

THE PRINCE AND THE PAUPER? CEO PAY IN THE UNITED STATES AND UNITED KINGDOM*

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We document differences in CEO pay and incentives in the United States and the United Kingdom for 1997. After controlling for size, sector and other firm and executive characteristics, CEOs in the US earn 45% higher cash compensation and 190% higher total compensation. The calculated effective ownership percentage in the US implies that the median CEO receives 1.48% of any increase in shareholder wealth compared to 0.25% in the UK. The differences, can be largely attributed to greater share option awards in the US arising from institutional and cultural differences between the two countries.

Corporate governance practices in the United Kingdom received increased attention in the 1990s, culminating in influential reports issued by the Cadbury (1992), Greenbury (1995) and Hampel (1998) committees. Among other recommendations, the reports outlined a best-practice framework for setting executive pay, and significantly expanded disclosure rules for UK executive compensation. The Greenbury and Hampel reports were, in part, a response to a growing controversy over chief executive officer (CEO) pay levels triggered when executives in several recently privatised electric utilities exercised share options worth millions of pounds. However, in spite of these reports, CEO pay levels rose more than 18% in 1997 alone, even as public-sector workers were being asked to accept raises of less than 3% (Buckingham and Cowe, 1998*a, b*). The continuing controversy, coupled with enhanced data availability through the new disclosure requirements, has sparked considerable academic interest in UK executive pay practices.

Although CEO pay levels in the United Kingdom have grown in recent years, they remain far behind pay levels enjoyed by CEOs in the United States. The international pay gap is especially pronounced after including gains realised from exercising share options. Chief executives in the 500 largest UK companies in aggregate made £330 million (or £660,000 each) in 1997, including £74 million from exercising options. In contrast, the top 500 US CEOs made in aggregate £3.2 billion (or £6.3 million each), including £2.0 billion from option exercises.¹ Indeed, Disney's Michael Eisner, dubbed by pay-critic Graef Crystal (1991) as the 'Prince of Pay', exercised options worth £348 million in December 1997, thus single-handedly out-earning the aggregate paycheques of the top 500 CEOs in the United Kingdom. British Sky Broadcasting's Sam

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¹ The US dollar-denominated data in this paper are converted to UK pounds by the contemporaneous exchange rate, which ranged from 1.61\$/£ to 1.65\$/£ over the 1997 fiscal year.

Chisolm, the highest-paid UK executive, is a mere pauper by American standards: his £6.8 million pay package would only rank as the 97th highest among US chief executives.

These anecdotal comparisons, while driven by option gains in the robust US stock market, hint at important differences in CEO pay practices in the United Kingdom and the United States. The purpose of this article is to provide a comprehensive comparison of pay practices in the two countries, and to generate stylised facts to stimulate future research. Existing international comparisons of pay practices have typically relied on non-comparable survey data, or have focused on narrow definitions of compensation that usually exclude the grant-date value of share options.² In contrast, our results are based on comparable and complete measures of CEO pay and stock-based incentives, utilising detailed data made available through enhanced disclosure requirements in the United States and (more recently) the United Kingdom. Our use of micro data allows us to analyse differences in compensation and incentives while controlling for factors such as company size, industry, human capital, growth opportunities, and performance.

We begin in Section 1 by offering an introduction to executive compensation, aimed at academic economists new to the area. In this section, we identify available data sources for CEO pay in the two countries, describe our sample, and discuss how to measure and value share options and other pay components.³ Section 2 analyses the level and structure of executive compensation, based primarily on data from 510 UK and 1,666 US corporations. We show that, while company size is an important determinant of pay in both countries, the rewards for scale are more pronounced in the United States than in the United Kingdom. We document that share option grants, valued at grant date, comprise a fairly small percentage of total pay for the typical British CEO, but are much more important for American CEOs. In addition, we document that American CEOs indeed out-earn their British counterpart, earning 45% more in cash pay and 190% more in total pay, even after controlling for size, industry, growth opportunities, CEO human capital, and other observable characteristics.

Also, Section 2 offers some cross-country time-series evidence on the levels of cash compensation from 1989–97, and on the prevalence of stock option plans from 1979–97. We show that, although cash compensation has been growing at about the same rate in both countries since the mid-1990s, the prevalence of option plans has been growing in the United States while declining in the United Kingdom.

² Abowd and Bognanno (1995) use survey data from compensation consultants to show that CEO pay differs internationally in both level and structure but little attempt is made to ensure commensurability between economies and control for scale, etc. Conyon and Schwalbach (1999) show differences in executive cash compensation across European economies after controlling for company size and job position. Main *et al.* (1994) compare cash compensation in 1990 between the United States and United Kingdom but exclude any comparison of the structure of pay.

³ Murphy (1999) provides a comprehensive review of the executive compensation literature, with an emphasis on US data. Recent UK research includes Main *et al.* (1996), Cosh and Hughes (1997), Conyon (1998), Conyon and Peck (1998*b*), and Ezzamel and Watson (1998). With the exception of Main *et al.*, these studies exclude share options and focus only on cash compensation.

Section 3 explores stock-based financial incentives for CEOs in the two countries. CEO wealth is linked directly to company share-price performance through their share holdings, their option holdings, and through shares awarded through long-term incentive plans (LTIPs). We show that these various holdings can be aggregated to form an ‘effective’ ownership percentage (or, following Jensen and Murphy (1990*a,b*), the ‘Pay-Performance Sensitivity’). Similar to our analysis of CEO pay levels, we compute the effective ownership percentage for each CEO and analyse how it varies across countries and with different firm and executive characteristics. We find that American CEOs, on average, own much larger fractions of their firms’ stock than do British CEOs. For example, the median holding for US CEOs is 0.29%, while the median holding for UK CEOs is only 0.05%. The median *effective* ownership (including options and LTIP grants) is more disparate: 1.48% for US CEOs vs. only 0.25% for UK CEOs.

Section 3 also explores how CEO cash compensation varies with share-price performance. We show that the elasticity of cash compensation to performance is higher in the United States than in the United Kingdom for all industries, although the difference is only statistically significant for the financial services industry. In addition, we examine the relation between CEO turnover and company performance. We find that CEO turnover is negatively correlated with shareholder returns in both the United Kingdom and United States, indicating that CEOs in both countries are more likely to lose their jobs following poor performance. The cross-country difference in the turnover-performance relationship is not statistically significant.

Section 4 considers a variety of explanations for the observed Anglo-American differences in compensation and incentives, including agency theory, taxes, and culture. Our objective is not to reconcile completely the differences in pay practices, but rather to identify potential explanations as opportunities for future research. We argue that traditional agency-theoretic considerations offer little insight in explaining the differences, unless US and UK executives differ systematically in their ability, productivity, or risk aversion. We document that, while personal income tax rates and rules in the United States and United Kingdom are generally quite similar, there are differences in corporate tax rules that may explain at least some of the observed differences in compensation and incentives. Finally, we consider a variety of economic, political, and cultural factors that help explain why share option compensation has increased dramatically in the United States, but not in the United Kingdom. Section 5 summarises our results, and explores implications of our results to broader multi-country comparisons of international pay practices.

1. An Introduction to Executive Compensation

1.1. *Data Sources*

The United States, United Kingdom, and Canada are currently the only countries that require detailed disclosure on the compensation practices for

individual top corporate executives.⁴ Disclosure rules for US executives were standardised and expanded in 1992 by the US Securities and Exchange Commission (SEC), and require details on share ownership, share options, and all components of compensation for the top five corporate executives. Disclosure rules in the United Kingdom were significantly expanded in recent years following the Greenbury (1995) and Hampel (1998) reports, and require disclosure of data comparable to those available for US executives (including previously unavailable details on share option grants and holdings).⁵ Although there are a variety of 'secondary sources' for compensation data in the two countries, the primary data source is the annual report in the United Kingdom, and the proxy statement in the United States.⁶

Although we offer some longitudinal comparisons, our analysis is based primarily on 1997 fiscal-year data, since this was the first year covered by the new UK disclosure requirements. The UK data analysed in this paper are drawn directly from the annual reports for the 510 largest companies (ranked by market capitalisation). The pay and ownership data are matched to Datastream data on company size, industry, and performance. Together, these companies account for virtually all (98%) of the market capitalisation of the entire UK stock market. The fiscal 1997 US compensation and company data are extracted from Standard and Poor's (S&P's) Compustat's 'ExecuComp' database, which includes proxy-statement data for 1,666 top executives in the S&P 500, the S&P Mid-Cap 400, the S&P Small-Cap 600, and other supplemental S&P indices. For each country and company, we identified the CEO (or most senior executive officer), and collected information on share ownership, current and prior option grants, salaries, annual bonuses, benefits, and LTIP cash and share awards.

The largest US companies are considerably larger than the largest UK companies, and our combination of large, mid, and small-cap US companies is meant to provide a distribution of US firms similar to the UK distribution. Nonetheless, our sample of US firms remains somewhat larger, with mean (median) 1997 market capitalisation of £3.4 billion (£790 million) in the United States, compared to £2.2 billion (£480 million) in the United Kingdom. Our results below include company size controls to adjust for systematic differences in size.

⁴ Other countries, including Japan and Germany, require disclosures of the aggregate amount paid to the group of top directors or executives, but do not identify individuals. Disclosure in Canada was mandated in 1993 by the Ontario Securities Regulation, and covers all publicly traded companies in the province of Ontario (including all companies on the Toronto Stock Exchange). See Zhou (1999) for an extensive analysis of CEO pay and incentives in Canada.

⁵ Although the US reporting requirements are generally more stringent than the UK requirements, data on prior share option grants are more detailed in the United Kingdom.

⁶ Secondary sources in the United Kingdom include Datastream and PriceWaterhouseCoopers' Corporate Register published by Hemmington Scott. These sources typically ignore share options, combine other pay components into a single number, and focus on the highest-paid executive rather than the CEO. Information about options can be obtained from the Register of Directors' Interests. In practice it can be difficult to access this source (see Main *et al.*, 1996, p. 1632). Secondary sources in the United States include the comprehensive Compustat ExecuComp data, and the less-comprehensive surveys published by *Forbes*, *Business Week*, and the *Wall Street Journal*.

1.2. *Measuring and Valuing the Components of Pay*

Compensation arrangements in both the United Kingdom and the United States contain the same basic components. CEOs in both countries receive base salaries and are eligible to receive annual bonuses paid based on accounting performance. CEOs in both countries also typically receive share options, which are rights to purchase shares of stock at a pre-specified 'exercise' price for a pre-specified term. CEOs also often participate in long-term incentive plans (LTIPs). In the United Kingdom, LTIPs are typically grants of shares of stock that become 'vested' (i.e., ownership is transferred to the CEO) only upon attainment of certain performance objectives. LTIPs in the United States take two primary forms: (1) 'restricted stock' grants that vest with the passage of time (but not with performance criteria); and (2) multi-year bonus plans typically based on rolling-average three or five-year cumulative accounting performance.

