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Abstract

We assess the impact on CEO pay (including salary, cash bonus, and benefits in kind) of changes in both accounting and shareholder returns in 99 British companies in the years 1972-89. After correcting for heterogeneity biases inherent in the standard specifications of the problem, we find a strong positive relationship between CEO pay and within-company changes in shareholder returns, and no statistically significant relationship between CEO pay and within-company changes in accounting returns. Differences between firms in long-term average profitability do appear to have a substantial effect on CEO pay, while differences between firms in shareholder returns add nothing to the within-firm pay dynamics.These findings call into question the rationale for explicitly share-based incentive schemes.

1. Introduction

Is the pay of CEOs – salary, cash bonus, and benefits in-kind – responsive to changes in a company's shareholder returns? Even if it is, is it more responsive to accounting rates of return than to shareholder returns? The assumption that the response of pay to market forces has been weaker than that to internal measures of performance such as accounting profits has been an important rationale for the proliferation of share options, LTIPs, and other stock market-based top-ups to executive compensation packages in both British and American companies.

Share options became an important element in British executive compensation packages only in 1984, following a tax reform which gave this form of compensation preferential treatment. Although share options have been common in many American companies since 1948, when a similar tax reform took effect in the US, a majority of large American companies only began to include share options in CEO compensation packages in the mid-1980s (Hall and Liebman, 1998). There is no doubt that, with share-based pay, the rewards received by CEOs for improved stock market performance are far higher than they had been; the findings for British (Main et al., 1996) and American (Boschen and Smith, 1995; Hall and Liebman, 1998) companies are in agreement on this point. If shareholders find it to their advantage to offer such powerful incentives, and if increasing shareholder wealth increases total welfare, then it is hard to fault the growth of share-based executive compensation. But there are reasons to doubt both conditions in the preceding sentence, and for that reason to ask whether the old pay systems were really the recipes for bureaucratic complacency they have been made out to be.

In this paper we assess the impact on basic CEO pay of changes in both accounting and shareholder returns in 99 British companies in the years 1972-89. We examine both within-firm and between-firm effects, in order to distinguish between variations in pay which are due to performance contingency, and variations which are due to lasting differences between companies in rates of return. We correct for time-wise heterogeneity in the elasticity of pay to firm size, and cross-sectional heterogeneity in the pay-returns relationships. We assess the effect on pay of within-and between-firm differences in returns in light of the within- and between-firm variation in the relevant variables.

The paper is organized as follows. Theoretical and empirical issues are outlined in Section 2. Data are described in Section 3, estimators and estimation strategy are discussed in Section 4, and estimation results in Section 5. Section 6 concludes.

2. Theoretical and Empirical Issues

Rosen (1992) summarized the research on the relationship between CEO pay and shareholder returns as finding that, prior to the explosion of share-based incentives, the semi-elasticity of CEO pay to shareholder returns ranged from 0.1 to 0.15. Jensen and Murphy (1990) had found the elasticity toward the bottom of this range, and had concluded that this was far too low to be in keeping with agency theory. Their study has been influential, yet its benchmark for an efficient contract is a world in which the CEO is the firm's sole residual claimant; the authors acknowledge, but do not quantify, problems of CEO risk aversion and limits on the ability of the CEO re bear risk (due re limited wealth). Taking just the first of these (risk aversion) into account, Haubrich (1994) shows that Jensen and Murphy's estimates are, in fact, consistent with standard principal – agent models of the shareholder – CEO relationship.

CEOs may, of course, be rewarded for a number of different things at the same time. The magnitude of the reward for stock market performance should be evaluated in comparison with other rewards. Of particular concern have been incentives which are 'managerial', which is to say incentives for serving the interests of a particular class of insiders rather than shareholders. It is often argued, for instance, that the positive relationship between CEO pay and company size is so strong that CEOs have an incentive to increase the size of their firm, regardless of shareholder returns (Baker et al., 1988; Cosh and Hughes, 1997; Meeks and Whittington, 1975). Yet there are good reasons why the top managers of large firms should be paid more than those of small ones, and the observed elasticities of CEO pay to firm size can be easily explained in terms either of incentives for effort (Calvo and Wellisz, 1978), or sorting by ability (Calvo and Wellisz, 1979; Rosen, 1982).

