA of 6%, EPS Growth of 9% and raw TSR of 16%. (Relative TSR for the median firm is zero by construction.)

Median profits after deducting a charge for invested capital are positive but low, ranging from £2.4 million for RI to £8.9 million for EP. (Median invested capital for the sample is £1,488 million indicating economic returns of less than 1% per year.) Consistent with the suggestion of low economic returns, the sample median value for annual ROIC minus WACC is zero. Further, the bottom quartile value for RI, EP, EVA®, and ROIC minus WACC is reliably negative, indicating that more that 25% of the 2,594 company-years in the sample are associated with value destruction regardless of the specific metric used. Future value is also negative at the bottom quartile of the sample. These findings raise questions about the level of value creation delivered by large UK companies despite apparent solid annual earnings growth and returns to shareholders.

Figure 19 plots median annual company performance by calendar year. Results for annual ROA and ROIC give the impression of positive and stable performance. Both return metrics remain reasonably stable across the period at around 7% for the median company, although a material dip in 2008 and 2009 is nevertheless evident. Median annual TSR and EPS Growth of 16% and 9%, respectively, also imply healthy performance across the period, although both metrics display higher volatility than return on capital ratios. Of particular note is the severe downward spike for median TSR in 2008, followed by a less pronounced but nevertheless significant downward spike for EPS Growth in 2009-2010. The delayed drop in EPS Growth relative to TSR around the crisis period is consistent with information being impounded in share price more quickly than accounting earnings.

A somewhat different picture emerges using value-based metrics RI, EP, and EVA®. Not surprisingly given the overlap in their definitions, all three measures provide similar insights. Median value-creation is marginally positive in the years prior to 2007, before turning significantly negative during the global financial crisis (2008 and 2009). From 2010 onwards, all three metrics rebound into positive territory, with the median company generating between £15 and £30 million economic income to capital providers per year, conditional on the particular value-based measure examined. The rebound is driven in part by a structural decrease in the cost of equity and WACC in 2009.

Overall, results using value-based metrics suggest that the typical FTSE-350 company generated little in the way of a meaningful net return on invested capital over the period 2003-2009 after adjusting for the full cost of funds, and although performance improved from 2010 onwards the median firm generated less than £9 million of EP (£3 million of RI) per year over the entire sample period. The compound growth in annual mean returns over the period is marginally above 8% based on results reported for ROIC – WACC in Appendix B, Table B2.

While future value represents only 10% of total market EV for the median company-year, Figure 20 reveals notable time-series variation in the relative levels of EV, CV_{EV} and FV_{EV}. Prior to 2010, FV_{EV} was reliably positive and exceeded 10% in

all years from 2004-2008, peaking at 30% in 2007. From 2009 onwards, however, FV_{EV} has been negligible or negative for the median company. As discussed in section 8, this partly reflects measurement error in EV resulting from reliance on the book value of debt and partly the collapse in equity values during the financial crisis. In subsequent analyses we set FV equal to zero when $EV < CV_{EV}$.

9.3 Correlations between performance measures

Next we examine the degree of alignment (correlation) between alternative performance metrics. Table 2 reports simple correlations based on annual measures while Table 3 replicates the analysis using rolling 3-year performance windows. Both tables report parametric (Pearson) and non-parametric (Spearman) correlations for completeness, although we emphasise the latter because they are more robust to extreme values.

Focusing first on the annual results, the top panel in Table 2 presents correlations among the value-based metrics (FCFF, RI, EP, EVA® and ROIC minus WACC). Spearman correlations reported below the diagonal generally exceed 0.5, with many coefficients exceeding 0.7. Value-based measures as a group are therefore reasonably well aligned, although the correlations are significantly lower than 1.0 indicating that the measures nevertheless capture different aspects of value creation. The highest degree of alignment is evident for RI, EP and EVA®, which is not surprising given all three are based on the same underlying structure.

The centre panel in Table 2 reports results for the group of traditional performance metrics (EPS Growth, TSR, ROA, and Sales Growth). The degree of alignment among these metrics is much lower than for the value-based measures, as evidence by Spearman correlations that rarely exceed 0.25. The lack of alignment could be due to these measures capturing different aspects of value generation; or it could indicate that all four measures are influenced by factors that have little to do with the underlying value creation process. The final panel in Table 2 sheds light on this issue. With the exception of ROA, none of the traditional metrics display close alignment with any of the value-based measures: the majority of correlation coefficients involving EPS Growth, TSR, and Sales Growth are below 0.2 and none exceed 0.3. Results cast serious doubt on the degree to which these metrics proxy for fundamental value generation.

ROA is the only traditional performance measure that shows meaningful alignment with the suite of value-based metrics. Despite its simplistic formulation and widely acknowledged limitations as a performance measure, our findings suggest that ROA can serve as a reliable, low cost first-pass to assessing the extent of periodic value generation.

Table 3 presents corresponding results for rolling 3-year performance windows. Correlation are generally higher across the board for the 3-year measures, consistent with the multi-year aggregation process providing clearer signals about sustainable performance by smoothing short-term transitory effects. This is most noticeable for the traditional performance metrics, where results in the centre panel reveal correlations around 0.3. Correlations reported in the bottom panel between traditional measures and value-based metrics are also higher than comparable results in Table 2.

This relative increase in alignment suggests that low correlations for annual values of EPS Growth, TSR, and Sales Growth are at least partly the result of transitory factors that have little to do with stable value creation in the medium- to long-term. The apparent impact of transitory performance on one-year windows highlights the potential risks associated with relying on such metrics in short-term bonus plans: incentivising and rewarding management based on significant one-

year improvements in EPS, TSR and sales does not necessarily equate with long-term value creation.

Crucially, results in the bottom panel reveal stubbornly low alignment between traditional measures and value-based metrics in absolute terms: correlations for EPS Growth, TSR and Sales Growth rarely exceed 0.3 and never exceed 0.4. The only exception, once again, is for ROA which aligns reasonably well with all value-based measures.

9.4 Explaining variation in value creation

The previous analysis investigates bivariate associations between value creation metrics and traditional performance measures. This section extends that analysis by examining the degree of variation in value-based metrics explained by a combination of EPS Growth, TSR, Sales Growth, and ROA. Assessing the combined explanatory power of multiple measures for value creation is important because most executive pay contracts utilize a combination of metrics, which when considered together as a group could produce significant alignment with fundamental value generation.

Table 4 reports regressions of annual value-based metrics (FCFF, RI, EP, EVA® and ROIC minus WACC) on various combinations of annual EPS Growth, TSR, Sales Growth and ROA.[3] Although EPS Growth, TSR and TSR_R are positively associated with value-based metrics (regression coefficients generally positive and statistically significant), their explanatory power, as evidence by the adjusted R^2, is negligible. Adding ROA to the model improves explanatory power but the total amount of variation explained does not generally exceed 20%. The exception is ROIC minus WACC, where adding ROA to the set of explanatory variables increases explanatory power to 67%. This increase reflects the combined effect of ROA capturing elements of single-period value creation and a mechanical link between the definitions of ROA and ROIC. (Note also that Sales Growth is *negatively* associated with EP, RI, and EVA®.)

Comparable analyses are presented in Table 5 using rolling 3-year performance windows, with very similar results. Over 3-year performance windows, EPS Growth and TSR display very little explanatory power individually or jointly for value-based metrics. Further, Sales Growth displays no significant links with value creation. Only ROA is associated with meaningful explanatory power but again the level only exceeds 20% for ROIC minus WACC. Collectively, results reveal very low alignment between traditional performance metrics and established measures of fundamental value creation.

9.5 Realised value generation

Table 6 partitions the sample according to the sign of rolling 3-year EP and TSR_R. IRRCi (2014) refers to the resulting 2×2 matrix as the Value Quadrant, which they argue provides a basis for understanding value creation:

- Positive EP/positive TSR_R quadrant: companies that are unambiguously creating value over the performance window;
- Positive EP/negative TSR_R quadrant: companies that have a value-creating business model but for various reasons (e.g., the financial crisis) this has not translated into superior TSR performance;
- Negative EP/positive TSR_R quadrant: companies facing significant uncertainty insofar as it remains unclear whether their business model will facilitate a

[3] RI, EP and EVA® are scaled by lagged sales to account for variation in company size. All regression variables are winzorized at the top and bottom percentiles to mitigate the impact of extreme performance outcomes.

positive return on capital in the near future and/or whether management have a clear plan to deliver these positive returns (despite positive market expectations and shareholder returns);
- Negative EP/negative TSR_R quadrant: companies classified by IRRC (2014) as challenged due to evidence of value destruction and poor returns to shareholders.

Over 45% of the sample is associated with value destruction as characterized by negative EP, of which the majority of cases are also characterized by negative TSR_R: 27.7% of all 3-year performance windows are located in the negative EP/ negative TRS_R cell in the Value Quadrant. The findings raise serious concerns about the performance of large UK corporates. Worryingly, only 32.5% of 3-year performance windows display positive EP/positive TSR_R, with a further 22.1% recording positive EP but negative relative TSR.

Table 7 replicates the same analysis using 5-year rolling performance windows. The scale of value destruction is even more pronounced, with 134 of the 478 performance windows (31.4%) located in the negative EP/negative TSR_R cell. With almost half the sample displaying negative cumulative EP in the medium term (the majority of which are also associated with below-median TSR), findings call into question senior management's record on value-generation over the last decade. Results mirror those presented by IRRCi (2014) for large US companies, where 35.4% of the sample displayed cumulative negative EP/negative TSR_R over the 5-year window 2008-2012.

Partitioning companies on the basis of ROIC minus WACC and change in Future Value (ΔFV_{EV}) provides an alternative way of specifying the Value Quadrant (IRRCi 2014). Similar results to those reported in Tables 6 and 7 are apparent. Almost half the sample (49.6%) is characterized by ROIC lower than WACC (i.e., value destruction) and of these cases, nearly half also display negative ΔFV_{EV}. In other words, almost a quarter of the sample (23.3%) are classified as challenged cases based on aggregate 3-year performance.

9.6 Summary

Low alignment between traditional metrics and value-based proxies highlights the importance of (and challenges associated with) performance measure choice in CEO pay arrangements. The view that linking pay to any commonly-used performance metric goes a long way to ensuring appropriate incentives and rewards for senior executives clearly represents a gross oversimplification of the problem. Different metrics provide very different perspectives on periodic performance and long-term value creation. The performance measure(s) to which pay is linked therefore represents a critical decision in executive compensation contact design. While the extant governance debate has repeatedly emphasised the need to ensure appropriate alignment between executive pay and corporate performance broadly defined, guidance on the particular performance measure(s) used is much less evident.

10. The pay-performance relationship

10.1 Determinants of realized total CEO pay

Our final set of analyses explore the relation between CEO pay and company performance. In particular, we examine the degree to which the alternative performance metrics presented in sections 8 and 9 explain variation in inflation-adjusted realized CEO pay. Empirical analyses are based on a series of linear regressions of the following form:

$$\text{CEO pay}_t = \delta_0 + \delta_1 \text{Metric}_t^k + \varepsilon_t, \quad (6)$$

where CEO pay is either total realized compensation or total realized variable compensation (both scaled by lagged total sales to control for size effects and both expressed in 2014 prices) and Metric is the k^{th} measure of company performance, where *k* = EPS Growth, TSR, TRS_R, Sales Growth, ROA, RI, EP, EVA® and (ROIC – WACC). Separate analyses are conducted using pay and performance measured over annual and 3-year rolling windows.[4]

The primary focus of the analyses concerns the sign of δ_1 and the explanatory power of the regression (measured using the adjusted R-square statistic). We expect δ_1 to be positive for a given performance measure if CEO pay varies in the same direction as performance (i.e., better performance translates into higher pay). The explanatory power of the regression captures the amount of variation in pay explained by a given performance measure: a relatively high (low) adjusted-R square indicates that more (less) of the variation in pay is explained by reported performance.

Findings based on annual performance windows and total pay are presented in Tables 8 and 9. The first six columns of Table 8 present results for the group of traditional performance metrics: EPS Growth, TSR, TSR_R, Sales Growth and ROA. None of the metrics explain a material amount of CEO pay: the explanatory power of the models is very low (typically less than one percent). Even when all five metrics are included in the same model (Model 6) the amount of total compensation explained is only 3.3%, with most of the explanatory power coming from ROA. Coefficient estimates indicate that CEO pay increases with EPS Growth, Sales Growth, TSR, TSR_R and ROA but the sensitivity of pay to these metrics is very low.