We define total compensation as the sum of base salary, annual bonus, LTIP awards, and share options valued at grant date. We measure LTIP share grants at the face value of the shares on the grant date, and impose 20% discounts for performance-contingent UK grants. LTIP cash awards are valued as the amount actually paid during the fiscal year. In valuing share options, we follow the approach used by both practitioners and academic researchers by measuring the grant-date expected value using the Black and Scholes (1973) formula, adjusted for continuously paid dividends:

$$\text{Option Value} = Pe^{-\ln(1+d)T} N(z) - Xe^{-\ln(1+r)T} N(z - \sigma\sqrt{T}), \quad (1)$$

where P is the grant-date share price, X is the exercise price, T is the time remaining until expiration, d is the annualised dividend yield, σ is the stock-price volatility, r is the risk-free discount rate, $N(\cdot)$ is the cumulative normal distribution function, and

$$z = \frac{\ln(P/X) + [\ln(1+r) - \ln(1+d) + \sigma^2/2]T}{\sigma\sqrt{T}}. \quad (2)$$

We measure the risk-free rates for the two countries as the average yield on 7-year UK and US Treasury bills.⁷ Volatilities are defined as the standard deviation of monthly continuously compounded returns over the prior 48 months, multiplied by $\sqrt{12}$. Dividend yields are computed as the average of the prior 48 monthly observations on cash dividend per share.⁸

In spite of its prevalence in both practice and academia, there are many drawbacks to using the Black-Scholes formula for calculating the value of an executive share option. First, the Black-Scholes value is, at best, a measure of

⁷ Options typically expire after either 5 or 10 years; our results are not sensitive to whether we use the 5, 7, or 10-year risk-free rates. The US risk-free rate is estimated at 6.3% for all fiscal 1997 data. The risk-free rate is set to 6.0% for UK firms with fiscal closings prior to July 31, 1997, and 7.0% for firms with later closings.

⁸ Dividend yields above 5% are 'trimmed' to 5%, and volatilities are trimmed to lie in the range 20% to 60%. We imposed these constraints because abnormal historical dividend yields and volatilities are poor predictors of yields and volatilities over the term of the option. These constraints do not, however, change any of our qualitative results.

the company's opportunity cost of granting the option, and will typically overstate the value to the executive-recipient (Hall and Murphy, 2000). Second, executive share options are subject to forfeiture if the executive leaves the firm prior to vesting; this probability of forfeiture reduces the cost of granting the option and thus implies that the Black-Scholes formula overstates option values. Third, the Black-Scholes formula assumes that options can only be exercised at the expiration date, but executive options can be exercised immediately upon vesting, which typically occurs relatively early in the option's term.⁹ Finally, following recommendations in the Greenbury (1995) report, share options granted in the United Kingdom typically vest only upon attainment of some performance criteria, often based on earnings-per-share growth. Although the existence of performance criteria will naturally reduce the company's cost of granting an option, the expected discount is fairly modest, because the criteria are seldom binding.¹⁰ Moreover, to the extent that the performance criteria are correlated with share prices, the criteria will be binding only when the intrinsic value of an unrestricted share option is low. Subject to these caveats, we present Black-Scholes values of stock options in our analyses below.

2. The Level and Composition of CEO Pay

2.1. *Summary Statistics*

Table 1 provides summary statistics for the level and composition of fiscal 1997 CEO pay, by company size, and industry, and country. Total pay is defined as the sum of salaries, bonuses, benefits, other cash pay, grant-date values of share options, and grant-date value of LTIP shares (discounted, where appropriate, for performance contingencies). Dollar-denominated data for each US executive are converted to UK pounds using the average exchange rate during the company's fiscal year; this rate varied between 1.61 \$/£ and 1.65 \$/£ during our sample period.

As reported in the top panel of Table 1, the average total compensation for the 510 UK CEOs is £589,000, while the median pay is £414,000. Total pay increases with firm size: the median pay for companies with 1997 revenues in excess of £1,500 million is £811,000, far larger than the £287,000 median pay for companies with revenues below £200 million. Median and average total pay is somewhat less in utilities than in other industries. The bottom panel shows that American CEOs earn substantially more than their British counterparts,

⁹ Early exercise has ambiguous implications for the cost of granting options. On one hand, the right to exercise early increases the amount an outside investor would pay for the option, and hence increases the option's cost. On the other hand, risk-averse undiversified executives tend to exercise much earlier than would a rational outside investor, and these early exercise decisions reduce the company's cost of granting options (Carpenter, 1998).

¹⁰ The most common criterion requires earnings-per-share growth exceeding 2% in any three years of the options' term. The Pension Investment Research Consultants (PIRC, 1998) argue that most requirements are non-demanding as their index of large companies has achieved real EPS growth rates in excess of 3%. Similarly, we calculated in our data set of UK companies that average (median) real earnings per share growth between 1992 and 1997 was 11.04% (13.32%). Even the company at the 20th percentile achieved average real EPS growth over the period of 2%.

Table 1
Summary Statistics for 1997 CEO Total Compensation, by Company Size and Industry

Group	Sample firms	Total pay		Average composition of total pay (%)				
		Average (£000s)	Median (£000s)	Base salary	Annual bonus	Option grant	LTIP shares	Other pay
United Kingdom								
All companies	510	589	414	59	18	10	9	5
By firm sales (millions)								
Less than £200	152	452	287	64	17	10	4	5
£200 to £500	119	403	335	61	19	8	6	6
£500 to £1,500	116	601	507	54	20	10	12	4
Above £1,500	123	927	811	55	16	10	15	4
By industry								
Mining/manufacturing	217	564	436	59	17	9	9	5
Financial services	84	559	411	60	22	6	7	4
Utilities	19	448	382	58	15	6	14	8
Other	190	645	397	58	17	11	8	5
United States								
All companies	1,666	3,565	1,508	29	17	42	4	8
By firm sales (millions)								
Less than £200	339	1,166	686	38	14	43	1	4
£200 to £500	379	1,833	926	36	18	36	3	7
£500 to £1,500	458	3,038	1,604	28	18	40	5	9
Above £1,500	490	7,056	3,552	20	17	48	5	10
By industry								
Mining/manufacturing	842	3,388	1,540	28	17	43	3	8
Financial services	198	6,277	2,787	19	20	47	5	8
Utilities	120	1,333	707	43	15	23	6	13
Other	506	3,326	1,438	32	16	43	3	6

Note: UK data from the largest companies in fiscal 1997, ranked by market capitalisation. US data include firms in the S&P 500, the S&P MidCap 400, the S&P SmallCap 600, and companies in S&P supplemental indices. Revenues for financial firms defined as net interest income (banks) and total income (insurance companies). Total compensation defined as the sum of salaries, bonuses, benefits, share options (valued on date of grant using the Black-Scholes formula), LTIP-related stock grants (valued at 80% of face value for performance-contingent awards), and other compensation. US dollar-denominated data are converted to UK pounds using the average \$/£ exchange rate during the fiscal year.

for every size and industry group. The average total compensation for the 1,666 US CEOs is £3.6 million, or 500% more than the average pay for UK executives. Similarly, the US median pay of £1.5 million is 260% more than the median UK pay. The US premium is especially pronounced for large firms (where the median US CEOs earns 340% more) and financial firms (where the average US CEOs earns 580% more).

The right-hand portion of Table 1 describes the average composition of CEO pay in the two countries. On average, CEOs in the United Kingdom receive 59% of their total pay in the form of base salaries, 18% in bonuses, 10% in share options (valued at grant-date), and 9% in LTIP shares (valued at grant-date, with a 20% discount for performance contingencies). In contrast, base salaries comprise a much smaller percentage of total pay for US execu-

tives (only 29%), while share option grants comprise a much larger percentage (42%). The divergence between UK and US pay practices is, again, especially pronounced for companies with revenues exceeding £1,500 million. Within this group, salaries account for more than half of pay for UK CEOs, but account for only one fifth of pay for US CEOs. Similarly, share option grants account for nearly 50% of pay for CEOs in large US firms, but only account for 10% of pay in large British firms.

Table 2 compares base salaries and the prevalence of contingent-pay practices in the two countries. The median United States base salary of £317,000 is more than 30% higher than the median United Kingdom salary of £240,000; median salaries are higher in the United States for each size and industry group. The percentage of CEOs receiving bonuses is roughly the same in the two countries (81% in the UK compared to 83% in the US). However,

Table 2
Summary Statistics for Components of CEO Pay, by Company Size and Industry

Group	Base salary Median (£000s)	Annual bonus received		Value of option grant		Value of LTIP shares	
		% with bonus	Median (£) (for >£0)	% with grants	Median (£) (for >£0)	% with grants	Median (£) (for >£0)
United Kingdom							
All Companies	240	81	91	50	69	32	161
By firm sales (millions)							
Less than £200	175	76	59	40	70	14	58
£200 to £500	200	82	69	44	45	25	94
£500 to £1,500	264	87	104	59	73	44	148
Above £1,500	410	80	146	59	108	50	294
By industry							
Mining/manufacturing	254	84	90	53	67	34	165
Financial services	222	83	115	45	50	29	132
Utilities	240	84	86	47	43	58	120
Other	221	77	83	48	110	29	177
United States							
All companies	317	83	270	72	1,142	19	325
By firm sales (millions)							
Less than £200	195	74	99	69	592	6	107
£200 to £500	256	82	180	64	787	15	180
£500 to £1,500	335	85	299	71	1,053	22	315
Above £1,500	487	89	518	80	2,505	30	579
By industry							
Mining/manufacturing	318	85	280	74	1,111	18	318
Financial services	395	92	437	81	1,713	31	611
Utilities	291	81	157	53	392	25	177
Other	301	78	239	68	1,232	15	336

Note: Median data for bonuses, options, and LTIP represent the median value of award/grant (in £000s) for the subsample of CEOs actually receiving awards/grants during the 1997 fiscal year. Revenues for financial firms defined as net interest income (banks) and total income (insurance companies). Share options (valued on date of grant using the Black-Scholes formula), LTIP-related stock grants (valued at 80% of face value for performance-contingent awards), and other compensation. US dollar-denominated data are converted to UK pounds using the average \$/£ exchange rate during the fiscal year.

conditional on receiving a bonus, US bonuses are much higher: the median bonus paid in the United States of £270,000 is triple the median bonus paid in the United Kingdom. American CEOs are more likely to receive option grants than their UK counterparts (72% in the United States versus only 50% in the United Kingdom). In addition, they are likely to receive much larger grants: the median option grant in the United States (for CEOs receiving options) of £1,142,000 is nearly *twenty times* the median grant value for UK CEOs (who receive only £69,000). Finally, Table 2 shows that 32% of UK CEOs receive LTIP share grants, while only 19% of US CEOs receive similar grants. However, although fewer US executives receive LTIP share grants (primarily restricted stock), the value of the grant (for those receiving grants) is higher in the US.