A more difficult case to answer is the responsiveness of pay to alternative measures of financial performance, such as accounting rates of return. If the stock market is efficient at valuing expected future earnings, then the additional information imparted by accounting measures of performance should be more closely correlated with free cash flow than with shareholder value. A strong response of executive pay to accounting profits after controlling for shareholder returns would, then, suggest an incentive structure with managerial orientation. On the other hand, a case can be made (Rogerson, 1997; Rosen, 1992) that shareholders should actually prefer to measure performance on the basis of accounting profits because they contain less noise than stock market measures. Be this as it may, the use of shareholder returns has become standard in recent studies of CEO pay. Many earlier studies, however, use accounting rates of return, and even some recent ones use earnings per share. Rosen's summary of these findings is that the semi-elasticity of CEO pay to accounting returns is about 1.0, that of pay to shareholder returns is in the range of 0.1-0.15.

Even if both measures of performance were equally good, we would expect the dynamics of the two to differ. Shareholder returns include both changes in share price and dividend payments. The change in share price should reflect changes in the market's expectations about the firm's future earnings; firms generally try to keep dividend payments steady, and use changes in them to signal changed expectations of future earnings. While changes in accounting returns do contain information about future earnings, they also contain information about one-off gains and losses. While performance-contingent pay could plausibly be linked to both transitory and permanent gains, we would expect the magnitude of the rewards for transitory gains to be lower. On this basis, even if accounting and shareholder returns impart similar information in the long run, we would expect a weaker immediate response to changes in accounting returns than to shareholder returns, but a comparable response in the long run.

3. Data

We have data on CEO remuneration, sales, accounting and share returns for a balanced panel of 99 firms in the years 1970-1989.[1] Remuneration is what is given in the company's annual report as 'total remuneration' of the highest paid director. For the most part this corresponds to the salary plus bonus listing in US annual reports, but it also includes in-kind payments. Remuneration and sales are deflated using the RPI. Remuneration, sales and company accounts variables come from the Cambridge/DTI Databank of Company Accounts, and share price information from the London Business School's London Shareprice Database. Finance, insurance, and property concerns are not included in the dataset, but other service firms are, along with manufacturing. Summary statistics appear in Table 1, and the firms are listed in Appendix 1.

The firms in this sample tend to be fairly large, for two reasons: first, large firms were more likely to have survived through the entire period in question and, second, through the vicissitudes of sample selection for the original data set, data on large firms was more consistently collected than data on small firms. Another limitation of the data is that it does not include information about options and other share-based remuneration. For more recent data this would be a serious limitation, but for most of the period under study these were not an important part of executive compensation. The data are suitable for the essentially historical question asked here: prior to the widespread adoption of share options, how responsive was the pay of CEOs in the UK to changes in accounting and stock market performance?

We define shareholder return for the firm's fiscal year as:

$$\text{SRET} = (\text{Dividend payments} + \text{Change in share price}) / \text{Starting share price}$$

where share prices are adjusted for rights issues. Our measure of accounting return is return on capital employed (ROCE), defined as:

$$\text{ROCE} = \text{Profits before interest and taxes} / \text{Average net assets}$$

Table 2 compares the overall, between-firm and within-firm variation in these two measures of returns. The overall standard deviation of SRET is much larger than that of RACE. This entire difference is accounted for by the greater within-firm variation in SRET.