Models 7-10 in Table 8 present a similar analysis for the suite of value-based measures: RI, EP, EVA® and (ROIC – WACC). While the explanatory power of the regressions typically equals or exceeds the levels reported for in Models 1-6 using traditional performance metrics, the values of δ_1 are *negative*, indicating that FTSE-350 CEOs actually receive higher compensation in periods where value has been destroyed. The results are counter to what we would expect to see if pay was aligned to value creation.

Models 11-14 provide results for regressions containing both the suite of standard performance metrics and a value-based metric. Performance, however measured, explains a maximum of 10% of the variation in total annual realized pay. Total pay is increasing in Sales Growth, TSR_R and ROA but negatively correlated with RI, EP, EVA® and (ROIC – WACC).

Table 9 reports results where we extend equation (6) to include various non-performance-related potential determinants of pay such as company size, industry, and lagged pay. The explanatory power of all models improves substantially: adjusted-R squares typically exceed 67%. Findings suggest that the main factors driving total realized CEO pay in FTSE-350 companies during the sample period are company size, sector, and the amount of pay received by the CEO in the previous year. Although these features may correlate with aspects of value-generation, they are at best likely to represent (very) blunt tools for assessing long-term corporate success.

[4] All compensation and performance variables are winzorized at the top and bottom extreme percentiles to reduce the impact on the results of extreme observations. Value metrics RI, EP and EVA® are scaled by lagged sales.

Analyses using total pay and performance measured over 3-year rolling windows yields identical conclusions to the single-period findings.

10.2 Determinants of realized variable CEO pay

Tables 10-11 repeat the same analysis using annual realized variable pay, defined as total pay less salary, pension and benefits). Results in Table 10 are entirely consistent with those documented for total pay. EPS Growth, Sales Growth, TSR_R and ROA are all positively correlated with variable pay but their combined explanatory power is less than 5%; value-based metrics explain negligible variation in performance-related pay and display *negative* coefficients; and performance metrics as a group explain less than 10% of variable compensation in models 11-14. Extending the regression to include company size, lagged variable pay and industry controls (Table 11) again leads to a dramatic increase in explanatory power: adjusted R-squares exceed 50%. These extended models also reveal positive associations between variable pay and RI, EP and EVA®, suggesting that the negative correlations reported in Table 9 may be driven by statistical problems relating to endogeneity. Crucially, however, the sensitivity of pay to these metrics remains economically small despite the statistical significance. In contrast, the sensitivity to structural factors such as size and industry remains surprisingly high.

Evidence that structural factors such as industry and past pay explain the major proportion of realized performance-related rewards cast serious doubt on the view that variable pay arrangements as currently structured serve to incentivize and reward superior performance, however defined. Even if these dimensions correlate with aspects of value-generation, at best they represent very blunt instruments for incentivizing and rewarding long-term corporate success.

In sum, despite the evolution of UK executive pay arrangements over the last two decades and in particular the greater emphasis on variable pay, the link between realized rewards and company performance remains stubbornly weak in general terms, and largely non-existent where fundamental value creation is concerned. Structural concerns over executive pay arrangements in the UK therefore persist.

10.3 Further evidence on the pay-value creation link

To shed further light on the link between CEO pay realizations and company performance, Table 12 reports average realized total CEO pay for the four cells in the Value Quadrant formed based on rolling 3-year performance intervals. If pay is aligned with fundamental value generation then higher levels of compensation should be observed for value creating cases in the top right quadrant (positive EP/ positive TSR_R) relative to value destroying cases in the bottom left quadrant (negative EP/negative TSR_R).

Results provide some reassurance that pay reflects value generation. Median total pay in the positive EP/positive TSR_R quadrant is £5.9 million compared with £4.5 million in the negative EP/negative TSR_R quadrant. The 30% higher pay for cases in the value creation quadrant is both statistically and economically significant. A similar but even more pronounced pattern is evident for mean pay: CEOs delivering consistent value creation receive 48% higher mean pay over a 3-year window relative to their value destroying counterparts. A key question, however, is whether the magnitude of these differences is sufficient given the extent of the performance differential.

Pay levels also vary positively with EP performance for CEOs delivering positive TSR_R over a 3-year window, consistent with rewards discriminating between positive realized returns on capital and expected value creation. Specifically,

median pay in the positive EP/positive TSR_R quadrant is 26% higher than median pay in the negative EP/positive TSR_R cell. Pay arrangements therefore appear to provide some distinction between proven value-creators and *expected* value creators whose business models are yet to deliver a tangible return on capital.

Findings in Table 12 suggest that CEO pay reflects value creation to the extent it differentiates between positive and negative EP, despite the absence of any positive linear association with pay across the entire distribution of EP performance (Tables 8-10). Collectively, the evidence suggests that pay may be linked with value creation in a simple nonlinear manner that distinguishes broadly between value generation and value destruction but not in a refined way that reflects the magnitude of fundamental value creation or loss.

In contrast, rewards show less differentiation between positive and negative TSR_R groups (i.e., realized returns to shareholders). For example, median pay is only 7% higher for the positive EP/positive TRS_R cell relative to the positive EP/ negative TSR_R cell; and pay levels are only 3% higher for the negative EP/positive TSR_R cell compared with the negative EP/negative TRS_R quadrant. The relative low sensitivity of pay to realized shareholder returns is consistent with our regression results reported in Tables 8-11.

10.4 Discussion

Results provide a somewhat mixed picture. On the one hand, pay is correlated with value generation at a primitive level, with CEOs generating positive economic profits receiving significantly higher pay than their counterparts generating negative economic profits. On the other hand, prevailing arrangements fail to deliver a more granular distinction between pay realizations and fundamental value creation. On balance and given the resources directed at modernising executive pay over the last two decades in the UK, the persistently weak and crude nature of the link between pay and performance is surprising and disappointing. Lack of apparent progress suggests factors other than the fraction of pay linked explicitly to performance (however measured) may serve to limit the degree of pay sensitivity:

- While performance-related pay is typically protected at zero on the downside, value creation can be negative. The resulting asymmetry served to weaken pay-performance sensitivities overall and particularly at low levels of value creation. Similarly, capping rewards in the presence of high value creation (although understandable) serve to further weaken pay-performance sensitivity. Performance measure choice in isolation is therefore not sufficient to solve the pay-performance problem: payoff structures that linearize the association between pay and performance (via carry-forward of gains and losses) are also critical.
- The common practice of basing equity grants on a percentage of base salary introduces a *negative* association between prevailing stock price performance and future pay realizations for companies with persistent lacklustre market performance. The practical need to reset incentives in the face of stock price declines unavoidably serves to supress realized pay-performance sensitivities.
- Although the trend toward greater use of non-financial performance metrics that better reflect long-term performance is encouraging, the devil is in the detail as always. Lack of transparency (targets are rarely disclosed), coupled with increased scope for subjectivity regarding target achievement, could compromise pay-performance linkages.
- Remuneration committees (remcos) play a critical intermediary role in the design and implementation of pay arrangements. Research reveals that remco

structure and expertise influence pay-performance alignment, due in part to the discretion that committees exercise over pay outcomes. Shareholders' ability to evaluate remco activities hinges on the presence of objective performance metrics and clearly defined remco goals. Failure to hold remcos accountable for their decisions can weaken pay-performance alignment even when underlying pay structures are appropriately designed.

11. Summary and conclusions

This report aims to inform the development of guidelines on the design and administration of senior remuneration arrangements among UK listed companies via an analysis of Chief Executive Officer (CEO) pay structures and their alignment with corporate value creation for FTSE-350 companies over the period 2003-2014/15.

The research addresses concern over the ability of widely used performance metrics such as EPS growth and TSR to reflect fundamental value creation for all capital providers (equity and non-equity), and hence to serve as a reliable basis for incentivizing and rewarding senior executives.

The primary insights emerging from the analysis are as follows. First, total pay for the median CEO has increased by 82% in real terms over the period, with an otherwise linear trend halted only by the financial crisis in 2008-2009 when pay levels slipped back to 2006 levels. Second and in sharp contrast to pay growth, the median FTSE-350 company generated little in the way of a meaningful economic profit over the period 2003-2009 (i.e., after adjusting for the full cost of funds), and although performance improved from 2010 onwards the level of economic return on invested capital has remained low in absolute terms (less than 1%). Third, while EPS growth and TSR are the dominant means of incentivizing and rewarding CEOs, these metrics correlate (very) poorly with theoretically more robust measures of value creation that relate performance to the cost of capital. Finally, despite relentless pressure from regulators and governance reformers over the last two decades to ensure closer alignment between executive pay and performance in the UK, the strength of the association between CEO pay and measures of fundamental value creation remains negligible at best.

Collectively, the evidence suggests a material disconnect between pay and fundamental value generation for (and returns to) capital providers. This conclusion is consistent with evidence reported by the IRRC Institute for a large sample of US companies (IRRCi 2014) and with unsupported assertions about poor pay-performance alignment in the UK made by the High Pay Centre (2016).

The research suggests the need to redirect the spotlight on CEO pay away from a focus on pay levels and broad calls for more performance-related pay arrangements, towards a more refined discussion about the type of performance measures employed.

We conclude that while compensation practices in the UK have come a long way over the last two decades, the journey is far from complete. Indeed the intensity of the focus on pay levels and the clamour for ever-more sophisticated ways of aligning senior executives' incentives with long-term value creation risks creating the illusion of pay-for-performance while failing to deliver the reality. Choice of performance measurement system lies at the heart of aligning CEO incentives and rewards with fundamental value generation, and as such there exists an urgent need to elevate the prominence of this issue in the ongoing pay debate.

Appendix A: Technical details for performance metrics

This appendix provides detailed information and analysis regarding the suite of performance variables used in the report. Unless otherwise indicated, financial statement and share price data are sourced from Thomson Reuters DataStream. In the definitions that follow, Datastream item codes for financial statement items are presented in parentheses.

Weighted Average Cost of Capital (WACC):

$WACC = [(E / (E + D)) \times R_e] + [(D / (E + D)) \times R_d \times (1 - \text{Tax Rate})]$

D = Total Debt (WC03255)
E = Total Shareholders' Equity (WC03995)
R_e = Cost of Equity (see notes 1-2 below)
R_d = Cost of Debt (see notes 3-4 below)
Tax Rate = Tax Rate (WC08346) (see note 6 below)

Notes

1. Analyses reported in the main body of the report employ firm-year estimates of R_e derived from a one-factor model (CAPM), with betas computed using monthly returns estimated over a 60-month window ending one-month prior to the fiscal year-end.
2. Robustness tests employ a variety of alternative R_e proxies. The first alternative is R_e computed using the Fama-French three-factor model with factor loadings estimated over both 24 and 60 months windows, and relevant risk factors provided by Gregory et al. (2013). The second alternative is a more primitive estimate of R_e based on an initial value of 10% which is then adjusted using firm- and time-specific company betas (i.e., $R_e = \beta \times 10\%$).
3. Analyses reported in the main body of the report employ firm-year estimates of R_d computed using published financial statement information. Specifically, R_d is equal to Interest Expense on Debt (WC01251) / Average Total Debt (WC03255) computed using opening and closing debt values from the statement of financial position.
4. An alternative estimate of R_d is computed using bond-level data collected by hand from Thomson Reuters Datastream. Specifically, R_d is defined as the weighted average redemption yield on outstanding bonds:, where Y is the average redemption yield on the j^{th} bond in issue for firm i and P is the ratio of the aggregate market value of the j^{th} bond to the aggregate market value of all bonds in issue. Despite its conceptual superiority, this measure of R_d has the disadvantage that it is only available for a small fraction (36%) of observations.
5. Firm-year estimates of R_e and R_d are prone to extreme observations regardless of the estimation procedure employed. In particular, R_e estimates can be very sensitive to periods of high stock market volatility that leads to extreme values for the market return and hence for firm-specific estimates of the equity risk premium. In extreme bear markets, for example, large negative market returns can result in a negative value for the equity risk premium, which in turn leads to negative estimates of R_e. We use market risk premia reported by Fernandez et al. (2008, 2010, 2011, 2012, 2013, 2014); for other years we set the risk premium equal to 5%.
6. Where Tax Rate (WC08346) is missing in a given year we use data from the preceding year where available and the following year otherwise. Tax Rate is winzorized at the upper and lower quartile values of the pooled distribution to minimize the impact of extreme rates and data errors.