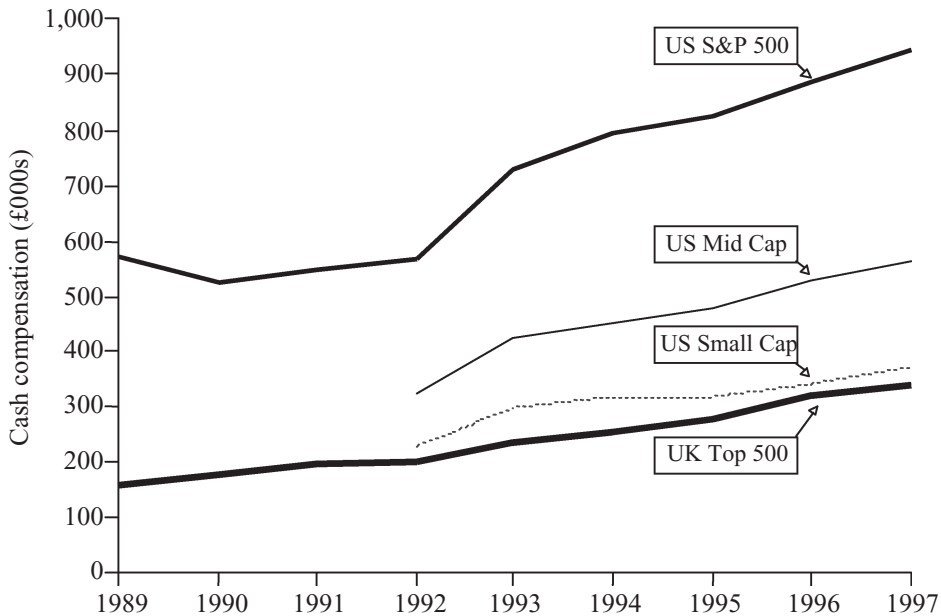
2.2. *Time-Series Comparisons*

Although longitudinal comparisons of total compensation are not possible because of UK disclosure requirements prior to 1997, time-series data on cash compensation (salaries and bonuses) are available for the sample companies. Fig. 1 shows the median cash compensation received from 1989–97 for UK CEOs and US CEOs in the S&P 500, and from 1992–97 for US CEOs in the MidCap 400 and SmallCap 600. The figure includes data from firms in our 1997 sample of 510 UK and 1,666 US firms.¹¹ As shown in the figure, the median cash pay for UK CEOs has grown from £158,000 in 1989 to £340,000 in 1997 (representing a 10% average annual growth). In the United States, median pay among S&P 500 CEOs has grown 6.4% annually, from £574,000 in 1989 to £945,000 in 1997. Since 1992, UK CEO cash compensation has increased on average 11.2% per year, compared to growth rates of 10.7%, 11.9%, and 10.2% for CEOs in the S&P 500, MidCap, and SmallCap companies, respectively.

The results in Fig. 1 suggest that cash compensation in UK firms is roughly ‘on par’ with median pay among CEOs in Small-Cap US firms, but still lies significantly below pay in larger US firms.¹² Moreover, as documented by Hall and Liebman (1998) and Murphy (1999), the value of share options granted to US CEOs has grown much faster than their cash compensation since the early 1990s. Indeed, as indicated in Table 1, share options have emerged as the single largest component of compensation for CEOs in the largest US companies. Although comparable longitudinal data on share-option grants in the United Kingdom are not systematically available, time-series data on the prevalence of option plans among UK and US companies are available and are reported in Fig. 2. The UK data are from Main (1999), and are based on data provided by a large compensation consulting firm. The US data for 1979–96

¹¹ The full time-series is not available for all of our 1997 sample firms, and the medians in Fig. 1 are therefore based on smaller samples in earlier years. The results are unchanged when we restrict the analysis to only firms with complete time-series data.

¹² The firms in the Small-Cap sample are considerably smaller than the firms in the UK sample, with mean (median) 1997 market capitalisation of only £344 million (£247 million) in the US Small-Cap sample compared to £2.2 billion (£484 million) in the UK sample.



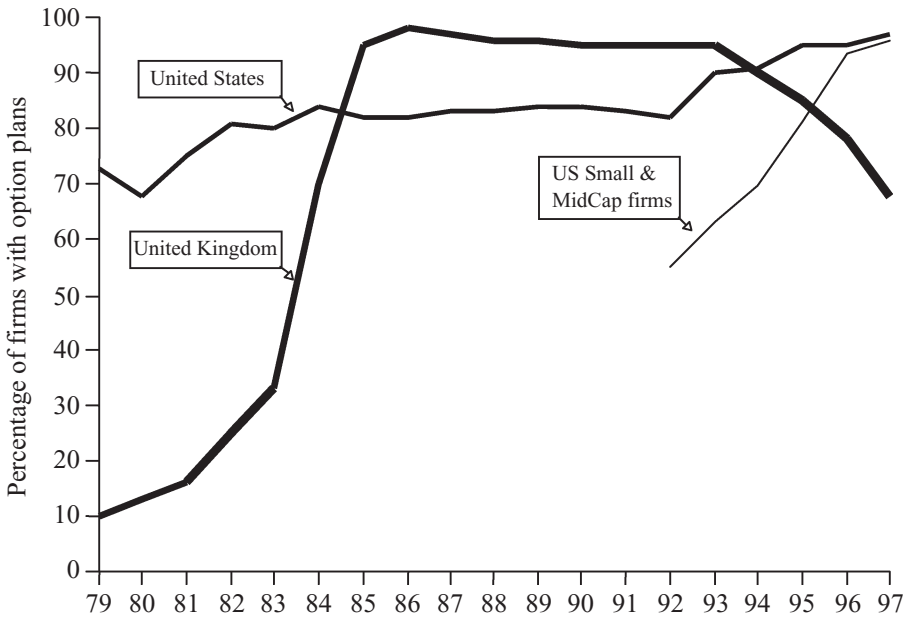
Note: Cash compensation includes salaries and bonuses. UK data from the largest 510 companies in fiscal 1997, ranked by market capitalisation. US data include firms in the 1997 S&P 500, the S&P MidCap 400, and the S&P SmallCap 600. US dollar-denominated data are converted to UK pounds using the average \$/£ exchange rate during each calendar year.

Fig. 1. Median Cash Compensation of US and UK CEOs, 1989–97

are from the Conference Board 'Top Executive Compensation' reports, which cover predominately S&P 500 companies.¹³ The data for 'US Small and MidCap' firms are extracted from ExecuComp, and defined as the fraction of MidCap and SmallCap companies in which the top five executives hold any options during the year.

As reported by Main (1999) and replicated in Fig. 2, option grants in the United Kingdom grew dramatically in popularity from the mid-1980s to the early-1990s. In particular, in 1978 only 10% of UK companies offered options to their top executives, by 1983 over 30% of companies offered options, and by 1986 nearly 100% offered options. However, the use of share options in the UK fell substantially in the mid-1990s; by 1997 only 68% of companies offered options to their top executives. In contrast to the UK experience, Fig. 2 shows that the prevalence of option plans in the US has increased rather than decreased in recent years. In particular, the percentage of large firms with option plans grew from 82% in 1992 to 97% in 1997. The growth in prevalence is more pronounced in smaller firms: in 1992 only 55% of all small and mid-

¹³ The Conference Board discontinued their plan-prevalence data series in 1997. For this year, we use ExecuComp data on the fraction of S&P 500 companies in which the top five executives hold any share options. This definition of prevalence closely tracks the Conference Board's survey responses for the 1992–6 period where both sources of prevalence data are available.



Note: UK data from Main (1999). US data 1979-96 from the Conference Board 'Top Executive Compensation' reports (various issues). US data for 1997 include percentage of S&P 500 companies that have executives holding options (these data closely track the Conference Board data from 1992-96). US Small and MidCap data include percentage of companies in the S&P MidCap 400 and SmallCap 600 that have executives holding options.

Fig. 2. *Prevalence of Stock Option Plans, 1979-97*

cap firms offered options to its top executives; 96% of the companies had plans in place by 1997.

Fig. 2 shows the percentage of companies that have option plans, but does not provide information on the magnitude of the grants to executives. Although UK option data prior to 1997 are not publicly available, Hemmington Scott estimate the total number of option shares held by the CEO in both 1991 and 1997. For 395 UK companies with share option data in both years the Hemmington Scott reports that the mean CEO option holdings (measured as a percentage of common equity) fell from 0.26% in 1991 to 0.22% in 1997; median holdings over the same time period increased slightly from 0.09% to 0.11%. In contrast, mean option holdings among US CEOs in 1,128 Execu-Comp firms with share option data in both 1997 and 1992 (the first year such shares were publicly disclosed) grew from 0.87% in 1992 to 1.1% in 1997; median holdings grew from 0.16% to 0.64% over the same time period.

Overall, Fig. 1 and 2 and our results on option shareholdings suggest that UK and US pay levels are diverging rather than converging in recent years. While CEO cash compensation is growing at roughly the same rate in both countries, the use of share options has increased in the United States while declining in the United Kingdom. In Section 5 below, we analyse the political

and economic factors contributing to the divergence of option-granting practices in the two countries.

2.3. Regression Results

The best-documented empirical finding in the executive compensation literature is the consistency of the relation between CEO pay and company size, typically measured as the elasticity of cash compensation to company revenues. Rosen (1992) summarises academic research covering a variety of industries and a variety of time periods in both the United States and the United Kingdom. Even though there is some variation in wage-size elasticities, his general conclusion is that the ‘relative uniformity [of estimates] across firms, industries, countries, and periods of time is notable and puzzling because the technology that sustains control and scale should vary across these disparate units of comparison.’ Table 3 replicates these earlier findings for 1997 CEO pay data, with pay-size elasticities η estimated from the regression:

$$\ln(1997 \text{ CEO Pay}) = \alpha + \eta \ln(1997 \text{ Sales}). \quad (3)$$

Consistent with prior findings (see Murphy, 1999), the estimated elasticities for US cash compensation (salary plus bonus) are not significantly different from $\eta \approx 0.3$ for all companies or for each of the four industry groups. The US elasticities for total compensation (including salaries, bonuses, benefits, share options, LTIP-shares, and other compensation) are somewhat higher than the elasticities for cash compensation, reflecting primarily that option grants are increasingly larger in bigger firms.