4. Estimation Strategy

We are interested in the response of CEO pay to both between-firm and within-firm variation in accounting and shareholder returns. Estimation of the 'between' response requires simply a cross sectional regression on firm means:

$$\text{PAY}^*_i = \alpha + \beta_{(1)}\text{SALES}^*_i + \beta_{(2)}\text{ROCE}^*_i + \beta_{(3)}\text{SRET}^*_i + \varepsilon_{(i)} \quad (1)$$

where PAY is the logarithm of the basic pay of the highest paid director, SALES is the logarithm of turnover, ROCE is return on capital employed, and SRET is shareholder return; for any variable x, $x_i^* = \Sigma_t x_{it}/t$. The between estimator has been shown (Pesaran and Smith, 1995) to capture the long-run aspect of a wide range of dynamic processes. We should note, however, that

[1] The Cambridge/DTI Databank stopped adding observations in 1990, when the relevant functions of the British Statistical Office were privatized. The Databank includes accounts data on a varying sample of companies from the mid-1950s to that point. Directors' remuneration data are provided from 1969. The London Business School London Shareprice Database substantially increases its coverage from 1971. The overlap of the two datasets gives us our period of study.

'long run' here could be too long to make sense as performance-contingent-pay: if a firm has consistently high returns over 18 years and consistently high CEO pay over the same period, this does not tell us that CEO pay is adjusted to changes in returns with a frequency that would be behaviourally important.

The between-firm estimates of responsiveness to both accounting and market returns are, at 0.94 and 0.10 respectively, in rough accord with Rosen's generalization, though at the low end (Table 3, column 1).

Estimating the response to within-firm variation in returns is more involved. Pesaran and Smith show that most 'within' estimators for panel data (e.g. fixed effects) produce inconsistent dynamic estimates when there is cross sectional heterogeneity in the underlying parameters (i.e. different slopes for different firms). They show that this bias can be avoided by estimating a separate time series regression for each firm and averaging the results, provided the coefficients of the individual time series are distributed independently of the regressors. Only one study of executive pay (Smith and Szymanski, 1995) has used this approach; because it both used a shorter panel and lacked data on shareholder returns, that study was not able to address the range of questions considered here. We use the Hildreth-Houck-Swamy variant of the random coefficients estimator (Hsiao, 1986), as implemented in LIMDEP.

Cross sectional heterogeneity is not a concern as regards the firm size effect (measured here by sales). This is not because it does not exist, it does (see Cosh, 1975), but because the effect is not a dynamic one: static and dynamic within-firm estimates, between and simple OLS estimates using the same data, all give us similar estimates of the elasticity of pay to sales. There is, however, considerable time-wise heterogeneity in the firm size effect. In the sample firms over the period of this study the real level of executive pay takes large swings, both down and up (Figure 1). At the same time, in annual cross sectional regressions, both the intercept and the coefficient on sales change considerably, the latter ranging from 0.21 to 0.32. The change can be largely explained as a function of changes in earnings differentials throughout the managerial hierarchy, without reference to financial performance (Guy, 1999). Since most of the variation in pay is explained by differences in firm size (in these data, a simple cross sectional regression of log sales on log pay, yields an R^2 of 0.65), an estimation procedure which incorrectly imposes an assumption of homogeneity produces problems.

To understand the effect of these changes in pay-size elasticity on the dynamic model, it is useful to think of the problem as a two step process, first regressing pay on sales, and then regressing the accounting and market return measures on the residual (Goldberger, 1991). Consider three ways of carrying out the first step. One is a simple regression of pay on sales, with pooled data:

$$\mathrm{PAY}_{i,t} = \alpha + \beta\mathrm{SALES}_{i,t} + v_{i,t} \quad (2a)$$

Second, we transform observations of pay and sales by taking deviations from annual sample means: for any variable x, $x_{i,t}^{**} = x_{i,t} - \Sigma_i x_{it}/n$. This is similar, though not identical, (Pesaran et al., 1997) to the inclusion of time dummies in the model,[2] which would allow the intercept, but not the coefficient on sales, to vary by year:

$$\mathrm{PAY}^{**}_{i,t} = \alpha + \beta\mathrm{SALES}^{**}_{i,t} + v_{i,t} \quad (2b)$$

Finally, we can allow both coefficients to vary, either by interacting SALES with the time dummy, or by estimating a separate cross sectional regression for each year:

$$\mathrm{PAY}_{i,t} = \alpha_t + \beta\mathrm{SALES}_{i,t} + v_{i,t} \quad (2c)$$

In Figure 2 we plot, by year, the means of the residuals for the first and fourth quartiles of firms in our panel, ranked by average real sales. We have, at this stage, omitted the financial

[2] We do not use time dummies because, in the random coefficients estimates which follow, they would cause colinearity in each of the underlying time series regressions.

performance variables, so we cannot call this model correctly specified; still we would expect the mean residual for any quartile to be close to zero in each year, and any large or systematic deviation from zero is a sign of misspecification.