7. The final R_d measure used in all tests reported in the main body of the report was checked manually and adjusted for outliers as follows:
   a. If R_d in year t is significantly higher than the value in all other sample years for that company then replace the value with the average of R_d for that company computed using all other years; if data for others is not available then replace with sample median value of R_d for year t;
   b. If the value of R_d presents a reasonable upward trend then retain original estimate.
8. Descriptive statistics for alternative WACC measures are as follows:

WACC measure		N	Mean	St dev	Max	Q3	Med	Q1	Min
Main measure used in reported tests		2594	0.07	0.03	0.19	0.09	0.07	0.06	0.01
Alternatives									
R_e	R_d								
Fama-French(24 mths)	Accounting data	2594	0.08	0.09	0.91	0.11	0.07	0.04	-0.47
Fama-French(60 mths)	Accounting data	2594	0.08	0.08	0.95	0.11	0.07	0.05	-0.43
10% × beta	Accounting data	2594	0.09	0.04	0.34	0.11	0.08	0.06	0.00
CAPM	Bond-level data	930	0.07	0.03	0.27	0.08	0.07	0.05	0.02
Fama-French(24 mths)	Bond-level data	930	0.08	0.08	0.81	0.10	0.07	0.04	-0.37
Fama-French(60 mths)	Bond-level data	930	0.08	0.07	0.63	0.10	0.07	0.05	-0.27
10% × beta	Bond-level data	930	0.09	0.04	0.29	0.10	0.08	0.06	0.01

<u>Free cash flows to the firm</u> (FCFF)
FCFF = FFO + INT + FOA — CAPX + DISP

FFO = Funds from Operations (WC04201)
INT = Interest Expense on Debt (WC01251) — Interest Capitalized (WC01255)) × (1 – Tax Rate (WC08346))]
FOA = Funds From/For Other Operating Activities (WC04831)
CAPX = Capital Expenditures (WC04601)
DISP = Disposal of Fixed Assets (WC04351)

Notes:
1. Where Tax Rate (WC08346) is missing in a given year we use data from the preceding year where available and the following year otherwise. Tax Rate is winzorized at the upper and lower quartile values of the pooled distribution to minimize the impact of extreme rates and data errors.
2. Disposal of Fixed Assets (WC04351) includes both cash flows from disposal of fixed assets and cash flows from disposal of subsidiaries; winsorize Disposal of Fixed Assets at 1% and 95%.

<u>Residual income</u> (RI)

RI = NOPAT – (IC × WACC)

NOPAT = Net operating profit after tax, defined as Earnings Before Interest And Tax (WC18191)*[1- Tax Rate (WC08346)]
IC = Invested Capital (see below notes 1-3 below)
WACC = Weighted Average Cost of Capital (see note 4 below)

Notes:

1. The measure of IC used in analyses presented in the body of the report is defined as Total Assets (WC02999) – Accounts Payable (WC03040) – Taxes Payable (WC03063) – Excess Cash1. The model proposed by Opler at al. (1999) is used to construct Excess Cash1. Specifically, Excess Cash1 is based on the residual (ε) from the following OLS regression is estimated annually using all firms from the Datastream UK population with available data,

$$Liquidity = \alpha + \beta_1 Market-to-Book + \beta_2 Size + \beta_3 CashFlow + \beta_4 NetWorkingCapita + \beta_5 Leverage + \beta_6 IndSigma + \beta_7 R\&D + \beta_8 Dividend + \varepsilon$$

   where
   Liquidity = Cash (WC02003 for non-banks; WC02004 for banks) / [Total Assets (WC02999) – Cash];
   Market-to-Book = [Total Assets – Total Shareholders' Equity (WC03995) + Market Value of Equity (MV)] / Total Assets;
   Size = Natural logarithm of Total Assets;
   Cash Flow = Funds from Operation (WC04201) / (Total Assets – Cash);
   Net Working Capital = [Current Assets (WC02201) – Current Liabilities (WC03101) – Cash] / (Total Assets – Cash);
   Capital Expenditure = Capital Expenditure (WC04601) / (Total Assets – Cash);
   Leverage = Total Debt (WC03255) / Total Assets;
   IndSigma= Mean of standard deviations of Cash Flow over 15 years for companies in the same level-2 industry group;
   R&D = R&D expense / Net Revenues (WC01001);
   Dividend = one where a dividend is paid and zero otherwise.

   Excess Cash1 is equal to ε × (assets-cash).
2. Sensitivity tests are conducted with an industry-adjusted measure of excess cash substituted for Excess Cash1 in IC. Excess Cash2 is equal to Cash (WC02003 for non-banks; WC02004 for banks) – [Total Assets (WC02999) × Industry-year median value of Cash / Total Assets].
3. Additional sensitivity tests are conducted with IC not adjusted for excess cash.
4. Analyses presented in main body of the report use WACC estimated using a one-factor model (CAPM), with betas computed using monthly returns estimated over a 60-month window ending one-month prior to the fiscal year-end. Robustness tests using alternative WACC estimates yield identical conclusions.

<u>Return on Invested Capital</u> (ROIC)
ROIC = NOPAT / IC

NOPAT = Net operating profit after tax, defined as Earnings Before Interest And Tax (WC18191)*[1 — Tax Rate (WC08346)]
IC = Invested Capital (see note 1 below)

Notes

1. The measure of IC used in analyses presented in the body of the report is the same as the primary measurement method used to compute RI as described above.

Robustness tests were conducted using the two alternative measures of IC outlined above in the description of RI.

Economic profit (EP)
EP = NOPAT — (IC × WACC)

NOPAT = Earnings Before Interest And Tax (WC18191) – Taxation (WC04150) – [(Interest Expense on Debt (WC01251) – Interest Capitalized (WC01255)) × Tax Rate (WC08346)], adjusted for Transitory Items [Extraordinary Items And Gains/Loss Sale of Assets (WC01601), and Discontinued Operations (WC01505)] and Research & Development Expense (WC01201) (see notes 2 and 3 below)
IC = Total Assets (WC02999) – Accounts Payable (WC03040) – Taxes Payable (WC03063) – Excess Cash (see note 1 below), adjusted for Transitory Items (see note 3 below) and Research & Development Expense (see note 4 below)

Notes:
1. The definition of EP follows that applied by IRRCi (2014) and as a result the tax adjustment used to construct NOPAT differs from the approach employed in the RI calculation. In reality the differences are trivial and have very little effect on the resulting NOPAT values (Spearman correlation coefficient = 0.96).
2. Following IRRCi (2014) approach Excess Cash is equal to Cash (WC02003 for non-banks, WC02004 for banks) – [2% × Net Sales or Revenue (WC01001)]. If the estimated value of Excess Cash < 0 then Excess Cash is set equal to 0.
3. Adjustment to NOPAT and IC for Transitory Items: for positive (negative) values, subtract (add) the items from (back to) NOPAT; amortize Transitory Items over a 5-year period using the straight-line method by increasing (reducing) NOPAT by the amortized gains (losses) and reducing (increasing) IC by the unamortized balance.
4. Adjustment to NOPAT and IC for Research & Development Expense (R&D): add the current year's R&D expense back to NOPAT and then adjust NOPAT for the estimated amortization charge assuming straight-line depreciation over 5 years; add the unamortized value of R&D expense back to IC.
5. Analyses presented in main body of the report use WACC estimated using a one-factor model (CAPM), with betas computed using monthly returns estimated over a 60-month window ending one-month prior to the fiscal year-end. Robustness tests using alternative WACC estimates yield identical conclusions.

Economic Value Added (EVA®®)
EVA® = (NOPAT + Adjustments) – [(IC + Adjustments) × WACC]

NOPAT and IC are as defined in the RI calculation described above
Adjustments comprise the following items:
R&D [Research & Development Expense (WC01201)] (see note 1 below)
Goodwill [Goodwill: Accumulated Amortization (WC02503), Amortization and Impairment of Goodwill (WC18224)] (see note 2 below)
Restructuring Charges [Restructuring Expense (WC18227)] (see note 3 below)
Deferred tax [Deferred Taxes: Credit (WC18183), Deferred Taxes: Debit (WC18184)] (see note 4 below)
Provisions [Provision for Loan Losses (WC01271), Reserves for Loan Losses (WC02275), Provision for Bad Debts (WC18298)] (see note 5 below)
Operating leases [Rental/Operating Lease Expense (WC18140), Lease Commitments: Year 1-5 (WC18141-WC18145), Lease Commitments: Over 5 Years (WC18146)] (see note 6 below)

Notes

1. Adjustments for R&D: add the current year's R&D expense back to NOPAT; adjust NOPAT for the estimated amortization charge assuming straight-line depreciation over 5 years; add unamortized R&D back to IC.
2. Adjustments for Goodwill: increase NOPAT by Amortization and Impairment of Goodwill in the current year; add Goodwill: Accumulated Amortization to IC.
3. Adjustment for Restructuring Charges: add Restructuring Expense [× (1 – Tax Rate) to produce a net-of-tax adjustment) to NOPAT; add corresponding amount to IC without amortization.
4. Adjustment for Deferred Tax: add (subtract) the increase in Deferred Tax Liability (Asset) to (from) NOPAT; subtract (add) Deferred Tax Asset (Liability) from (to) IC.
5. Adjustment for Provisions (adjust Provision for Loan Losses for financial companies and Provision for Bad Debts for non-financials): add (subtract) increases (decreases) in the provision (net of tax) back to (from) NOPAT; add the appropriate provision balance (from the statement of financial position) back to IC.
6. Adjustment for Operating Leases: add present value of future lease payments to IC; adjust NOPAT for the implied interest portion of the rental expense (net of the tax shield); for companies reporting operating leases payables within 2 to 5 years as a single number; distribute the total amount evenly over 4 years; discount operating lease payables beyond 5 years using the discount factor for year 5.
7. The measure of IC used in analyses presented in the body of the report is the same as the primary measurement method used to compute RI as described above. Robustness tests were conducted using the two alternative measures of IC outlined above in the description of RI.
8. Analyses presented in main body of the report use WACC estimated using a one-factor model (CAPM), with betas computed using monthly returns estimated over a 60-month window ending one-month prior to the fiscal year-end. Robustness tests using alternative WACC estimates yield identical conclusions.

Current Value component of market enterprise value (CV_{EV})

CV_{EV} = IC + Present Value of current EP

Notes

1. Following IRRCi (2014), the Present Value of EP is set equal to EP / WACC (i.e., current EP is treated as a perpetuity.
2. Analyses presented in main body of the report use WACC estimated using a one-factor model (CAPM), with betas computed using monthly returns estimated over a 60-month window ending one-month prior to the fiscal year-end. Robustness tests using alternative WACC estimates yield identical conclusions.

Future value component of market (FV_{EV})

FV_{EV} = Market Enterprise Value — CV_{EV}

Market Enterprise Value = Market Value of Equity + Total Debt (WC03255) – [2% × Revenue (WC01001)]

EPS Growth

EPS Growth = $(EPS_t - EPS_{t-1}) / |EPS_{t-1}|$

$|EPS_{t-1}|$ = absolute value of EPS_{t-1}

Notes

1. Analyses reported in the main body of the report employ a non-GAAP measure of permanent EPS from I/B/E/S. The I/B/E/S construct adjusts GAAP net income from continuing operations for transitory and non-operating items following the

approach analysts adopt when constructing their EPS forecasts. The EPS figure from I/B/E/S tends to be higher (more positive) and less volatile than the corresponding GAAP net income figure. I/B/E/S EPS is typically presented on a diluted basis.

2. Robustness tests are conducted using bottom-line (GAAP) EPS as published in the net income statement. Test are conducted using both basic EPS (WC05210) and diluted EPS (WC05290).

Total Shareholder Return (TSR)

$TSR = (P_t - P_{t-1} + D_t) / P_{t-1}$

P_{t-1} = Price per share (from Datastream) on the first day of the fiscal year
P_t = Price per share (from Datastream) at the corresponding fiscal year-end date
D = Distributions to shareholders reinvested at the realized return (see note 1 below)

Notes

1. For the analyses reported in the main body of the report, D is defined as Dividends Per Share declared for the fiscal year. In supplementary tests we defined D as Dividends Per Share plus the value of Share Repurchases Per Share (open market plus tender offer), with the latter hand-collected from companies published annual reports. Note, however, that share repurchase data are only available for the sub-period 2003-2011. The Spearman correlation between the two TSR metrics is 0.93. We use the dividend-only measure in our main tests to minimize loss of data.