Interestingly, the estimated pay-size elasticities for UK firms in Table 3, while positive and statistically significant for all industries, are uniformly and significantly smaller for UK firms than for US firms. For example, an elasticity of cash pay to sales of 0.316 in the United States and 0.197 in the United Kingdom indicates that doubling size increases cash pay by 32% in the United States but

Table 3
Estimated Elasticities of CEO Compensation with Respect to Firm Revenues

Industry	United States		United Kingdom	
	Salary + bonus	Total pay	Salary + bonus	Total pay
All companies	0.316 [0.24]	0.413 [0.28]	0.197* [0.31]	0.217* [0.26]
Mining & manufacturing	0.294 [0.20]	0.423 [0.35]	0.189* [0.31]	0.157* [0.23]
Financial services	0.342 [0.42]	0.465 [0.34]	0.177* [0.26]	0.205* [0.30]
Utilities	0.334 [0.36]	0.459 [0.30]	0.209 [0.17]	0.314 [0.32]
Other	0.329 [0.28]	0.366 [0.20]	0.270 [0.45]	0.296 [0.33]

Note: Elasticities computed from regressions of $\ln(\text{Pay})$ on $\ln(\text{Sales})$ for 510 UK and 1,666 US companies. R^2 in brackets. Revenues for financial firms defined as net interest income (banks) and total income (insurance companies).

* indicates that the estimated elasticity in the United Kingdom is significantly different from the US elasticity at the 1% level.

only by 20% in the United Kingdom. Similarly, doubling size increases total pay by 41% in the United States, but only by 22% in the United Kingdom.¹⁴

Table 4 reports coefficients of regressions estimating the US pay premium after controlling for company size and industry. We use revenues as our measure of company size, and classify companies into four broad industry groups; our results are not changed using alternative size definitions (assets, market capitalisation) or more narrowly defined industries. The dependent variable in columns (1) and (2) is $\ln(\text{Salary} + \text{Bonus})$, while the dependent variable in columns (3) and (4) is $\ln(\text{Total Pay})$. The coefficient on the US dummy in column (1) of 0.3861 indicates that, after controlling for size and industry, CEOs in the United States earn approximately 47% more than their British counterparts.¹⁵ Similarly, the US dummy in column (3) of 1.142 indicates that total expected pay is 215% higher in the United States after controlling for size and industry.

Existing empirical studies of executive compensation have consistently documented that company size and industry are the two most important factors determining levels of CEO pay. However, researchers routinely include additional controls for risk (because CEOs will demand higher expected pay levels if compensation is risky), investment opportunities (because firms with growth options need better managers), and human capital. The regressions in columns (2) and (4) of Table 4 include as additional explanatory variables the volatility of shareholder returns (as a proxy for risk), the book-to-market ratio (the inverse of a proxy for investment opportunities), and CEO age and age-squared (traditional human capital variables to allow concave age-earnings profiles). In addition, the regressions include a dummy variable set to unity if the CEO and board chairman position are combined, and zero if the corporation has a separate non-executive chairman. Combining the CEO and chairman position is expected to increase pay for two reasons. First, the combination is a proxy for added responsibility and/or ability of the incumbent CEO. Second, the combination is a proxy for the CEO's influence over the board and the remuneration committee. In the United Kingdom, such combinations are the exception: only 18% of the sample companies have CEOs who also serve as board chairmen. However, in the United States such combinations are the rule: nearly two-thirds (66%) of the sample have combined CEO/chairmen.

Columns (2) and (4) of Table 4 report coefficients for cash and total compensation. The control for risk is insignificant in the cash compensation regression, but significant for total compensation, while the control for investment options is insignificant in both regressions.¹⁶ The human capital controls are significant, and suggest that CEO age-earnings profiles for cash (total)

¹⁴ Guy (1999) documents empirical evidence that the annually estimated CEO pay-size elasticity varies positively with annual median pay. This is consistent with our results since median US pay is higher than in the United Kingdom.

¹⁵ Calculated as $e^{0.3861} - 1 \approx 0.47$.

¹⁶ However, in unreported regressions on only UK data, cash compensation is positively and significantly related to volatility, and negatively and significantly related to book-to-market ratios. Since our primary objective here is to identify cross-country differences in pay levels, we leave further examination of cross-country differences in slope coefficients to future research.

Table 4
Explanatory Regressions for 1997 CEO Compensation

Independent variable	Dependent Variable			
	ln (<i>Salary and Bonus</i>)		ln (<i>Total Pay</i>)	
	(1)	(2)	(3)	(4)
Intercept	4.023 (52.6)	2.293 (3.7)	3.839 (42.6)	1.435 (2.0)
ln (<i>Sales</i>)	0.2873 (26.9)	0.2693 (20.8)	0.3689 (29.3)	0.3883 (25.7)
<i>Finance</i> (Dummy)	0.3236 (6.1)	0.3278 (5.7)	0.3553 (5.7)	0.4083 (6.1)
<i>Utility</i> (Dummy)	-0.3848 (-5.4)	-0.3902 (-5.0)	-0.7891 (-9.3)	-0.7146 (-7.8)
<i>Other Industry</i> (Dummy)	-0.1130 (-2.9)	-0.0625 (-1.5)	-0.0956 (-2.1)	-0.1248 (-2.6)
<i>Volatility of Shareholder Returns</i>	—	-0.0609 (-0.3)	—	0.8702 (4.0)
<i>Book to Market Ratio</i>	—	-0.0007 (-0.2)	—	0.0006 (0.1)
<i>CEO/Chairman Combined</i> (Dummy)	—	0.1038 (2.5)	—	0.1771 (3.7)
<i>CEO Age</i>	—	0.0663 (3.0)	—	0.0779 (3.3)
<i>CEO Age-Squared</i>	—	-0.0006 (-3.1)	—	-0.0009 (-4.0)
<i>US Firm</i> (Dummy)	0.3861 (9.5)	0.3747 (7.7)	1.142 (23.9)	1.072 (18.8)
Sample Size	2,165	1,805	2,165	1,805
R ²	0.306	0.315	0.437	0.474

Note: t-statistics in parentheses. Total compensation defined as the sum of salaries, bonuses, benefits, share options (valued on date of grant using the Black-Scholes formula), LTIP-related stock grants (valued at 80% of face value for performance-contingent awards), and other compensation. Book to market defined as the book value of tangible equity divided by the end-of-year market capitalisation. US dollar-denominated data are converted to UK pounds using the average \$/£ exchange rate during the fiscal year.

compensation turn downward after age 55 (age 43).¹⁷ The coefficients on the CEO/chairman dummy variables are positive and significant, indicating that the combination increases cash and total compensation by 11% and 19%, respectively. Including the control for CEO/chairman combinations reduces the estimated US premium slightly, from 47% to 45% for salary and bonus, and from 215% to 190% for total compensation.

Several stylised facts emerge from the results of Tables 1–4 and Figs. 1–2. First, American chief executives are paid significantly more than British chief executives, even after controlling for company size, industry, and other firm and executive characteristics. Second, although CEO pay increases with company size in both countries, the pay-size gradient is significantly higher in the United States than in the United Kingdom. Third, the US pay premium can be traced largely, but not entirely, to the prevalence and magnitude of share option grants, which have increased in the United States since the mid-1990s, while declining in the United Kingdom.

3. The Relation Between CEO Pay and Corporate Performance

Empirical investigations of executive incentives have typically focused on the relation between the CEO's wealth and the wealth of the company's shareholders. CEO wealth is *directly* related to shareholder wealth through the CEO's holdings of shares, share options, and LTIP shares. In addition, CEO wealth can be *indirectly* related to shareholder wealth through accounting-based bonuses (reflecting the correlation between accounting returns and share-price performance) and through year-to-year adjustments in salary levels, target bonuses, and option and LTIP grant sizes. Finally, CEO wealth (and reputation) is affected by performance if CEOs lose their jobs when their firms are performing poorly.

3.1. *The Direct Relation Between CEO and Shareholder Wealth*

The most obvious linkage between CEO and shareholder wealth comes from the CEO's holdings of company shares. As reported in Table 5, the share ownership for UK CEOs is worth an average of £7 million, substantially smaller than the average holdings among US CEOs of over £60 million. The ownership distribution is significantly skewed: the median holdings for UK and US executives are £460,000 and £3.3 million, respectively. Interestingly, the value of shares held by the CEO declines with company size in the United Kingdom, but *increases* with company size in the United States. In the largest firms, US CEOs hold on average shares worth £145 million (median £5 million), while UK CEOs hold shares worth only £3.4 million (median £330,000).

Since agency costs arise when agents receive less than 100% of the value of output, the CEO's share of ownership is a natural measure of the severity of

¹⁷ For example, $0.0663 \times \text{Age} - 0.0006 \times \text{Age}^2$ reaches a maximum at age $0.0663/(2 \times 0.0006) = 55.25$.

Table 5

Summary Statistics for Stock-Based CEO Incentives, by Company Size and Industry

Group	Share holdings (£ millions)		Share holdings (% of common)		Option holdings (% of common)		Pay-performance sensitivity (%)	
	Average	Median	Average	Median	Average	Median	Average	Median
<i>United Kingdom</i>								
All companies	7.01	0.46	2.13	0.05	0.24	0.11	2.33	0.25
By firm sales (millions)								
Less than £200	9.86	1.41	4.38	0.63	0.38	0.21	4.72	1.09
£200 to £500	9.50	0.70	2.55	0.14	0.24	0.14	2.75	0.42
£500 to £1,500	4.55	0.13	0.76	0.02	0.19	0.12	0.91	0.16
Above £1,500	3.40	0.33	0.21	0.01	0.10	0.04	0.31	0.05
By industry								
Mining/ manufacturing	6.01	0.26	1.91	0.04	0.24	0.14	2.11	0.23
Financial services	5.95	0.84	1.98	0.07	0.19	0.05	2.14	0.31
Utilities	0.16	0.11	0.01	0.00	0.03	0.02	0.05	0.02
Other	9.31	0.71	2.64	0.10	0.28	0.11	2.89	0.37
<i>United States</i>								
All companies	60.37	3.26	3.10	0.29	1.18	0.72	4.18	1.48
By firm sales (millions)								
Less than £200	16.63	2.07	5.32	0.96	1.84	1.37	6.98	3.65
£200 to £500	23.84	2.93	3.94	0.58	1.39	0.94	5.20	2.05
£500 to £1,500	32.25	2.64	2.36	0.25	1.12	0.70	3.43	1.26
Above £1,500	145.26	4.96	1.61	0.09	0.62	0.40	2.17	0.56
By industry								
Mining/ manufacturing	33.77	3.14	2.78	0.31	1.22	0.76	3.87	1.53
Financial services	127.46	7.58	2.25	0.31	0.98	0.52	3.17	1.01
Utilities	6.19	0.58	0.25	0.05	0.35	0.12	0.53	0.16
Other	91.34	4.22	4.63	0.38	1.40	0.95	5.96	2.01

Note: UK data from the largest companies in fiscal 1997, ranked by market capitalisation. US data include firms in the S&P 500, the S&P MidCap 400, the S&P SmallCap 600, and companies in S&P supplemental indices. Revenues for financial firms defined as net interest income (banks) and total income (insurance companies).