In 2a (the first panel of Figure 2), mean residuals for both larger and smaller firms are negative from 1974 to 1983, and positive from 1985 to 1989; the extremes of high and low are greater for the larger firms. After de-meaning (2b), the mean residuals for each group are much reduced, but in terms of signs the time pattern persists for the larger firms, and is now reversed for the smaller firms. The residuals from annual cross sections (2c) show no such pattern. For this reason we prefer the residuals from 2c as the dependent variable in our dynamic models; however, because studies using either levels or time dummies/annual demeaning are common, we report such results for comparison.

We estimate:

$$v_{i,t} = \alpha_i + \lambda_i v_{i,t-1} + \Sigma_t \beta_{ri} \mathrm{ROCE}_{i,r} + \Sigma_t \beta_{si} \mathrm{SRET}_{i,s} + \varepsilon_{i,t} \quad (3)$$

where v is the residual from (2c). The subscript i on the coefficients reminds us that in the first stage a separate regression is estimated for each firm. We test down from current and two lagged values for both measures of returns. The Schwartz criterion guides us to t and $t-1$ for both variables.

For comparison, we then estimate:

$$\mathrm{PAY}_{i,t} = \alpha_i + \lambda_i \mathrm{PAY}_{i,t-1} + \beta_{1i}\mathrm{SALES}_{i,t} + \beta_{2i}\mathrm{ROCE}_{i,t} + \beta_{3i}\mathrm{ROCE}_{i,t-1} + \beta_{4i}\mathrm{SRET}_{i,t} + \beta_{5i}\mathrm{SRET}_{i,t-1} + \varepsilon_{i,t} \quad (4a)$$

This is analogous to (2a), in that neither the intercept nor the sales coefficient is allowed to vary over time. We also estimate:

$$\mathrm{PAY}^{**}_{i,t} = \alpha_t + \lambda_i \mathrm{PAY}^{**}_{i,t-1} + \beta_{1i}\mathrm{SALES}^{**}_{i,t} + \beta_{2i}\mathrm{ROCE}_{i,t} + \beta_{3i}\mathrm{ROCE}_{i,t-1} + \beta_{4i}\mathrm{SRET}_{i,t} + \beta_{5i}\mathrm{SRET}_{i,t-1} + \varepsilon_{i,t} \quad (4b)$$

where x^{**} indicates a variable de-meaned by year, analogous to (2b). Finally, we estimate the same model after de-meaning the financial performance variables as well as pay and sales:

$$\mathrm{PAY}^{**}_{i,t} = \alpha + \lambda_i \mathrm{PAY}^{**}_{i,t-1} + \beta_{1i}\mathrm{SALES}^{**}_{i,t} + \beta_{2i}\mathrm{ROCE}^{**}_{i,t} + \beta_{3i}\mathrm{ROCE}^{**}_{i,t-1} + \beta_{4i}\mathrm{SRET}^{**}_{i,t} + \beta_{5i}\mathrm{SRET}^{**}_{i,t-1} + \varepsilon_{i,t} \quad (4c)$$

5. Estimation Results

5.1. Within-firm and Between-firm Responses

Table 3 reports results for (1), (3) and (4a, b, c). Long-run effects in the random coefficients models are $(\beta_1 + \beta_2)/(1 - \lambda)$. Comparing (3) with (1), we see that the estimated shareholder returns effect in (3) is of approximately the same size, but in (3) it is statistically significant at the 5% level. The coefficient on accounting returns in (3) is about a quarter of that in (1), but with almost as large a standard error and hence of no statistical significance in (3).