Relative TSR (TSR_R)

$TSR\_R = TSR - TSR\_350$

TSR = Total Shareholder Return as defined above
TSR_350 = median TSR for all companies in the FTSE 350 index (excluding investment trusts) as at July 2007

Sales Growth

$Sales\ growth = (Revenue_t - Revenue_{t-1}) / |Revenue_{t-1}|$

Revenue = Net Revenue ((WC01001)

Return on Assets (ROA)

ROA = Operating Profit / Total Assets

ROA is item WC08326 from Thomson Reuters Datastream

Appendix B: Summary statistics for performance metrics

Table B1: Descriptive statistics for pooled sample

Variable	Mean	Stdev	Max	p95	Q3	Median	Q1	p5	Min
FCF	613.92	3,597.83	45,743.05	3,179.98	345.28	113.14	36.14	-78.12	-95,883.88
FCF - Capital charge	-946.69	6,661.90	16,571.49	789.48	81.31	4.34	-92.32	-3,540.08	-165,538.56
RI	-957.82	6,163.28	15,166.51	808.08	62.98	2.39	-77.75	-3,708.16	-95,482.79
EP	-957.64	6,100.33	12,424.73	846.46	79.63	8.70	-81.87	-4,073.05	-108,411.12
EVA	-850.70	5,591.81	15,805.27	1,055.60	81.56	6.66	-80.98	-3,581.93	-74,521.25
ROIC	0.07	0.10	2.29	0.20	0.11	0.07	0.03	-0.02	-1.11
ROIC-WACC	0.01	0.10	2.22	0.14	0.05	0.00	-0.04	-0.12	-1.17
ROA	0.07	0.09	1.22	0.19	0.10	0.06	0.03	-0.03	-0.55
TSR	0.19	0.60	13.33	0.83	0.36	0.16	-0.06	-0.48	-0.96
TSR_R	0.05	0.58	13.10	0.66	0.20	0.00	-0.18	-0.52	-1.08
EPS Growth	0.23	3.71	144.81	1.09	0.24	0.09	-0.07	-0.55	-67.57
Sale Growth	0.08	0.29	5.57	0.42	0.14	0.05	-0.02	-0.20	-5.68
CV_{EV}	11,058.14	58,524.74	56,603 1.09	64,043.55	6,181.85	1,774.80	499.90	-1,569.20	-1,484,069.73
FV_{EV}	1,430.81	58,325.67	1,964,050.97	10,795.47	943.28	38.18	-1,178.98	-15,801.40	-375,153.60
EV	12,488.95	42,565.45	653,441.26	54,602.05	5,741.50	1,959.79	830.20	312.27	-37,55.94
R_e	0.08	0.04	0.29	0.15	0.11	0.08	0.06	0.03	0.00
R_d	0.07	0.03	0.32	0.13	0.08	0.06	0.05	0.03	0.01
WACC	0.07	0.03	0.19	0.12	0.08	0.06	0.05	0.03	0.01

Table B2: Median values for performance metrics by calendar year

Variable	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
FCF	75.91	85.17	92.42	94.51	120.84	125.03	136.60	135.98	137.13	114.54	126.38	128.39
FCF – Capital charge	6.23	1.07	-2.16	-5.31	-15.56	-49.68	27.26	31.66	14.24	5.49	13.10	25.56
RI	0.01	-1.97	1.63	9.37	-0.33	-39.11	-17.61	11.52	15.41	15.70	11.42	24.73
EP	1.85	1.07	2.03	15.10	3.23	-44.64	-21.96	23.74	25.43	35.13	16.31	27.00
EVA	8.62	1.07	-2.16	-5.31	-15.56	-49.68	27.26	31.66	14.24	5.49	13.10	25.56
ROIC	0.06	0.06	0.07	0.09	0.08	0.06	0.05	0.06	0.06	0.07	0.06	0.07
ROIC – WACC	0.00	0.00	0.00	0.01	0.00	-0.02	-0.01	0.01	0.01	0.01	0.01	0.02
ROA	0.05	0.06	0.07	0.08	0.08	0.06	0.04	0.06	0.06	0.06	0.06	0.07
TSR	0.13	0.26	0.24	0.25	0.15	-0.27	0.11	0.23	0.00	0.19	0.28	0.08
TSR_R	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EPS Growth	0.06	0.14	0.02	0.15	0.16	0.14	0.02	-0.05	0.12	0.10	0.07	0.04
Sale Growth	0.06	0.07	0.07	0.09	0.07	0.11	0.03	0.04	0.05	0.03	0.03	0.00
CV_{EV}	1005.98	1017.56	1100.66	1398.76	1324.71	1033.80	1493.31	1963.50	2508.62	2758.69	2633.19	3058.95
FV_{EV}	1.28	117.65	220.32	130.73	394.88	217.65	28.65	-337.26	-440.36	-342.20	22.42	-226.04
EV	1283.16	1462.35	1757.40	1824.14	2066.28	1702.62	1865.67	1891.16	1814.35	2215.87	2719.93	2743.58
R_e	0.08	0.09	0.10	0.09	0.11	0.11	0.07	0.06	0.06	0.06	0.06	0.05
R_d	0.06	0.06	0.07	0.07	0.07	0.07	0.06	0.05	0.06	0.05	0.05	0.05
WACC	0.07	0.07	0.07	0.07	0.08	0.08	0.05	0.05	0.05	0.05	0.05	0.05

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Figure 1: Frequency count of companies by number of fiscal years of data

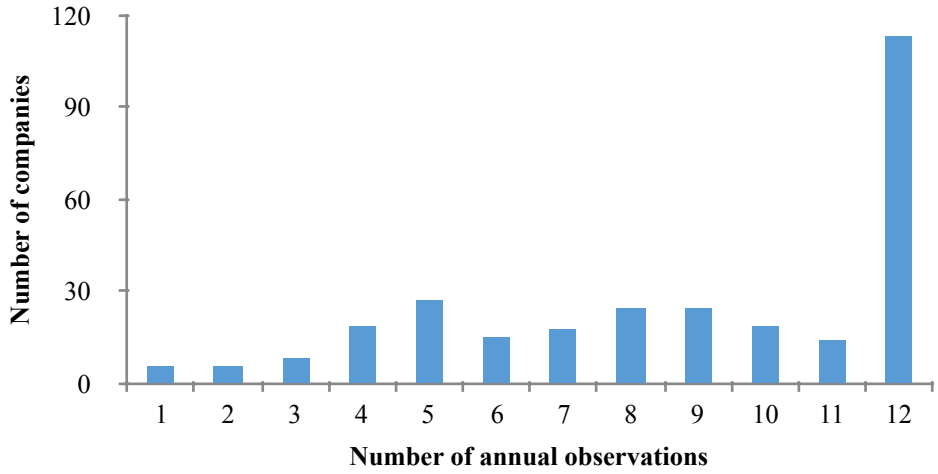

Figure 2: Frequency count of companies by number of rolling 3-year performance windows