The Pay-Performance Sensitivity is defined as:

$$\left(\frac{\text{Shares held as}}{\% \text{ of firm shares}} \right) + \left(\frac{\text{Options held as}}{\% \text{ of firm shares}} \right) \times \left(\frac{\text{Option}}{\text{Delta}} \right) + \left(\frac{\text{LTIP shares as}}{\% \text{ of firm shares}} \right) \times \left(\frac{\text{LTIP}}{\text{Delta}} \right)$$

where $0 < \text{Option Delta} < 1$ is the share-weighted-average slope of the Black-Scholes function at the year-end stock price, for options outstanding at the fiscal year end, and $(\text{LTIP Delta}) = 1$.

the agency problem. As reported in Table 5, the average and median share-holdings for UK CEOs (expressed as a percentage of outstanding shares) are 2.13% and 0.05%, respectively, significantly smaller than the average and median holdings among US CEOs of 3.10% and 0.29%, respectively. In the largest firms, US CEOs hold on average 1.61% of their company's shares (median 0.09%), while UK CEOs hold only 0.21% (median 0.01%). In fact, whether measured in pounds or percentages, or at averages or medians, share ownership among US CEOs is substantially higher than ownership among UK CEOs for each size and industry group in Table 5. Consequently, share owner-

ship mitigates more of the agency problem in the United States than in the United Kingdom.

Holdings of unexercised share options also provide a direct link between CEO and shareholder wealth, because the value of the options held increases with increases in the share price. Table 5 shows that the average US executive holds options to purchase 1.18% of the company's outstanding shares (median 0.72%), while the average UK executive holds options to purchase only 0.24% (median 0.11%) of his company's shares. Again, pair-wise comparisons from the top and bottom panels of Table 5 reveal that holdings of previously granted but unexercised share options are substantially higher in the United States than in the United Kingdom for every size and industry group.

Finally, holdings of unvested LTIP shares provide an additional direct link between CEO and shareholder wealth. First, the value of the underlying shares naturally increases penny-for-penny with increases in the share price. Second, there is an additional link to the extent that the shares vest only upon meeting share-based performance criteria. The average US executive holds LTIP shares (primarily restricted stock) on 0.09% of the company's outstanding shares, while the average UK executive holds LTIP shares on 0.03%; the median LTIP shareholdings is zero in both countries.

One way to aggregate the various components of the direct link between CEO and shareholder wealth is to simply sum the various ownership percentages. However, a share option provides the same incentives as a share of stock only if the option is deep 'in the money' (that is, the share price is far in excess of the exercise price). Therefore, each share option should count somewhat less than one share of stock when adding the holdings to form an aggregate measure of CEO incentives. In constructing our aggregate measure of CEO incentives, we weight each option by the 'Option Delta', which ranges from near zero (for deep out-of-the-money options) to near one (for deep in-the-money options on non-dividend paying stock).¹⁸ The option delta is a well-known concept from option pricing theory, and equals the 'slope' of the Black-Scholes function (that is, the change in the Black-Scholes value for an incremental change in the share price). Formally,

$$\text{Option Delta} = e^{-\ln(1+d)T} N(z), \quad (4)$$

where d , T , and z are as defined in (1). Option deltas for ten-year 'at the

¹⁸ The percentage option holdings multiplied by the option delta is a measure of the change in CEO option-related wealth corresponding to a change in shareholder wealth. More formally, suppose that the CEO holds N share options, and suppose that shareholder wealth increases by £1. If there are S total shares outstanding, the share price P will increase by $\Delta P = £1/S$, and the value of the CEO's options will increase by $N\Delta P(\partial V/\partial P)$, where V is the Black-Scholes value of each option. Substituting for ΔP , the CEO's share of the value increase is given by $(N/S)(\partial V/\partial P)$, or the CEO's options held as a fraction of total shares outstanding multiplied by the 'slope' of the Black-Scholes valuation. For examples of this approach which yield a distribution of CEO incentives, see Jensen and Murphy (1990*b*), Yermack (1995), and Murphy (1999). Hall and Murphy (2000) offer a modified approach to measure the pay-for-performance incentives of risk-averse undiversified executives. An alternative approach, adopted by Jensen and Murphy (1990*a*) for the United States and Main, *et al.* (1996) for the United Kingdom, involves estimating the option pay-performance sensitivity as the coefficient from a regression of the change in option value on the change in shareholder wealth. The procedure is similar to how we identify the 'indirect' relation between pay and performance below.

money' options are ≈ 0.9 for options on non-dividend paying shares, and ≈ 0.6 for options on shares with a 3% dividend yield.

Calculating the option delta for each option held at the end of the fiscal year requires exercise price and expiration-term information for each outstanding option grant. The information required to calculate option deltas for 1997 grants is publicly disclosed (and hence available) for companies in both the United Kingdom and United States. The required data are not uniformly available, however, for grants made prior to 1997, but unexercised at the end of the 1997 fiscal year. In particular, although most UK companies provide detailed data on each grant held at the fiscal year closing, some UK companies and all US companies only provide data on (1) the number of share options held, and (2) the average exercise price for unexercised options granted in prior years.¹⁹ In cases where complete data were not available, we calculated deltas for an aggregated prior grant, with an exercise price equal to the average exercise price and a term assumed to be five years.²⁰

LTIP shares are also not equivalent to unrestricted shares owned, because they may be forfeited if certain employment and performance objectives are not achieved. Analogous to our treatment of stock options, we weight each LTIP share by an 'LTIP Delta', which is a measure of the change in value of each LTIP share for an incremental change in the share price. We assume that LTIP recipients will remain employed long enough for all time-related restrictions to lapse. Under this assumption, American-style restricted shares (which vest with the passage of time, without a performance contingency) have an LTIP delta of one, because a £1 increase in the share price results in a £1 increase in the LTIP share. Calculating LTIP deltas for performance-contingent grants is more complicated. The delta is near zero when there is little chance of achieving threshold performance, near one when the LTIP shares are highly likely to become vested, and above one in the range where small changes in share prices have a large effect on the likelihood of vesting. As a simplification, we assume that LTIP deltas for all LTIP shares are one, independent of performance-vesting contingencies.

Our aggregate measure of direct incentives is the CEO's 'effective' ownership percentage, computed as the following delta-weighted average:

¹⁹ Although the Greenbury report generally required detailed disclosure of prior grants, it recognised that 'in the disclosure of share option details there is some risk that the abundance of information will mask rather than highlight the nature and scale of option schemes', and allowed less-than-complete option information when remuneration committees are 'satisfied that this will not result in failure to disclose information of material importance'. Greenbury (1995, p. 29).

²⁰ About 80% of UK annual reports provided full information (i.e. the exercise price and expiration date) on every prior grant of options still outstanding. In the remaining 20% of cases an exercise price is almost always given although it is weighted exercise price of all options held (see Conyon and Sadler, 1999). The expiration date is given in only 50% of cases and is typically the expiration date of the longest-dated option. US proxy statements provide information on the number and intrinsic value of options held at the end of the fiscal year (based on the fiscal year-end stock price, P). The number (N) and intrinsic value (Y) of previously granted options is calculated by subtracting new grants from total outstanding options, and adjusting the year-end intrinsic value of the new grants from the total intrinsic value. We treat the previously granted options as a single prior grant with exercise price X , where $N(P - X) = Y$, or $X = P - (Y/N)$.

$$\begin{aligned} & \left(\frac{\text{Shares Held as}}{\% \text{ of Firm Shares}} \right) + \left(\frac{\text{Options Held as}}{\% \text{ of Firm Shares}} \right) \times \left(\frac{\text{Option}}{\text{Delta}} \right) \\ & + \left(\frac{\text{LTIP Shares as}}{\% \text{ of Firm Shares}} \right) \times \left(\frac{\text{LTIP}}{\text{Delta}} \right). \quad (5) \end{aligned}$$

Our measure of effective CEO ownership is essentially the ‘Pay-Performance Sensitivity’ introduced by Jensen and Murphy (1990*a*). The difference is that we have measured the effective ownership percentage, while Jensen and Murphy measured the change in CEO wealth per \$1,000 change in shareholder wealth, which equals the effective ownership percentage multiplied by ten. Also, our effective CEO ownership statistic yields a distribution of CEO incentives. That is we calculate directly the incentive (pay-performance term) for each CEO separately. This differs from much of the prior compensation literature which relies on regression techniques to derive a single average estimate of the pay-performance link.²¹

The final two columns of Table 5 show the average and median pay-performance sensitivity for CEOs grouped by country, company size, and industry. The average and median pay-performance sensitivities for US CEOs are 4.18% and 1.48%, respectively, significantly higher than the average (2.33%) and median (0.25%) sensitivities for UK CEOs. In the largest firms, the median US CEO has a sensitivity, or effective ownership, of 0.56%, more than ten times the effective ownership of their British counterparts.

Table 6 presents coefficients from OLS and median regressions where the dependent variable is the stock-based pay-performance sensitivity from (5). The coefficient on the US dummy in column (1) of 2.467 indicates that the average effective ownership is 2.5 percentage points higher in the United States than the United Kingdom, after controlling for company size and industry. The regression in column (2) includes controls for risk, investment opportunities, and human capital introduced in Table 4: the volatility of returns, the book-to-market ratio, CEO age and age-squared, and a dummy variable indicating that the CEO and board chairman position are combined. The volatility and book-to-market variables are insignificant, while the age variables are significant and indicate that pay-performance sensitivities are monotonically increasing after age 52. The coefficient of the CEO/chairman dummy variable is positive and significant, indicating that pay-performance sensitivities are higher for combined CEO/chairmen. So, although the level of pay is higher when the posts are combined (and corporate governance reformers typically argue for these posts to be separated for this reason) the link between pay and performance (effective ownership percentage) is also higher. Including the control for CEO/chairman combinations reduces the coefficient on the US dummy variable to 0.9632, but the coefficient remains significantly positive. Columns (3) and (4) present coefficients from median

²¹ See, for example, Conyon and Peck (1998*a*).