These coefficients are, of course, estimated on different dimensions of the data, and to assess their behavioural significance we need to consider the within-firm and between-firm variation in the relevant variables. Dynamic response of pay to within-firm changes in performance can be interpreted as performance-contingent pay. The long-run properties of the same dynamics should be captured by the between estimates. Sensitivity of pay to a one-standard deviation change in the performance variables is reported in Table 4.

The estimated between-firm and within-firm effects for SRET are roughly the same for (1) and (3) (0.10 and 0.12, respectively), and we can regard the between estimate as a simple reflection of the dynamic within result. Within firms, a 1-year one-standard deviation improvement in shareholder returns produces additional CEO pay of 6.6% in that and subsequent years.

The effect on pay of a between-firm difference in ROCE is much stronger than the dynamic within-firm effect. This suggests that most of the positive relationship between pay and accounting profits is of too long term a nature to be the result of performance-contingent remuneration. It is consistent, however, with at least two alternate explanations: first, with the matching of more highly regarded executives with companies which are consistently more profitable; second, with the possibility that CEOs have power within firms which enables them to share in long-term rents – the more the rent, the higher the pay. We do not have the means here to shed light on these contending explanations.

5.2. Consequences of Ignoring Changes in the Pay-Firm Size Relationship

Comparing results from (3) with those from (4a, b, c), we see that, had we not corrected for time-wise heterogeneity in the pay-firm size relationship, we would have obtained within estimates more in keeping with conventional wisdom: the response of pay to changes in profit would have appeared both larger and statistically stronger, while the response of pay to changes in shareholder return would have appeared in most cases smaller and in all cases statistically weaker. When all variables are in levels (4a) we get high estimates of the long-run effects of both accounting and share returns on pay, both significant but only at the 10% level. When we de-mean pay and sales (4b), both of these estimates fall, and accounting returns becomes statistically insignificant. De-meaning all variables (4c) produces no big changes from (4b) in the size of the long-run estimates, but now both are statistically insignificant.

6. Conclusion

This paper considers a question from the recent history of executive pay in Great Britain: prior to the widespread use of share options in compensation packages, was the pay of top executives responsive to stock market returns, to accounting profits, or to both?

After adjusting for time-wise heterogeneity in the firm size effect, we find that the within-firm response of CEO pay (salary, bonus and benefits in kind) to shareholder returns is much stronger – in terms both of proportion of salary and statistical significance – than is the response to accounting returns. While theory offers little guidance to the size of the incentive that would be optimal from the standpoint of the shareholders (Rosen, 1992), much less for other stakeholders in the firm, the strength of the relationship does tell us that British CEOs during the 1970s and 1980s had much more to gain from improving share returns than from improving accounting returns, even without taking share ownership or share options into account. Since many top executives have shareholdings as well, this finding provides a lower bound for both the relative and absolute importance of share returns in the remuneration of these CEOs. This is contrary to earlier findings about the reward structure for CEOs prior to the advent of share options and other compensation schemes designed to align CEO interests with those of shareholders. It calls into question that rationale for such schemes.

The relationship of pay to between-firm differences in both shareholder and accounting returns is, in contrast, in keeping with the earlier findings. Comparing these between-firm results together with our within-firm findings, we infer that in this case at least, the widely observed positive relationship between CEO pay and accounting returns is mostly due to very long run differences in profitability between firms, rather than to a performance-contingent element of the pay package.

When we fail to correct for time-wise heterogeneity in the pay-firm size elasticity, we get much different results. Since this heterogeneity comes from changes over time in the distribution of real pay levels, it is potentially a problem in any executive pay study using a long panel of data, especially in a period where the distribution of earnings changes substantially. The statistical methodology employed here provides a way to address that problem. Future research should focus on applying this methodology to more recent, complete, and disaggregated measures of executive remuneration. In the case of the UK, the assembly of panels of such data is a project in itself.[3]

[3] Long panels which include data on CEO share options are available for the US. For the UK, up to the mid-1990s, this data was effectively available only with the cooperation of individual companies. For most other countries in the world, data on the remuneration of individual executives is not publicly reported.