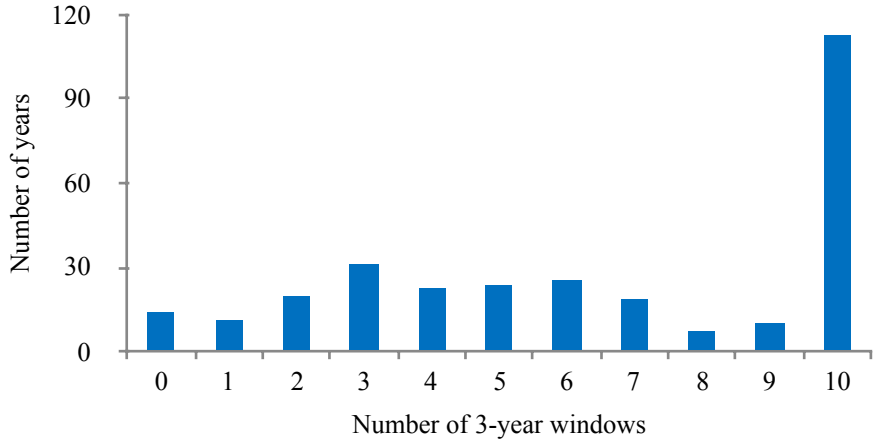

Figure 3: Sample distribution by calendar year

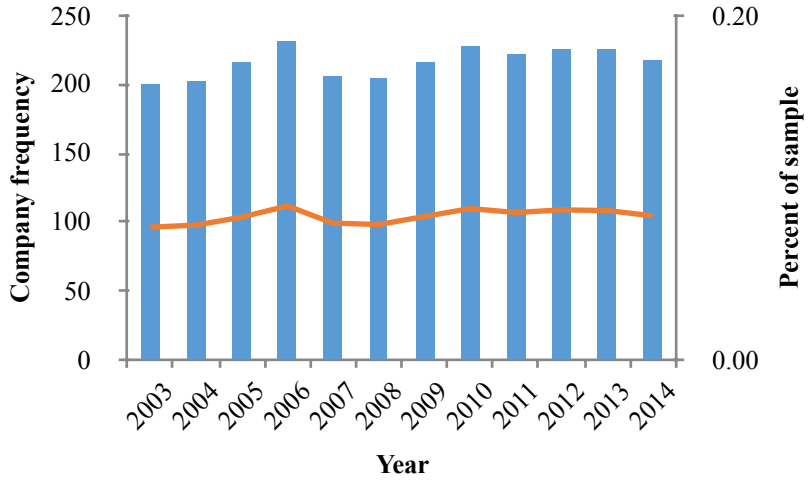

Figure 4: Distribution of sample companies by industry

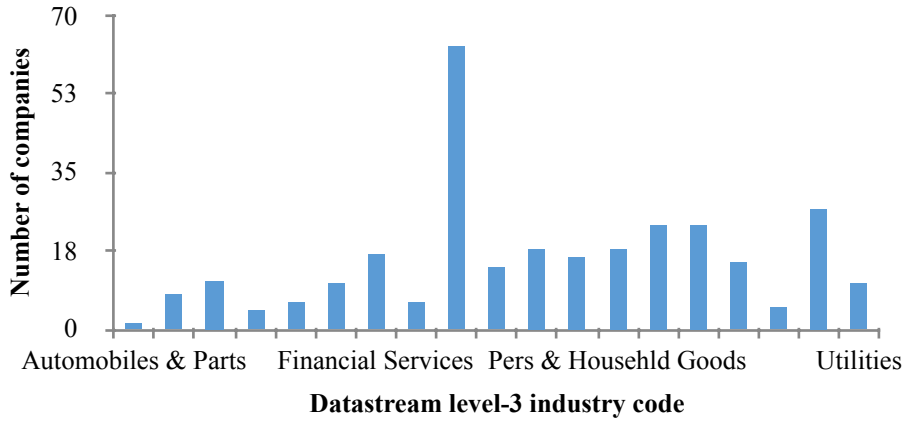

Figure 5: Median realized total annual price-adjusted CEO pay by calendar year

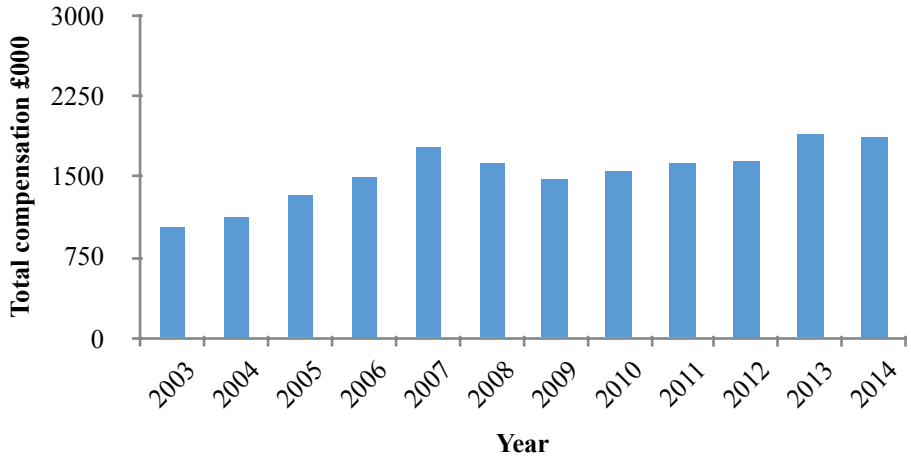

Figure 6: Median realized total annual price-adjusted CEO pay by industry

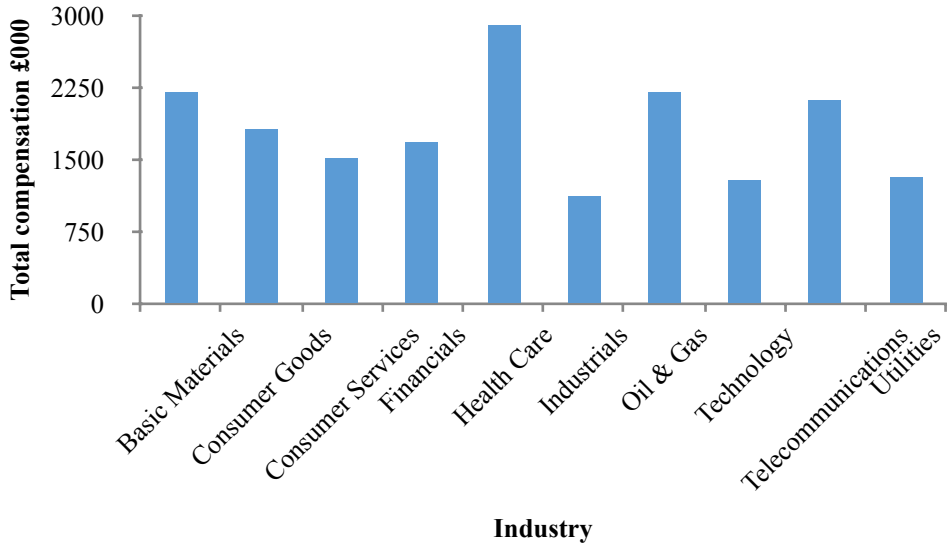

Figure 7: Components of realized pay for the mean CEO

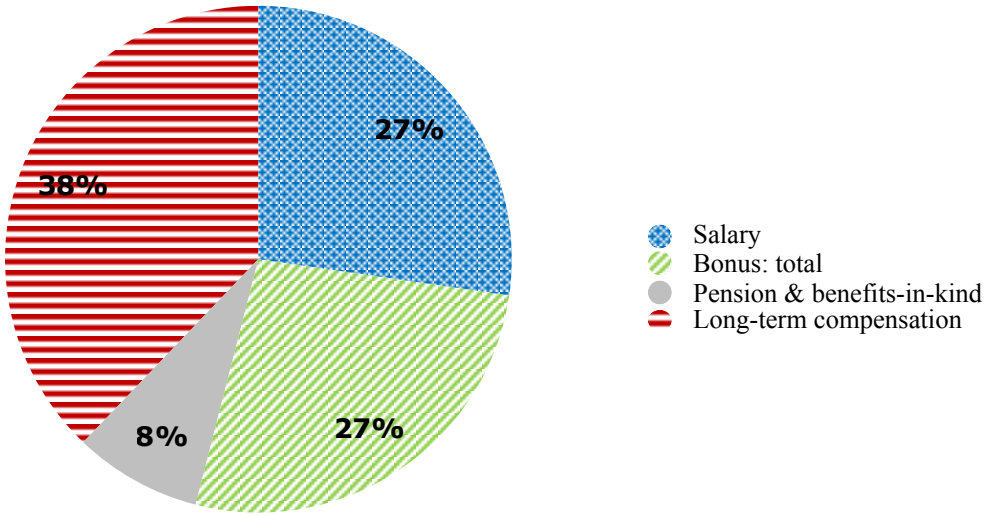

Figure 8: Mean realized total annual price-adjusted CEO pay components by calendar year

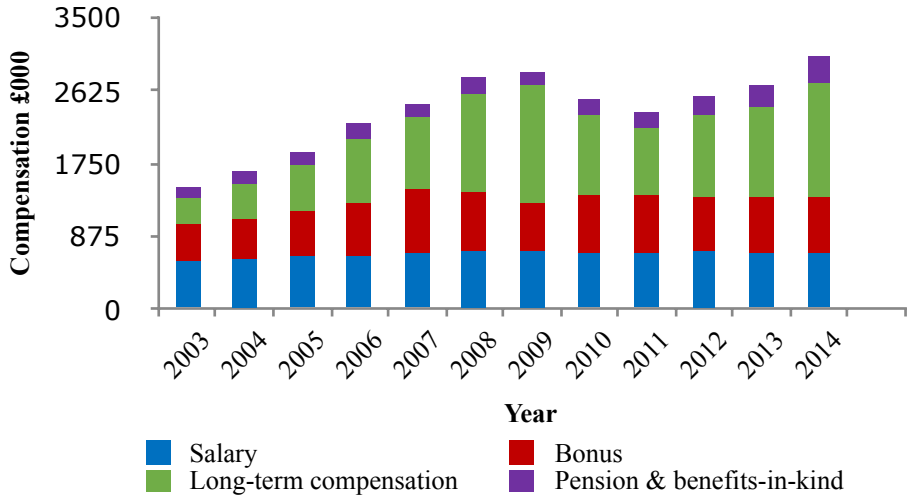

Figure 9: Mean realized total annual price-adjusted CEO pay components by industry