Table 6
Explanatory Regressions for Stock-Based Pay-Performance Sensitivity

Independent Variable	Dependent Variable: <i>Stock-Based Pay-Performance Sensitivity</i>			
	OLS regressions		Median regressions	
	(1)	(2)	(3)	(4)
Intercept	8.181 (12.1)	32.191 (5.8)	3.052 (21.3)	9.545 (9.3)
$\ln(\text{Sales})$	-1.038 (-11.0)	-1.103 (-9.5)	-0.414 (-20.6)	-0.320 (-15.1)
<i>Finance</i> (Dummy)	-0.324 (-0.7)	-0.645 (-1.3)	-0.188 (-1.9)	-0.037 (-0.4)
<i>Utility</i> (Dummy)	-2.724 (-4.3)	-2.533 (-3.6)	-0.946 (-7.0)	-0.557 (-4.4)
<i>Other Industry</i> (Dummy)	1.764 (5.2)	2.026 (5.4)	0.304 (4.2)	0.360 (5.2)
<i>Volatility of Shareholder Returns</i>	—	2.303 (1.4)	—	4.384 (14.3)
<i>Book to Market Ratio</i>	—	0.018 (0.4)	—	0.003 (3.9)
<i>CEO/Chairman Combined</i> (Dummy)	—	2.898 (7.9)	—	0.394 (5.8)
<i>CEO Age</i>	—	-0.967 (-5.0)	—	-0.320 (-8.9)
<i>CEO Age-Squared</i>	—	0.009 (5.5)	—	0.003 (9.8)
<i>US Firm</i> (Dummy)	2.467 (6.9)	0.963 (2.2)	1.225 (16.1)	0.652 (8.2)
Sample Size	2,174	1,812	2,174	1,812
R ²	0.092	0.157	0.080	0.102

Note: t-statistics (for OLS) and asymptotic t-statistics (for median regressions) in parentheses. Sales for financial firms defined as net interest income (banks) and total income (insurance companies).

See the footnote on the prior table for our definition of the Pay-Performance Sensitivity.

regressions. The book to market and volatility measures are now significant. Importantly, the US dummy variables in both columns (3) and (4) are positive and significant (although quantitatively smaller than in the mean regressions), indicating that median pay-performance sensitivities are substantially higher in the United States, even after including our control variables.

3.2. *The Indirect Relation Between CEO and Shareholder Wealth*

In addition to the *direct* relation through ownership, LTIP shares, and options, CEO wealth is *indirectly* related to company stock-price performance through performance-based bonuses, raises, and LTIP and option grant sizes. The CEO pay literature has yet to reach a consensus on the appropriate methodologies and metrics to use in evaluating the indirect relation between CEO pay and company stock-price performance.²² However, the most common approach has involved estimating some variant of the following first-difference regression:

$$\Delta \ln(\text{Salary} + \text{Bonus})_{it} = \alpha + \beta \Delta \ln(\text{Shareholder Value})_{it}, \quad (6)$$

where the change in shareholder value, $\Delta \ln(\text{Shareholder Value})_t$ ignores share issues or repurchases and therefore equals the continuously accrued rate of return on common stock, r_t . The estimated coefficient β is the elasticity of cash compensation with respect to shareholder value (or, following Rosen (1992), the ‘semi-elasticity’ of pay with respect to the rate of return).²³

Table 7 reports coefficients from estimating (6) with US interactions. The pay-performance elasticity for UK CEOs in column (1) is 0.1213, indicating that an additional ten percentage point shareholder return corresponds to an additional 1.2% pay raise. The pay-performance elasticity for US CEOs in column (1) is 0.27 ($\approx 0.1213 + 0.1488$), or more than double the elasticity for UK CEOs. The difference in elasticities is statistically significant at the 10% level. The remaining columns in Table 7 report estimated elasticities for the industrial groups. The estimated US elasticity is higher than the corresponding UK elasticity for all industries, although the difference is only statistically significant for the financial services industry.

3.3. *CEO Turnover and Corporate Performance*

Another important potential source of managerial incentives is the threat of being fired for poor performance. Several researchers, beginning with Coughlan and Schmidt (1985), Warner *et al.* (1988), and Weisbach (1988) have documented an inverse relation between CEO turnover and shareholder

²² See Murphy (1999) for a discussion and comparison of the various approaches.

²³ Most of the UK literature has been concerned with estimating this type of equation and ignoring the importance of the direct relation between CEO pay and shareholder wealth (as reviewed in Conyon *et al.*, 1995). Moreover, Gregg *et al.* (1993) show that the ‘implicit’ link between CEO pay and shareholder returns became de-coupled in the 1990s. In fact, this may simply be attributable to the restructuring of CEO pay packages and the importance of non-cash forms of compensation.

Table 7
CEO Pay-Performance Elasticities for Salary and Bonus, by Industry

Independent Variable	Dependent Variable: $\Delta \ln(\text{Salary} + \text{Bonus})$				
	All industries	Mining & manufacturing	Financial services	Utilities	Other industries
	(1)	(2)	(3)	(4)	(5)
Intercept	0.1448 (7.1)	0.1552 (6.6)	0.2298 (3.4)	0.5689 (1.3)	0.1158 (3.0)
$\ln(1 + \text{Shareholder Return})$	0.1213 (2.0)	0.1569 (2.2)	-0.1809 (-1.0)	-0.6359 (-0.6)	0.1348 (1.3)
(Dummy) <i>US Firm</i>	-0.0861 (-2.8)	-0.0883 (-2.8)	-0.3273 (-2.8)	-0.6182 (-1.4)	-0.0350 (-0.5)
$(\text{Return}) \times (\text{US Dummy})$	0.1558 (1.9)	0.1268 (1.5)	0.7567 (2.9)	1.062 (1.0)	0.1101 (0.7)
R ²	0.038	0.050	0.107	0.065	0.026
Sample Size	2,069	1,009	273	135	652

Note: White asymptotic t-statistics in parentheses. UK data from the largest 510 companies in fiscal 1997, ranked by market capitalisation. US data include firms in the S&P 500, the S&P MidCap 400, and the S&P SmallCap 600. Shareholder return from Datastream (UK) and Compustat (US).

returns for US companies; Conyon (1998) has shown that the inverse relation holds for UK data as well, and Kaplan (1994*a,b*) reports similar findings for Japan and Germany.

Table 8 reports the coefficient estimates from logistic regressions of CEO turnover on shareholder returns by industry. The dependent variable is equal to one if the CEO is in his last full year of office in fiscal year 1996. The independent variables include 1996 fiscal-year performance, a US dummy, and the US dummy interacted with the performance variable to identify cross-country differences in the turnover-performance relation. The coefficient on the performance variable is negative in all regressions (and significant in all but financial services), indicating that CEOs in the United Kingdom are indeed more likely to depart following poor performance. The interaction variable is positive but insignificant in all regressions, suggesting that there are no systematic US-UK differences in the CEO turnover-performance relation in our data.²⁴

Our conclusion that the turnover-performance relation in the United Kingdom is not significantly different from that in the United States is robust to alternative definitions of performance (using various lagged performance measures, and allowing performance-size interactions). In addition, our conclusion is consistent with Kaplan (1994*a,b*), who finds no systematic differences in turnover-performance relations in the United States vs. Japan or the United States vs. Germany. However, we view our results here as preliminary because (i) they are based on only a single year of turnover data; (ii) we are not controlling for turnover related to normal retirement; and (iii) we are not controlling for corporate governance variables, including the composition of the board. We leave a comprehensive investigation to future research.

4. Discussion

Consistent with our objective of generating stylised facts to stimulate future research, our paper to this point has been primarily descriptive. That is, although we have documented that American CEOs are higher paid and have better stock-based incentives than British CEOs, we have offered little in the way of theory or conjecture to help explain these interesting differences. In this section, we will briefly discuss a variety of factors that may explain the cross-country differences. As noted earlier, our objective is not to reconcile completely the differences in pay practices, but rather to identify potential explanations, leaving formal hypothesis development and testing to future research.

4.1. *Agency-theoretic Considerations*

The traditional principal-agent model highlights the trade-off between risk and incentives. Increasing the pay-performance sensitivity imposes more risk

²⁴ Estimating logit regressions for each country separately yielded negative and significant correlations between CEO turnover on shareholder returns in both the US and UK data.

Table 8
CEO Turnover-Performance Regressions, by Industry

Dependent Variable: <i>CEO Turnover in 1996</i>					
Independent variable	All industries	Mining & manufacturing	Financial services	Utilities	Other industries
	(1)	(2)	(3)	(4)	(5)
Intercept	-1.71 (-10.7)	-1.70 (-7.8)	-2.34 (-3.9)	-0.78 (-1.0)	-1.63 (-5.8)
$\ln(1 + \text{Shareholder Return})$	-1.65 (-2.8)	-1.56 (-1.7)	-0.20 (-0.1)	-12.54 (-1.8)	-1.81 (-2.2)
(Dummy) <i>US Firm</i>	-0.26 (-1.4)	-0.40 (-1.6)	-0.78 (-1.0)	-1.15 (-1.4)	-0.12 (-0.4)
$(\text{Return}) \times (\text{US Dummy})$	0.43 (0.7)	0.29 (0.3)	2.66 (1.1)	11.37 (1.6)	0.50 (0.5)
Sample Size	1,942	984	241	135	582
Pseudo R^2	0.030	0.037	0.023	0.034	0.042

Note: Dependent variable = 1 if CEO is in last year of office in 1996. Mean of the dependent variable is 0.119. Shareholder return is measured in 1996. z-statistics in parentheses. UK data from the largest 510 companies in fiscal 1997, ranked by market capitalisation. US data include firms in the S&P 500, the S&P MidCap 400, the S&P SmallCap 600, and companies in supplemental S&P indices. Shareholder return from Datastream (UK) and Compustat (US).

on CEOs, who in turn demand higher levels of expected compensation to compensate for the additional risk. Therefore, the facts that US CEOs are better paid and have stronger incentives than UK CEOs may both reflect equilibrium incentive contracts.