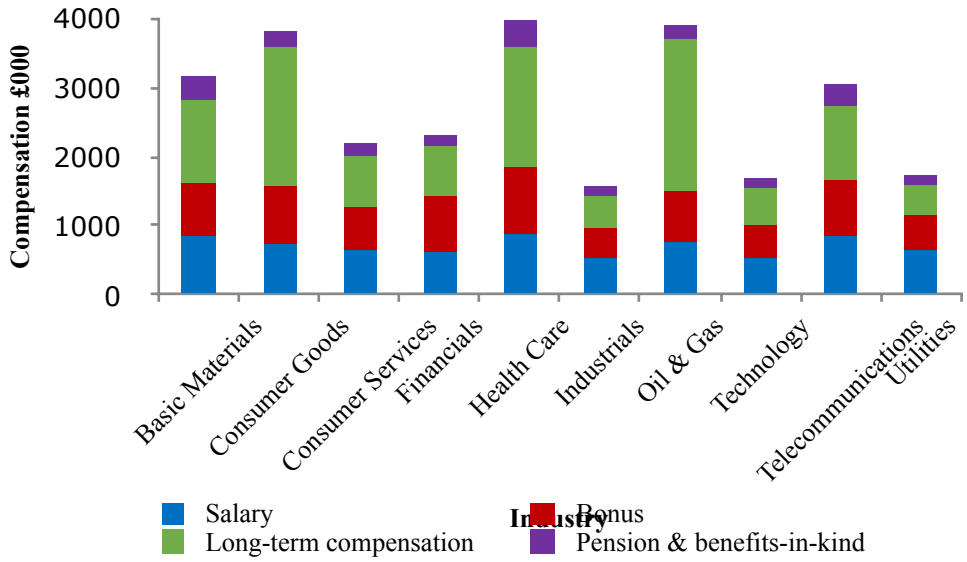

Figure 10: Performance measures categories employed in CEO pay contracts

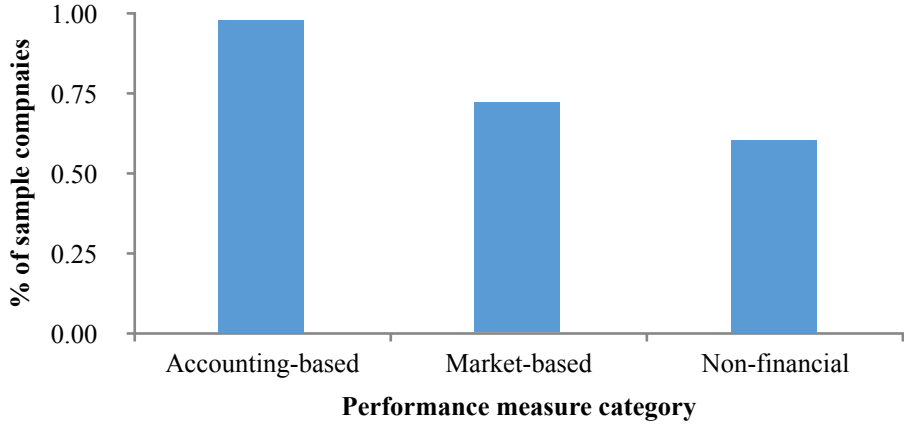

Figure 11: Accounting-based performance metrics decomposed into subgroups

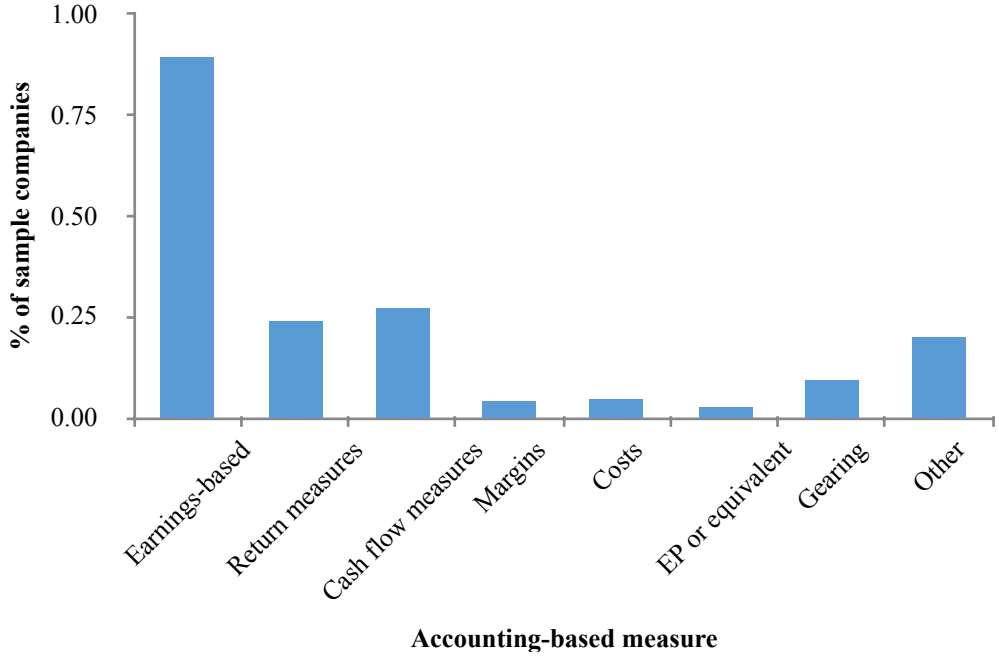

Figure 12: Non-financial performance metrics decomposed by subgroup

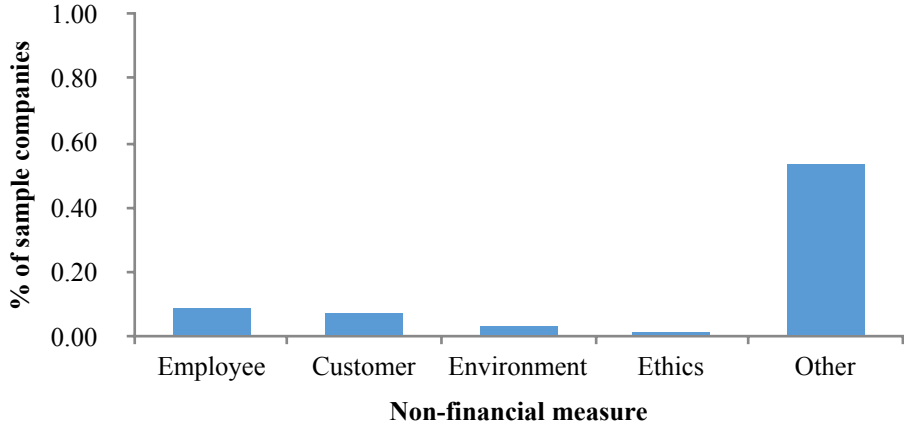

Figure 13: Performance metric category by time

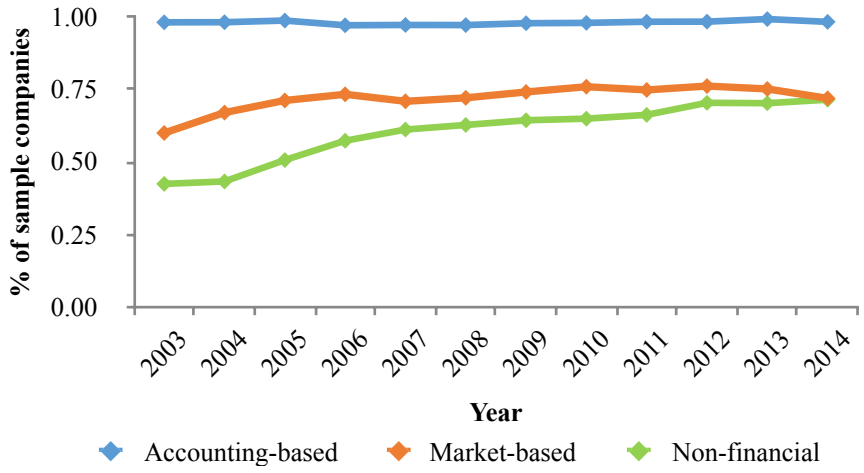

Figure 14: Accounting-based performance measures by time

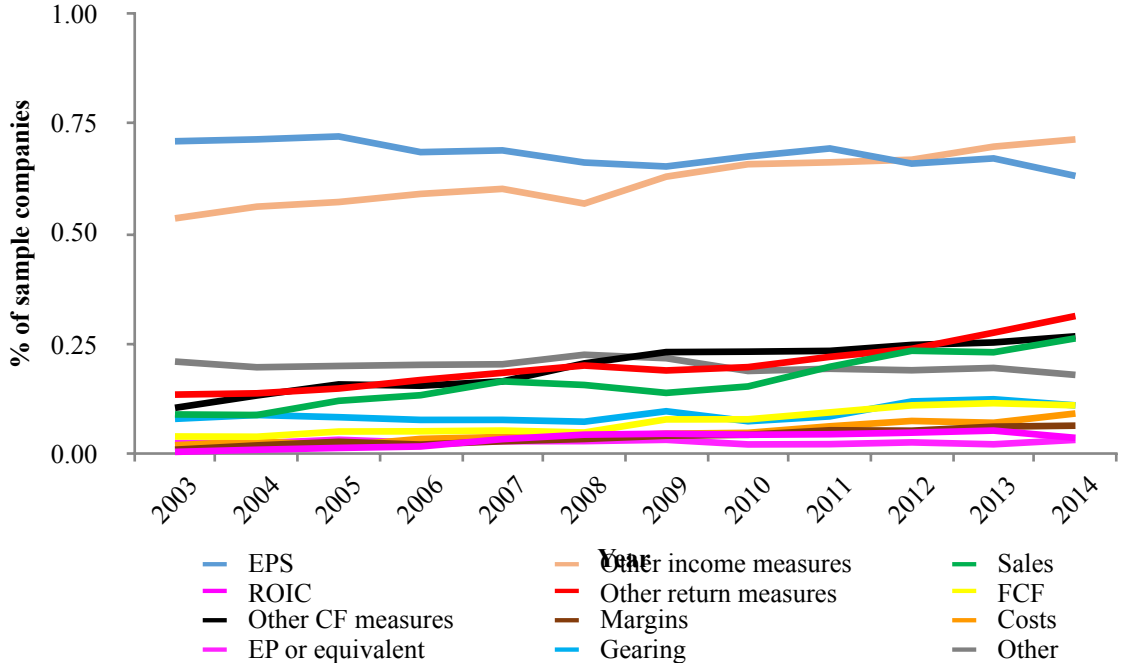

Figure 15: Performance measure categories by industry

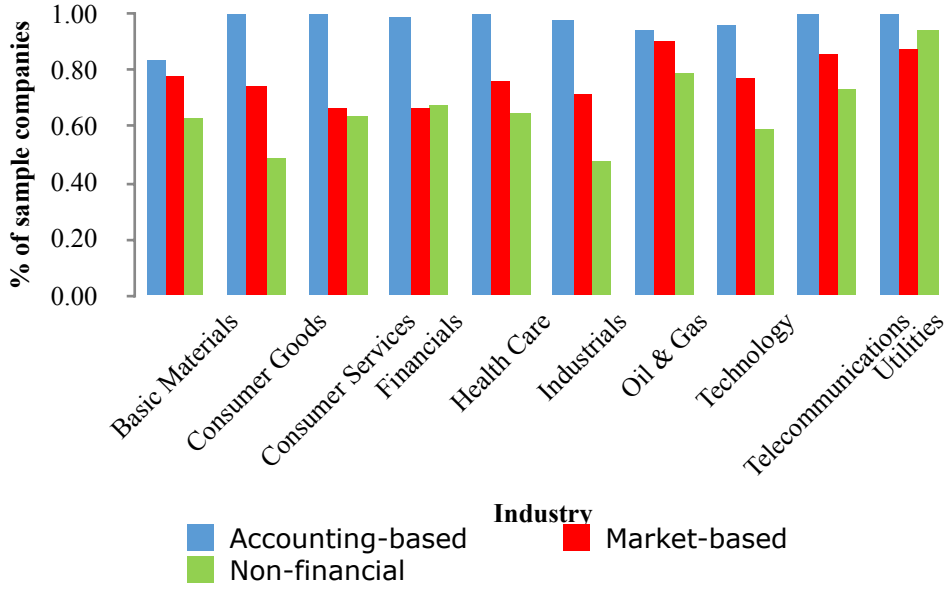

Figure 16: Non-financial performance measures by industry

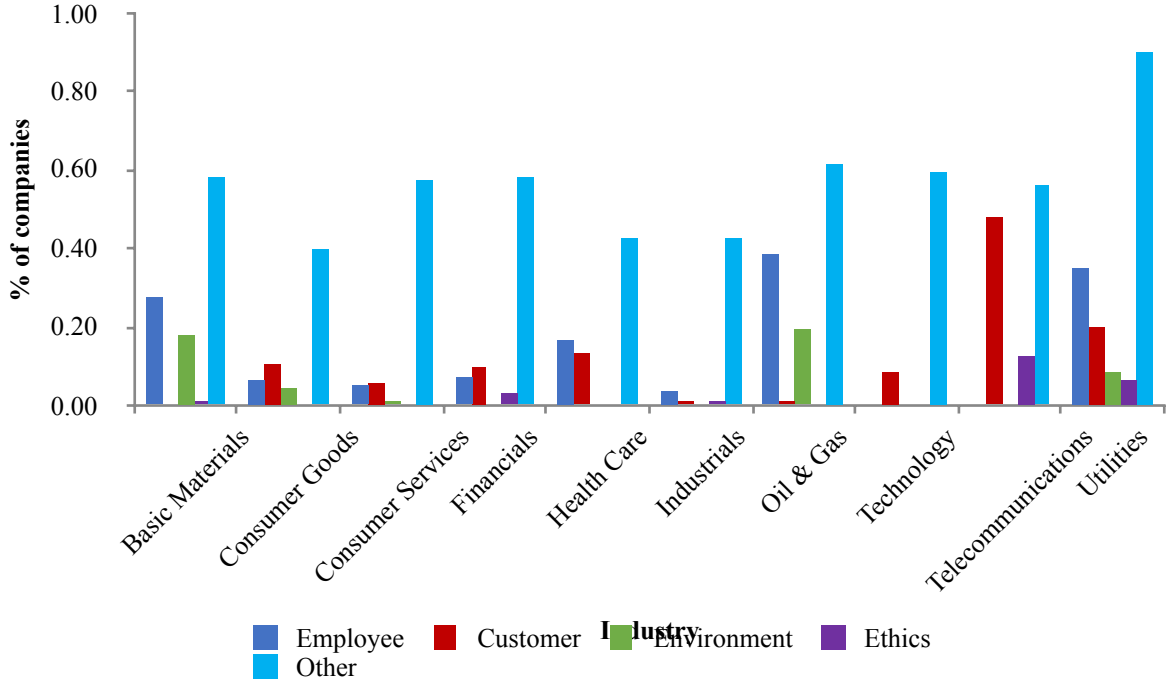

Figure 17: Performance measure categories by compensation component

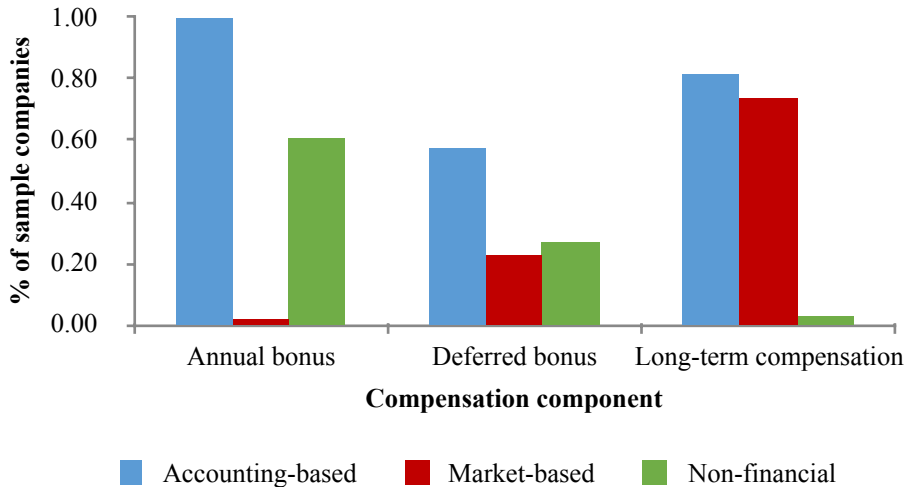

Figure 18: Average (mean) cost of equity (R_e), debt (R_d) and WACC by calendar year.

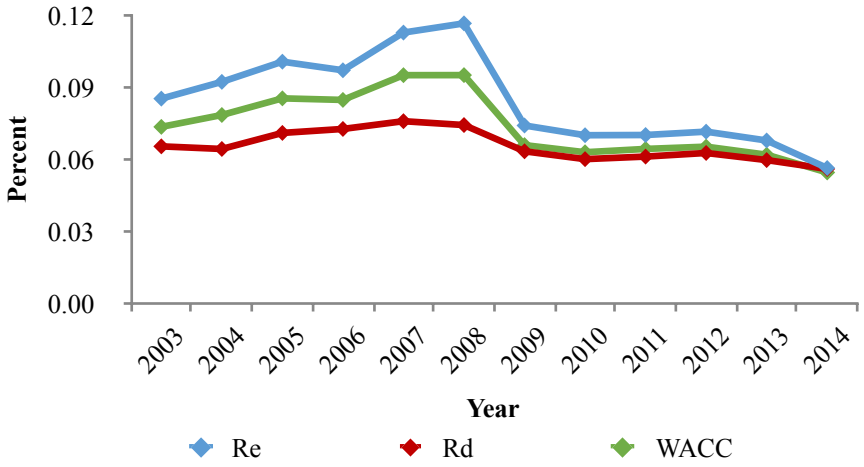

Figure 19: Evolution of performance over sample period

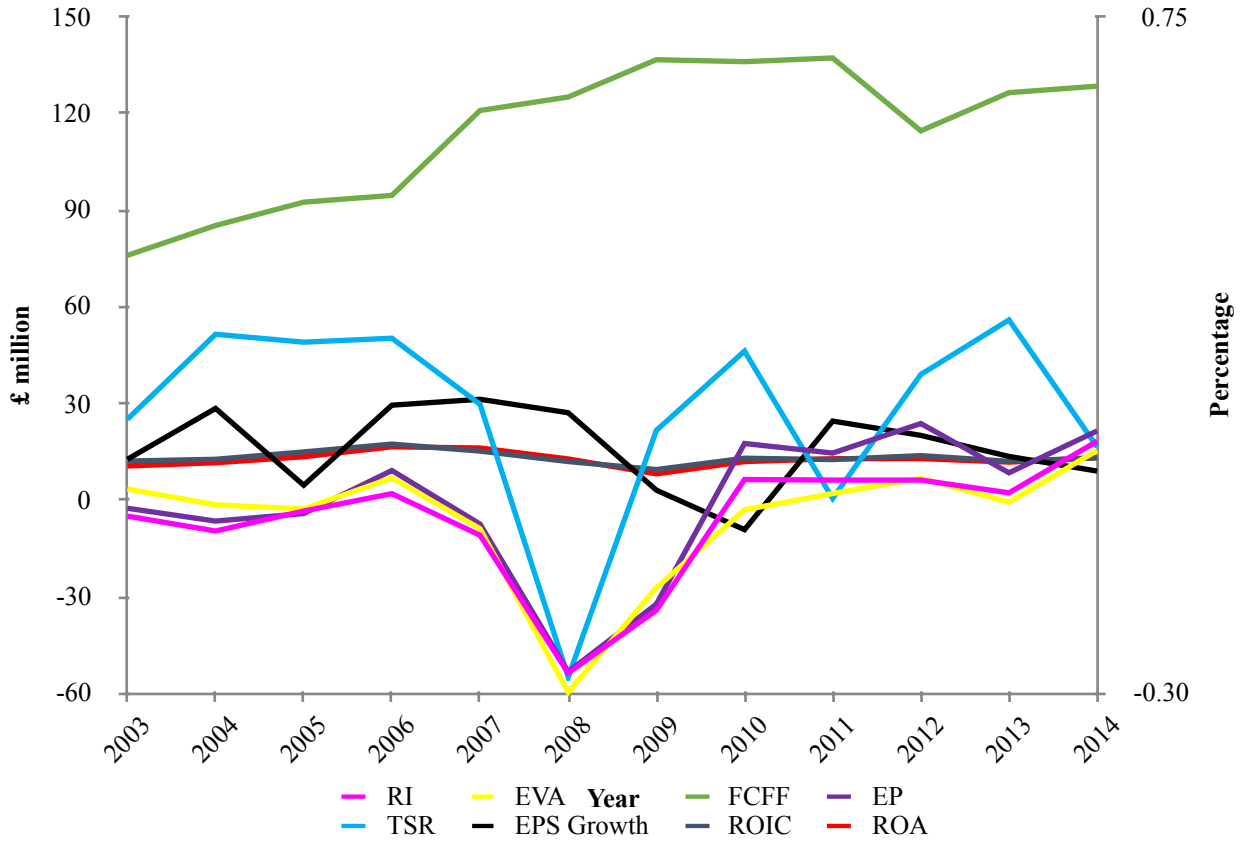

Figure 20: Total market Enterprise Value, Current Value and Future Value by time

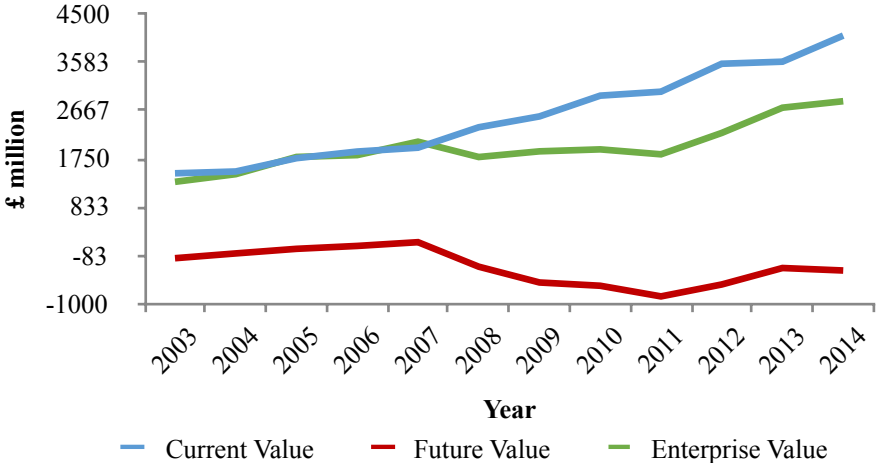

Table 1: Number of distinct performance measures in CEO pay contracts

	N	Mean	St dev	Upper quartile	Median	Lower quartile
All plans	2594	4.06	1.77	5	4	3
Annual bonus	2525	2.62	1.41	3	2	2
Deferred bonus	403	1.18	0.60	1	1	1
Long-term compensation	2477	1.82	0.84	2	2	1

Table 2: Correlations for annual performance metrics. Pearson (Spearman) correlations are reported above (below) the diagonal in the first two panels, while the third panel reports Spearman correlations only. (Probability values are reported below correlation coefficients in italics.)

Value-based metrics

	FCF–WACC	RI	EP	EVA©	ROIC–WACC
FCF–WACC		0.89	0.89	0.87	0.12
		0.01	*0.01*	*0.01*	*0.01*
RI	0.54		0.98	0.98	0.16
	0.01		*0.01*	*0.01*	*0.01*
EP	0.50	0.93		0.98	0.17
	0.01	*0.01*		*0.01*	*0.01*
EVA©	0.52	0.89	0.84		0.16
	0.01	*0.01*	*0.01*		*0.01*
ROIC–WACC	0.45	0.80	0.76	0.71	
	0.01	*0.01*	*0.01*	*0.01*	

Traditional metrics

	ROA	TSR	TSR_R	EPS Growth	Sales Growth
ROA		0.11	0.10	0.06	0.09
		0.01	*0.01*	*0.01*	*0.01*
TSR	0.17		0.97	0.02	0.02
	0.01		*0.01*	*0.26*	*0.40*
TSR_R	0.19	0.90		0.02	0.02
	0.01	*0.01*		*0.22*	*0.23*
EPS Growth	0.22	0.13	0.16		0.05
	0.01	*0.01*	*0.01*		*0.01*
Sales Growth	0.21	0.09	0.14	0.30	
	0.01	*0.01*	*0.01*	*0.01*	

Value-based metrics versus traditional metrics

	ROA	TSR	TSR$_{\bar{R}}$	EPS Growth	Sales Growth
FCF–WACC	0.43	0.10	0.09	0.04	-0.05
	0.01	*0.01*	*0.01*	*0.06*	*0.01*
RI	0.74	0.13	0.13	0.14	0.10
	0.01	*0.01*	*0.01*	*0.01*	*0.01*
EP	0.69	0.14	0.13	0.15	0.13
	0.01	*0.01*	*0.01*	*0.01*	*0.01*
EVA©	0.66	0.10	0.09	0.14	0.13
	0.01	*0.01*	*0.01*	*0.01*	*0.01*
ROIC–WACC	0.90	0.18	0.18	0.22	0.22
	0.01	*0.01*	*0.01*	*0.01*	*0.01*

Notes: a probability value less than 0.05 means that the regression coefficient is statistically significant.

Table 3: Correlations for performance metrics computed over 3-year rolling windows. Pearson (Spearman) correlations are reported above (below) the diagonal in the first two panels, while the third panel reports Spearman correlations only. (Probability values are reported below correlation coefficients in italics.)

Value-based metrics

	FCF–WACC	RI	EP	EVA©	ROIC–WACC
FCF–WAAC		0.95	0.95	0.94	0.17
		0.01	*0.01*	*0.01*	*0.01*
RI	0.61		1.00	0.99	0.20
	0.01		*0.01*	*0.01*	*0.01*
EP	0.55	0.95		0.99	0.20
	0.01	*0.01*		*0.01*	*0.01*
EVA©	0.57	0.92	0.90		0.20
	0.01	*0.01*	*0.01*		*0.01*
ROIC–WACC	0.52	0.79	0.76	0.73	
	0.01	*0.01*	*0.01*	*0.01*	

Traditional metrics

	ROA	TSR	TSR_R	EPS Growth	Sales Growth
ROA		0.18	0.18	0.07	0.13
		0.01	*0.01*	*0.01*	*0.01*
TSR	0.30		0.95	0.05	0.18
	0.01		*0.01*	*0.04*	*0.01*
TSR_R	0.32	0.85		0.06	0.19
	0.01	*0.01*		*0.01*	*0.01*

EPS Growth	0.34	0.31	0.36		0.09
	0.01	*0.01*	*0.01*		*0.01*
Sales Growth	0.22	0.25	0.30	0.49	
	0.01	*0.01*	*0.01*	*0.01*	

Value-based metrics versus traditional metrics

	ROA	TSR	TSR_R	EPS Growth	Sales Growth
FCF–WAAC	0.51	0.14	0.14	0.11	-0.07
	0.01	*0.01*	*0.01*	*0.01*	*0.01*
RI	0.75	0.24	0.22	0.24	0.10
	0.01	*0.01*	*0.01*	*0.01*	*0.01*
EP	0.71	0.25	0.23	0.26	0.13
	0.01	*0.01*	*0.01*	*0.01*	*0.01*
EVA©	0.69	0.23	0.21	0.24	0.12
	0.01	*0.01*	*0.01*	*0.01*	*0.01*
ROIC–WACC	0.91	0.29	0.30	0.35	0.23
	0.01	*0.01*	*0.01*	*0.01*	*0.01*

Notes: a probability value less than 0.05 means that the regression coefficient is statistically significant.

Table 4: Regressions explaining one-year value creation metrics. (Probability values are reported below coefficient estimates in italics.)

Dependent variable: EP					
	Model 1	Model 2	Model 3	Model 4	Model 5
Intercept	-0.17	-0.13	-0.13	-0.14	-0.37
	0.01	*0.01*	*0.01*	*0.01*	*0.01*
TSR	0.25				
	0.01				
TSR_R		0.21		0.20	0.08
		0.01		*0.01*	*0.01*
EPS Growth			0.04	0.03	0.00
			0.03	*0.14*	*0.93*
ROA					3.68
					0.01
Sale Growth					-0.16
					0.01
Adj. R-square	0.02	0.01	0.00	0.01	0.18

Dependent variable: RI					
	Model 1	Model 2	Model 3	Model 4	Model 5
Intercept	-0.17	-0.14	-0.14	-0.14	-0.34
	0.01	*0.01*	*0.01*	*0.01*	*0.01*
TSR	0.19				
	0.01				
TSR_R		0.16		0.15	0.05
		0.01		*0.01*	*0.10*
EPS Growth			0.02	0.02	-0.01
			0.10	*0.30*	*0.69*
ROA					3.35
					0.01
Sale Growth					-0.24
					0.01
Adj. R-square	0.02	0.01	0.00	0.01	0.20

Dependent variable: EVA©

	Model 1	Model 2	Model 3	Model 4	Model 5
Intercept	-0.15	-0.12	-0.12	-0.13	-0.32
	0.01	*0.01*	*0.01*	*0.01*	*0.01*
TSR	0.18				
	0.01				
TSR_R		0.14		0.14	0.03
		0.01		*0.01*	*0.23*
EPS Growth			0.04	0.03	0.00
			0.02	*0.08*	*0.84*
ROA					3.00
					0.01
Sale Growth					-0.08
					0.14
Adj. R-square	0.02	0.01	0.00	0.01	0.15

Table 4 *continued*

Dependent variable: FCF

	Model 1	Model 2	Model 3	Model 4	Model 5
Intercept	0.13	0.13	0.13	0.13	0.09
	0.01	*0.01*	*0.01*	*0.01*	*0.01*
TSR	0.03				
	0.03				
TSR_R		0.03		0.02	0.00
		0.03		*0.10*	*0.76*
EPS Growth			0.03	0.03	0.02
			0.01	*0.01*	*0.01*
ROA					0.39
					0.01
Sale Growth					0.11
					0.01
Adj. R-square	0.00	0.00	0.01	0.01	0.03

Dependent variable: ROIC-WACC

	Model 1	Model 2	Model 3	Model 4	Model 5
Intercept	-0.01	0.00	0.00	0.00	-0.06
	0.01	*0.15*	*0.11*	*0.05*	*0.01*
TSR	0.04				
	0.01				
TSR_R		0.03		0.03	0.00
		0.01		*0.01*	*0.72*
EPS Growth			0.01	0.01	0.00
			0.01	*0.01*	*0.04*
ROA					0.92
					0.01
Sale Growth					0.00
					0.88
Adj. R-square	0.03	0.02	0.00	0.02	0.67

Notes: a probability value less than 0.05 means that the regression coefficient is statistically significant.

Table 5: Regressions explaining value creation metrics measured over 3-year rolling windows. Probability values are reported below coefficient estimates in italics.