To illustrate, suppose that firm value is given by $x = e + \varepsilon$, where e is executive effort, and ε is (normally distributed) uncontrollable noise, $\varepsilon \approx N(0, \sigma^2)$. Moreover, suppose that managerial contracts take the simple linear form $w(x) = s + bx$, where s is a fixed salary and b is the sharing rate (or 'pay-performance sensitivity'). Assuming that the executive has exponential utility, $U(x) = -e^{r[W - c(e)]}$, where r is the executive's absolute risk aversion and $c(e)$ is the convex disutility of effort, the optimal sharing rate is given by:²⁵

$$b = \frac{1}{1 + r\sigma^2 c''}. \quad (7)$$

Equation (7) implies that the optimal pay-performance sensitivity b will equal 1 when output is certain ($\sigma^2 = 0$) or executives are risk-neutral ($r = 0$). Incentives will be weaker for more risk-averse executives ($\partial b/\partial r < 0$), and will also be weaker the greater the uncontrollable noise in firm value ($\partial b/\partial \sigma^2 < 0$). Moreover, expected compensation $E(w) = s + bE(x)$ will increase monotonically with b to compensate for both the increased risk imposed, and the increased effort induced, by higher pay-performance sensitivities.

Equation (7) suggests a finite number of factors that might explain higher pay and incentives among US executives. First, American CEOs may be less risk averse or have steeper marginal costs of effort than their British counterparts, but to our knowledge there is no theory or empirical work suggesting such international differences in risk-aversion coefficients. Second, UK performance might be measured with substantially more noise than in the United States, leading to lower pay-performance sensitivities and lower expected levels of pay. However, we find no evidence that cash flows or shareholder returns are systematically more variable in the United Kingdom than in the United States.

Overall, the traditional principal-agent model encapsulated in (7) does not offer promising explanations for the difference in pay levels and incentives in the two countries. Extensions of the model to incorporate differences in both ability and in the marginal productivity of CEO effort might help reconcile the data, but only given the additional assumptions that executives are more able and more productive in the United States.²⁶ For example, Granick (1972) shows that US managers have greater exposure to different functions and operating divisions and that such diversity is rewarded at the top of the hierarchy. The complexity of the filtering and training processes, and differences in each country, may explain divergences in pay between the United States and United Kingdom. Similarly, American CEOs may have more decision rights and influence over corporate results than do British executives.

²⁵ For similar derivations of the optimal pay-performance sharing rate, see Lazear and Rosen (1981), Holmstrom and Milgrom (1991), Gibbons and Murphy (1992), and Milgrom and Roberts (1992).

²⁶ Half of us are unwilling to concede to such assumptions.

Unfortunately, traditional agency theory gives little guidance on why the career paths, production functions, or hierarchical structures should vary across international boundaries.

4.2. *Taxes*

As emphasised by Miller and Scholes (1982) and Abowd and Bognanno (1995), corporate and personal tax regimes affect the optimal structure of executive compensation contracts. Overall, the personal income tax rules and rates affecting executive pay are quite similar in the United States and United Kingdom. Cash compensation and gains from 'unapproved' (or 'nonqualified') share options are taxed as personal income in both countries, at comparable rates.²⁷ 'Approved' share options, granted infrequently to top executives because of institutional restrictions, are taxed at capital gains rates in both countries. In recent years, the capital gains rate in the UK has increased from 30% to 40%, while falling from 28% to 20% in the US.

Apart from the difference in capital gains tax rates, which is both relatively recent and fairly benign (given the paucity of approved share grants), there are no major differences in the personal tax regimes in the United Kingdom and the United States related to executive compensation. However, there are two significant differences in the extent to which compensation is deductible from corporate profits as an ordinary business expense. First, the exercise-date spread between the market and exercise price on unapproved options is treated as a deductible compensation expense in the United States, but not in the United Kingdom. Second, under rules passed in 1993, the United States limits the deductibility of 'non-performance-based' compensation (including salaries, restricted stock, and discretionary bonuses) to \$1 million.²⁸ Thus, UK rules allow deductions for cash compensation but not for exercised options, while US rules allow deductions for exercised options but limit deductions for cash compensation. As discussed in the next sub-section, we believe that these differences have played at least some role in the relative prevalence of share options in US pay packages.

4.3. *The Rise (US) and Fall (UK) of Share Options*

The fact that US CEOs are better paid with stronger pay-performance sensitivities is largely attributable to the relative prevalence and magnitude of share options in the US. As documented by Hall and Liebman (1998) and Murphy (1999) and suggested by Fig. 2, the importance of share options in US compensation packages is a relatively recent phenomenon, reflecting an

²⁷ The highest marginal tax rate is approximately 40% in both countries. The top UK rate affects incomes above £28,000, while the top US bracket is indexed for inflation and is currently about £175,000 for married taxpayers.

²⁸ Research on the effects of the deductibility limitation, which apply only to the top five executives in publicly traded corporations, has concluded that the rule has had a modest influence on both the level and structure of US pay plans (Perry and Zenner, 1999; Rose and Wolfram, 1997).

explosion in option granting practices since the mid-1980s. Over the same period, many UK companies have rejected share option plans in favour of performance share plans such as LTIPs (Main, 1999). Understanding the factors that have led to the rise in share options in the United States, and the fall of share options in the United Kingdom, is critical in understanding the differences in compensation and incentives in the two countries.

The increased popularity of share option grants for US executives can be traced, in large part, to a combination of economic, political, and cultural factors. Shareholder groups and academics in the early 1990s called for more stock-based compensation in CEO pay packages, citing the lack of meaningful rewards and penalties in the typical package. The deductibility limitations on non-performance-related pay introduced by the Clinton Administration in 1993 further fuelled the popularity of stock options. The trend was nearly reversed in the mid-1990s, however, when the Financial Accounting Standards Board (FASB) announced plans to institute a grant-date accounting charge for companies granting share options. Ultimately, FASB yielded to pressure from the business community, accounting firms, and the hi-tech ('Silicon Valley') sector, and opted against requiring an accounting change, adopting instead enhanced footnote disclosure of granting practices. The October 1995 FASB retreat ensured the continued trend in option awards, since the grants remained invisible from an accounting perspective, but fully deductible from a tax perspective.

The S&P500 Index (a broad measure of US stock-market performance) increased by 300% in the 1990s; the UK FTSE Index increased by only 150% during the same period. Proponents of large share option grants have pointed to the US stock-market performance as evidence that options provide incentives for executives to increase shareholder wealth. But, the robust stock market has also been a contributing factor to the growing demand for option compensation among US executives. The current cohort of executives has not experienced a major market downturn, and the overwhelming majority of US share options issued since 1980 have been exercised well in-the-money. As a result of these past successes, both executives and employees have embraced share options as the quickest, and (by their perception) the surest, route to obtaining substantial wealth.

Economic, political and cultural factors have also shaped option granting policies in the United Kingdom. In contrast to the United States, where these factors have encouraged the use of share option compensation, a variety of recent statutory and non-statutory arrangements in the United Kingdom have *discouraged* share option grants. Options in the United Kingdom became controversial in 1995, after executives in several recently privatised electric utilities exercised options worth millions of pounds. The influential Greenbury report (1995) encouraged companies to replace their option plans with LTIP share plans which 'may be as effective, or more so, than improved share option schemes in linking rewards to performance' Greenbury (1995, paragraph 6.32). In response to the Greenbury report and the ongoing controversy, the government tightened the restrictions on approved option awards, reducing

the amount that could be awarded (expressed as the aggregate exercise price) from the greater of £100,000 or four times cash emoluments to only £30,000.

An important non-statutory consideration for UK companies is the codes of conduct issued by institutional investors and their representatives. Although not legally binding, policy guidelines from the Association of British Insurers (ABI) and other investor groups are highly influential and closely followed. The ABI guidelines (1994, 1995), for example, effectively constrain the issuing of share options—approved and unapproved—to four times cash compensation.²⁹ More recently, the Pension Investment Research Consultants (PIRC, 1998) called on companies to toughen performance targets for executive option schemes and other incentive plans.

In sum, executive pay has been highly controversial in both the United States and the United Kingdom, and has generated a variety of responses from the government and tax authorities, the accounting boards, the media, and institutional investors. Although the root causes of the controversy in the two countries are basically similar, the responses have been markedly different: while the net effect of these factors has been to greatly increase option grants in the United States, the net effect has discouraged the use of option grants in the United Kingdom in favour of LTIPs.

4.4. *Culture*

We have documented that US CEOs have higher pay and stock-based incentives than CEOs in the United Kingdom, and shown that these results are driven, in large part, by the recent divergence in share option practices. Although it is difficult for us to explain why a similar controversy over CEO pay has led to increased option grants in the United States but decreased grants in the United Kingdom, it is tempting to attribute at least part of the divergence to cultural differences between the two countries. The United States, as a society, has historically been more tolerant of income inequality, especially if the inequality is driven by differences in effort, talent, or entrepreneurial risk taking. In this light, perhaps it is natural that the United States reacts to claims of excessive CEO pay by increasing the link between pay and performance, thus exacerbating income inequality, while the United Kingdom reacts through wage compression and reducing the pay-performance link.

The divergence in top wages in the UK vs. US is not, of course, limited to top executives. The best doctors, engineers, professors, athletes, lawyers, investment bankers, and entertainers all earn substantially more in the United States than in the United Kingdom. The US wage premiums for 'superstars' in all occupations persist in spite of the similarities in language, culture, tax regimes, and institutions. These premiums may be evidence that the US market for superstars (Rosen, 1981) is more competitive than the UK market, with 'winner-take-all' rents flowing to the producers (Frank and Cook, 1995).

²⁹ Conyon and Sadler (1999) and Main (1999) consider the implications of this rule.

Thus, perhaps the CEO-pay differentials should be examined in the context of broader competitive and culture factors.

5. Conclusion

The recent wave of international corporate mergers, such as Daimler-Chrysler and British Petroleum-Amoco, has sparked academic and practitioner interest in understanding international differences in executive pay policies. International comparisons are inherently difficult, because of fundamental differences in data availability, tax regimes, corporate governance and the organisation of business. For a variety of reasons, the United States and United Kingdom offer a natural laboratory to examine in detail differences in compensation and incentives practices. First, the United Kingdom and United States (along with Canada) are currently the only countries that require detailed disclosure on the compensation practices for individual top corporate executives. Second, the United Kingdom and United States share a common language and have similar capital markets and underlying economies. Third, the United States and United Kingdom employ similar corporate governance structures, especially when compared to those in Japan, Germany, and other economic powers. These important similarities, in a sense, stack the deck against finding significant differences in pay practices.

Nonetheless, several stylised facts have emerged from our comprehensive comparison of CEO incentives and pay practices in the United Kingdom and the United States. Expected pay levels, after controlling for company size and industry, are significantly higher in the United States than in the United Kingdom. Although base salaries are modestly higher in the United States, and annual bonuses substantially higher, the driving force behind the US premium is the prevalence and sheer magnitude of share option grants to US executives. The divergence between UK and US pay practices is especially pronounced in large firms and financial firms.