Dependent variable: EP					
	Model 1	Model 2	Model 3	Model 4	Model 5
Intercept	-0.58	-0.43	-0.42	-0.44	-1.12
	0.01	*0.01*	*0.01*	*0.01*	*0.01*
TSR	0.33				
	0.01				
TSR_R		0.29		0.28	0.08
		0.01		*0.01*	*0.05*
EPS Growth			0.04	0.02	-0.01
			0.02	*0.35*	*0.62*
ROA					3.18
					0.01
Sale Growth					-0.03
					0.66
Adj. R-square	0.03	0.02	0.00	0.02	0.20

Dependent variable: RI					
	Model 1	Model 2	Model 3	Model 4	Model 5
Intercept	-0.55	-0.43	-0.42	-0.44	-1.04
	0.01	*0.01*	*0.01*	*0.01*	*0.01*
TSR	0.27				
	0.01				
TSR_R		0.24		0.23	0.06
		0.01		*0.01*	*0.10*
EPS Growth			0.03	0.01	-0.01
			0.02	*0.37*	*0.67*
ROA					2.87
					0.01
Sale Growth					-0.08
					0.19

Adj. R-square	0.03	0.02	0.00	0.02	0.20

Dependent variable: EVA©

	Model 1	Model 2	Model 3	Model 4	Model 5
Intercept	-0.53	-0.40	-0.39	-0.40	-1.01
	0.01	*0.01*	*0.01*	*0.01*	*0.01*
TSR	0.29				
	0.01				
TSR_R		0.25		0.25	0.07
		0.01		*0.01*	*0.09*
EPS Growth			0.04	0.01	-0.01
			0.02	*0.36*	*0.54*
ROA					2.81
					0.01
Sale Growth					0.02
					0.81
Adj. R-square	0.03	0.02	0.00	0.02	0.19

Table 5 *continued*

Dependent variable: FCF

	Model 1	Model 2	Model 3	Model 4	Model 5
Intercept	0.39	0.38	0.37	0.37	0.32
	0.01	*0.01*	*0.01*	*0.01*	*0.01*
TSR	-0.01				
	0.29				
TSR_R		-0.01		-0.02	-0.03
		0.59		*0.26*	*0.06*
EPS Growth			0.01	0.02	0.02
			0.02	*0.01*	*0.02*
ROA					0.26
					0.01
Sale Growth					-0.02
					0.46

Adj. R-square	0.00	0.00	0.00	0.00	0.01

Dependent variable: ROIC-WACC

	Model 1	Model 2	Model 3	Model 4	Model 5
Intercept	-0.03	0.00	0.00	-0.01	-0.24
	0.01	*0.48*	*0.81*	*0.32*	*0.01*
TSR	0.06				
	0.01				
TSR_R		0.07		0.06	-0.01
		0.01		*0.01*	*0.18*
EPS Growth			0.01	0.00	0.00
			0.01	*0.17*	*0.02*
ROA					1.05
					0.01
Sale Growth					0.01
					0.32
Adj. R-square	0.04	0.04	0.00	0.04	0.71

Notes: a probability value less than 0.05 means that the regression coefficient is statistically significant.

Table 6: Value Quadrant (IRRCi 2014) based on 3-year rolling performance windows

Economic Profit		TSR_R			
		Negative		Positive	
	Positive	ROIC-WACC (median):	0.12	ROIC-WACC (median):	0.14
		TSR_R (median):	-0.31	TSR_R (median):	0.45
		No. of firms:	152	No. of firms:	176
		% of obs.:	19.52	% of obs.:	29.01
	Negative	ROIC-WACC (median):	-0.16	ROIC-WACC (median):	-0.12
		TSR_R (median):	-0.43	TSR_R (median):	0.40
		No. of firms:	189	No. of firms:	166
		% of obs.:	30.33	% of obs.:	21.14

Table 7: Value Quadrant (IRRCi 2014) based on 5-year rolling performance windows

Economic Profit		TSR_R			
		Negative		Positive	
	Positive	ROIC-WACC (median):	0.23	ROIC-WACC (median):	0.29
		TSR_R (median):	-0.39	TSR_R (median):	0.72
		No. of firms:	96	No. of firms:	130
		% of obs.:	19.52	% of obs.:	29.01
	Negative	ROIC-WACC (median):	-0.30	ROIC-WACC (median):	-0.22
		TSR_R (median):	-0.69	TSR_R (median):	0.60
		No. of firms:	141	No. of firms:	116
		% of obs.:	30.33	% of obs.:	21.14

Table 8: Regressions of realized annual total price-adjusted CEO pay on measures of single-period performance. (Probability values reported in italics.)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10	Model 11	Model 12	Model 13	Model 14
Intercept	0.0029	0.0026	0.0029	0.0032	0.0027	0.0024	0.0027	0.0028	0.0028	0.0030	0.0011	0.0014	0.0013	0.0011
	0.01	*0.01*	*0.01*	*0.01*	*0.01*	*0.01*	*0.01*	*0.01*	*0.01*	*0.01*	*0.01*	*0.01*	*0.01*	*0.01*
EPS Growth	0.0007				0.0004	0.0004					0.0003	0.0004	0.0004	0.0003
	0.01				*0.02*	*0.04*					*0.04*	*0.03*	*0.03*	*0.07*
Sale Growth		0.0052			0.0048	0.0046					0.0038	0.0042	0.0044	0.0046
		0.01			*0.01*	*0.01*					*0.01*	*0.01*	*0.01*	*0.01*
TSR			0.0010	-0.0013	-0.0010	-0.0012					-0.0001	-0.0001	0.0000	-0.0005
			0.01	*0.13*	*0.23*	*0.17*					*0.93*	*0.91*	*0.97*	*0.57*
TSR_R				0.0026	0.0020	0.0020					0.0010	0.0011	0.0009	0.0013
				0.01	*0.03*	*0.03*					*0.26*	*0.24*	*0.30*	*0.17*
ROA						0.0050					0.0159	0.0135	0.0138	0.0223
						0.01					*0.01*	*0.01*	*0.01*	*0.01*
RI							-0.0023				-0.0033			
							0.01				*0.01*			
EP								-0.0016				-0.0024		
								0.01				*0.01*		
EVA									-0.0022				-0.0030	
									0.01				*0.01*	
ROIC-WACC										-0.0007				-0.0191

										0.65				*0.01*
Adj. R-square (%)	0.53	2.78	0.32	0.59	3.26	3.54	4.17	2.62	3.83	-0.03	10.25	8.18	9.69	5.49

Notes: a probability value less than 0.05 means that the regression coefficient is statistically significant.

Table 9: Regressions of realized annual total price-adjusted CEO pay on measures of single-period performance and additional control variables. (Probability values reported in italics.)

	Model 1	Model 2	Model 3	Model 4	Model 5
Intercept	0.0001	0.0000	0.0000	-0.0001	-0.0001
	0.56	*0.93*	*0.96*	*0.79*	*0.82*
EPS Growth		-0.0001	-0.0001	-0.0001	-0.0001
		0.40	*0.41*	*0.41*	*0.40*
Sale Growth		-0.0004	-0.0004	-0.0003	-0.0003
		0.28	*0.33*	*0.39*	*0.44*
TSR		-0.0005	-0.0005	-0.0004	-0.0006
		0.31	*0.30*	*0.40*	*0.26*
TSR_R		0.0011	0.0011	0.0010	0.0011
		0.06	*0.05*	*0.08*	*0.05*
ROA		0.0031	0.0027	0.0034	0.0039
		0.01	*0.02*	*0.01*	*0.04*
RI		-0.0006			
		0.01			
EP			-0.0004		
			0.01		
EVA				-0.0008	
				0.01	
ROIC-WACC					-0.0028
					0.10
Market capitalization	0.0005	0.0005	0.0005	0.0005	0.0005
	0.01	*0.01*	*0.01*	*0.01*	*0.01*
Time trend	0.0000	0.0000	0.0000	0.0000	0.0000
	0.16	*0.19*	*0.17*	*0.19*	*0.25*
Lag total pay	0.6066	0.5979	0.5993	0.5952	0.6061
	0.01	*0.01*	*0.01*	*0.01*	*0.01*
Industry indicators	Yes	Yes	Yes	Yes	Yes
Adj. R-square (%)	67.17	67.41	67.35	67.59	67.27

Notes: a probability value less than 0.05 means that the regression coefficient is statistically significant.

Table 10: Regressions of realized annual price-adjusted variable CEO pay on measures of single-period performance. (Probability values reported in italics.)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10	Model 11	Model 12	Model 13	Model 14
Intercept	0.0016	0.0014	0.0016	0.0017	0.0014	0.0011	0.0016	0.0016	0.0016	0.0017	0.0006	0.0007	0.0006	0.0005
	0.01	*0.01*	*0.01*	*0.01*	*0.01*	*0.01*	*0.01*	*0.01*	*0.01*	*0.01*	*0.01*	*0.01*	*0.01*	*0.01*
EPS Growth	0.0005				0.0003	0.0003					0.0002	0.0003	0.0003	0.0002
	0.01				*0.01*	*0.02*					*0.02*	*0.02*	*0.01*	*0.03*
Sale Growth		0.0035			0.0032	0.0029					0.0026	0.0028	0.0028	0.0029
		0.01			*0.01*	*0.01*					*0.01*	*0.01*	*0.01*	*0.01*
TSR			0.0008	-0.0004	-0.0002	-0.0004					0.0000	0.0000	0.0001	-0.0001
			0.01	*0.44*	*0.66*	*0.44*					*0.96*	*0.97*	*0.92*	*0.88*
TSR_R				0.0015	0.0010	0.0010					0.0006	0.0007	0.0006	0.0007
				0.01	*0.07*	*0.07*					*0.25*	*0.22*	*0.29*	*0.23*
ROA						0.0058					0.0101	0.0089	0.0094	0.0140
						0.01					*0.01*	*0.01*	*0.01*	*0.01*
RI							-0.0007				-0.0013			
							0.01				*0.01*			
EP								-0.0004				-0.0009		
								0.01				*0.01*		
EVA									-0.0007				-0.0012	
									0.01				*0.01*	
ROIC-WACC										0.0027				-0.0090

										0.01				*0.01*
Adj. R-square (%)	0.75	3.19	0.69	0.90	4.00	5.07	0.87	0.29	0.88	0.27	7.72	6.61	7.68	6.18

Notes: a probability value less than 0.05 means that the regression coefficient is statistically significant.

Table 11: Regressions of realized annual price-adjusted variable CEO pay on measures of single-period performance and additional control variables. (Probability values in italics.)

	Model 1	Model 2	Model 3	Model 4	Model 5
Intercept	-0.0001	-0.0003	-0.0003	-0.0004	-0.0004
	0.42	*0.06*	*0.07*	*0.02*	*0.03*
EPS Growth		0.0000	0.0000	0.0000	0.0000
		0.61	*0.61*	*0.61*	*0.61*
Sale Growth		0.0002	0.0002	0.0002	0.0002
		0.41	*0.46*	*0.54*	*0.55*
TSR		-0.0003	-0.0003	-0.0002	-0.0001
		0.49	*0.46*	*0.61*	*0.71*
TSR_R		0.0007	0.0007	0.0007	0.0006
		0.07	*0.07*	*0.10*	*0.12*
ROA		0.0030	0.0030	0.0037	0.0039
		0.01	*0.01*	*0.01*	*0.01*
RI		0.0004			
		0.01			
EP			0.0004		
			0.01		
EVA				0.0002	
				0.10	
ROIC-WACC					0.0003
					0.81
Market capitalization	0.0003	0.0003	0.0003	0.0003	0.0003
	0.01	*0.01*	*0.01*	*0.01*	*0.01*
Time trend	0.0000	0.0000	0.0000	0.0000	0.0000
	0.84	*0.99*	*0.99*	*0.87*	*0.84*
Lag total pay	0.3138	0.3249	0.3255	0.3215	0.3188
	0.01	*0.01*	*0.01*	*0.01*	*0.01*
Industry indicators	Yes	Yes	Yes	Yes	Yes
Adj. R-square (%)	54.28	55.32	55.35	55.15	55.10

Notes: a probability value less than 0.05 means that the regression coefficient is statistically significant.

Table 12: CEO pay for the Value Quadrant (IRRCi 2014) based on 3-year rolling performance windows

Economic Profit		TSR_R			
		Negative		Positive	
Positive		ROIC-WACC (median):	0.12	ROIC-WACC (median):	0.14
		R_TSR (median):	-0.31	R_TSR (median):	0.45
		No. of firms:	152	No. of firms:	176
		% of obs.:	19.52	% of obs.:	29.01
		3-year total pay: Mean	8,121.74	3-year total pay: Mean	8,776.28
		(£000) Std dev	7,782.90	(£000) Std dev	13,403.67
		Median	5,474.15	Median	5,858.38
Negative		ROIC-WACC (median):	-0.16	ROIC-WACC (median):	-0.12
		R_TSR (median):	-0.43	R_TSR (median):	0.40
		No. of firms:	189	No. of firms:	166
		% of obs.:	30.33	% of obs.:	21.14
		3-year total pay: Mean	5,926.24	3-year total pay: Mean	7,061.50
		(£000) Std dev	6,038.46	(£000) Std dev	7,409.19
		Median	4,504.30	Median	4,648.99