The link between CEO wealth and shareholder wealth is also much stronger in the United States than in the United Kingdom. Jensen and Murphy (1990*a*) argued that US CEOs have insufficient incentives to increase shareholder wealth, but incentives among British CEOs pale compared to their American counterparts. CEOs in the US hold more shares of stock (measured both in value and as a percentage of outstanding shares), hold more share options, and hold at least as many LTIP shares as do UK CEOs. Overall, the pay-performance sensitivity is substantially higher in the United States than the United Kingdom, for every size and industry group. Moreover, the indirect relation between cash compensation and stock-price performance is also more strongly positive in the United States than the United Kingdom. In short, CEOs in the United States have more incentives to improve shareholder wealth than do CEOs in the United Kingdom.

The differences between pay and incentive practices in the United States and United Kingdom are somewhat surprising, given the similarities in corporate governance and the managerial labour markets. The differences are

especially surprising since executive pay has been highly controversial in both countries, for similar underlying reasons. We believe that corporate tax deductibility rules—which encourage option compensation in the United States while discouraging option compensation in the United Kingdom—help explain the observed differences in pay structures. Ultimately, however, the differences largely reflect subtle political and cultural differences in the two countries. In the US, the controversy over CEO pay has led to tighter links between executive pay and performance (primarily through an explosion in option grants), exacerbating wage inequality given the robust US stock market. In the United Kingdom, the pay controversy has led to statutory and non-statutory policies that discourage large share option grants, lessening the pay-performance link and leading to a relatively compressed wage structure.

The differences in pay practices between the United States and the United Kingdom (or, more generally among any countries) would have few consequences on supply and demand relations if the managerial labour markets were truly isolated within country boundaries. But, large companies are increasingly multinational, and must continuously deal with expatriate compensation and horizontal wage inequities caused by heterogeneous local labour market conditions. Moreover, top-level managers are increasingly mobile and will naturally flow to higher-paid markets: 62 of the top 800 CEOs in the United States are foreign born, 30 are originally European.³⁰ Understanding the magnitude, causes, and consequences of international differences in executive pay practices has important implications for our understanding of the globalisation of world commerce.

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References

- Abowd, J. and Bognanno, M. (1995). 'International differences in executive and managerial compensation.' In (R. Freeman and L. Katz, eds.) *Differences and Changes in Wage Structures*, pp. 67–103. Chicago: University of Chicago Press.
- Association of British Insurers (1995) 'Share options and profit sharing incentive schemes.' ABI, London.
- Association of British Insurers (1994) 'Long term remuneration for senior executives.' ABI, London.
- Black, F. and Scholes, M. (1973). 'The pricing of options and corporate liabilities.' *Journal of Political Economy*, vol. 81, pp. 637–59.
- Buckingham, L. and Cowe, R. (1998a). 'Boardroom pay 98: Pleas for restraint fail to curb executive excess.' *The Guardian*, 22 July.
- Buckingham, L. and Cowe, R. (1998b). 'The boardroom bonanza: exclusive survey reveals top directors' pay soaring by 18%.' *The Guardian*, 22 July.
- Cadbury A. (1992). 'Code of best practice.' Report from the Committee on Financial Aspects of Corporate Governance. London: Gee Publishing.
- Carpenter, J. (1998). 'The exercise and valuation of executive stock options.' *Journal of Financial Economics*, vol. 48(2), pp. 127–58.
- Conyon, M.J. (1998). 'Directors' pay and turnover: an application to a sample of large UK firms.' *Oxford Bulletin of Economics and Statistics*, vol. 60, pp. 485–507.

³⁰ Based on data from *Forbes'* Annual Survey of Executive Compensation, May 19, 1997.

- Canyon, M. J. and Peck, S. I. (1998*a*). 'Recent developments in UK corporate governance.' In (T. Buxton, P. Chapman and P. Temple, eds.) *Britain's Economic Performance*. London: Routledge.
- Canyon, M. J. and Peck, S. I. (1998*b*). 'Board control, remuneration committees and top management compensation.' *Academy Management Journal*, vol. 41, pp. 146–57.
- Canyon, M. J. and Sadler, G. V. (1999). 'CEO compensation, option incentives and information disclosure.' Warwick University mimeograph.
- Canyon, M. J. and Schwalbach, J. (1999). 'Corporate governance, executive pay and performance in Europe.' In (J. Carpenter and D. Yermack, eds.) *Executive Compensation and Shareholder Value: Theory and Evidence*, pp. 13–34. Dordrecht: Kluwer Academic Press.
- Canyon, M. J., Gregg, P. and Machin, S. (1995). 'Taking care of business: executive compensation in the UK.' *ECONOMIC JOURNAL*, vol. 105 (May), pp. 704–15.
- Cosh, A. and Hughes A. (1997). 'Executive remuneration, executive dismissals and institutional shareholdings.' *International Journal of Industrial Organization*, vol. 15, pp. 469–92.
- Coughlan, A. T. and Schmidt, R. M. (1985). 'Executive compensation, managerial turnover and firm performance.' *Journal of Accounting and Economics*, vol. 7, pp. 43–66.
- Crystal, G. (1991). *In Search of Excess: The Overcompensation of American Executives*. New York: Norton & Company.
- Ezzamel, M. and Watson, R. (1998). 'Market comparison earnings and the bidding-up of executive cash compensation: evidence from the United Kingdom.' *Academy Management Journal*, vol. 41, pp. 221–31.
- Frank, R. H. and Cook, P. J. (1995). *Winner-Take-All Society*. New York: Free Press.
- Gibbons, R. and Murphy, K. J. (1992). 'Optimal incentive contracting in the presence of career concerns: theory and evidence.' *Journal of Political Economy*, vol. 100, pp. 468–505.
- Granick, D. (1972). *Managerial Comparisons of Four Developed Countries: France, Britain, United States and Russia*. Cambridge MA: MIT Press.
- Greenbury, R. (1995). *Directors' Remuneration: Report of a study group chaired by Sir Richard Greenbury*. London: Gee Publishing.
- Gregg, P., Machin, S. and Szymanski, S. (1993). 'The disappearing relationship between directors' pay and corporate performance.' *British Journal of Industrial Relations*, vol. 31, pp. 1–10.
- Guy, F. (1999). 'Earnings distribution, corporate governance and CEO pay.' ESRC Centre for Business Research, University of Cambridge. Working Paper No. 126.
- Hall, B. J. and Leibman, J. B. (1998). 'Are CEOs really paid like bureaucrats?' *Quarterly Journal of Economics*, vol. 113 (3), pp. 653–91.
- Hall, B. J. and Murphy, K. J. (2000). 'Optimal exercise prices for executive stock options.' *American Economic Review*, Volume 20 No 2, May, pp. 209–214.
- Hampel, R. (1998). 'Committee on Corporate Governance: Final Report.' London: Gee Publishing.
- Holmstrom, B. and Milgrom, P. (1991). 'Multi-task principal-agent analyses: incentive contracts, asset ownership and job design.' *Journal of Law, Economics and Organization*, vol. 7, pp. 24–52.
- Jensen, M. and Murphy, K. J. (1990*a*). 'Performance pay and top-management incentives.' *Journal of Political Economy*, vol. 98(2), pp. 225–64.
- Jensen, M. and Murphy, K. J. (1990*b*). 'CEO incentives: it's not how much you pay, but how.' *Harvard Business Review*, vol. 68 (May/June), pp. 138–49.
- Kaplan, S. (1994*a*). 'Top executive rewards and firm performance: a comparison of Japan and the United States.' *Journal of Political Economy*, vol. 102(3), pp. 510–46.
- Kaplan, S. (1994*b*). 'Top executives, turnover, and firm performance in Germany.' *Journal of Law, Economics and Organization*, vol. 10(1), pp. 142–59.
- Lazear, E. and Rosen, S. (1981). 'Rank order tournaments as optimum labour contracts.' *Journal of Political Economy*, vol. 89, pp. 841–64.
- Main, B. G. (1999). 'The rise and fall of executive share options in Britain.' In (J. Carpenter and D. Yermack, eds.) *Executive Compensation and Shareholder Value: Theory and Evidence*, pp. 83–113. Dordrecht, Kluwer Academic Press.
- Main, B. G., Bruce, A. and Buck, T. (1996). 'Total board remuneration and company performance.' *ECONOMIC JOURNAL*, vol. 106, pp. 1627–44.
- Main, B. G., O'Reilly, C. and Crystal, G. (1994). 'Over here and over there: a comparison of top executive pay in the UK and the USA.' *Contributions to Labour Studies*, vol. 4, pp. 115–27.
- Milgrom, P. and Roberts, J. (1992). *Economics, Organizations, and Management*. New Jersey: Prentice Hall.
- Miller, M. and Scholes, M. (1982). 'Executive compensation, taxes and incentives.' In (W. Sharpe and C. Cootner, eds.), *Financial Economics: Essays in Honor of Paul Cootner*, pp. 179–201. Englewood Cliffs NJ: Prentice Hall.
- Murphy, K. J. (1999). 'Executive compensation.' In (O. Ashenfelter and D. Card, eds.) *Handbook of Labor Economics*, vol. 3. Amsterdam: North Holland.
- PIRC (1998). *Executive Share Schemes: Trends in 1998*. London, Pension Investment Research Consultants.

- Perry, T. and Zenner, M. (1999). 'Pay for performance? Government regulation and the structure of compensation contracts.' University of North Carolina mimeograph.
- PriceWaterhouseCoopers Corporate Register, various years, published Hemmington Scott.
- Rose, N. and Wolfram, C. (1997). 'Regulating CEO pay: assessing the impact of the tax-deductibility cap on executive compensation.' MIT.
- Rosen, S. (1981). 'The economics of superstars.' *American Economic Review*, vol. 71 (5), pp. 845–58.
- Rosen, S. (1992). 'Contracts and the market for executives.' In (L. Werin and H. Wijkander, eds.) *Contract Economics*, pp. 181–211. Oxford: Blackwell.
- Warner, J., Watts, R. and Wruck, K. (1988). 'Stock prices and top management changes.' *Journal of Financial Economics*, vol. 20, pp. 461–92.
- Weisbach, M. (1988). 'Outside directors and CEO turnover.' *Journal of Financial Economics*, vol. 20, pp. 431–60.
- Yermack, D. (1995). 'Do corporations award CEO stock options effectively?' *Journal of Financial Economics*, vol. 39, pp. 237–69.
- Zhou, X. (1999). 'CEO pay, firm size and corporate performance: evidence from Canada.' *Canadian Journal of Economics*, (forthcoming).