References

Baker, George P., Jensen, Michael C. and Murphy, Kevin J., "Compensation and Incentives: Practice vs. Theory," Journal of Finance, July 1988, 43(3), pp. 593-616.

Boschen, John F. and Smith, Kimberly J., "You Can Pay Me Now and You Can Pay Me Later: The Dynamic Response of Executive Compensation to Firm Performance," Journal of Business, October 1995, 68(4), pp. 577-608.

Calvo, Guillermo A. and Wellisz, Stanislaw, "Supervision, Loss of Control, and the Optimum Size of the Firm," Journal of Political Economy, 1978, 86(5), pp. 943-52.

Calvo, Guillermo A. and Wellisz, Stanislaw, "Hierarchy, ability and income distribution," Journal of Political Economy, 1979, 87(5,pt. 1), pp. 991-1010.

Cosh, Andrew, "The Remuneration of Chief Executives in the United Kingdom," Economic Journal, March 1975, 85(337), pp. 75-94.

Cosh, Andy and Hughes, Alan, "Executive Remuneration, Executive Dismissal and Institutional Shareholdings," International Journal of Industrial Organization, July 1997, 15(4), pp. 469-92.

Goldberger, Arthur S., A Course in Econometrics. Cambridge, MA: Harvard University Press, 1991.

Guy, Frederick, "Earnings Distribution, Corporate Governance, and CEO Pay," Working Paper 126. ESRC Centre for Business Research, University of Cambridge, 1999.

Hall, Brian J. and Liebman, Jeffrey, "Are CEOs Really Paid Like Bureaucrats?" Quarterly Journal of Economics, August 1998, 113(3), pp. 653-91.

Haubrich, Joseph G., "Risk Aversion, Performance Pay and the Principal-Agent Problem," Journal of Political Economy, April 1994, 102(2), pp. 258-76.

Hsiao, Cheng, Analysis of Panel Data. Cambridge: Cambridge University Press, 1986.

Jensen, Michael C. and Murphy, Kevin J., "Performance Pay and Top Management Incentives," Journal of Political Economy, 1990, 98(2), pp. 225-64.

Main, Brian G.M., Bruce, Alistair and Buck, Trevor, "Total Board Remuneration and Company Performance," Economic Journal, November 1996, 106, pp. 1627-44.

Meeks, Geoffrey and Whittington, Geoffrey, "Directors' Pay, Growth and Profitability," Journal of Industrial Economics, September 1975, 24(1), pp. 1-14.

Pesaran, M. Hashem and Smith, Ron, "Estimating Long-run Relationships from Dynamic Heterogeneous Panels," Journal of Econometrics, 1995, 68, pp. 791-803.

Pesaran, M. Hashem, Smith, Ron and Akiyama, Taka, Energy Demand in Asian Economies. Washington, DC: World Bank, 1997.

Rogerson, William P., "Intertemporal Cost Allocation and Managerial Investment Incentives: A Theory Explaining the Use of Economic Value Added as a Performance Measure," Journal of Political Economy, August 1997, 105(4), pp. 770-95.

Rosen, Sherwin, "Authority, Control, and the Distribution of Earnings," Bell Journal of Economics, 1982, 13, pp. 311-23.

Rosen, Sherwin, "Contracts and the Market for Executives," in L.W.a.H. Wijkander, ed., Contract Economics. Oxford: Basil Blackwell, 1992.

Smith, Ron and Szymanski, Stefan, "Executive Pay and Performance: The Empirical Importance of the Participation Constraint," ***International Journal of the Economics of Business***, 1995, 2 (3), pp. 485-95.

Tables and figures

Table 1. Descriptive statistics – selected years, 1982 prices

Variable	Mean	Standard Deviation	Minimum	Maximum
1972				
CEO pay	110818.22	57697.06	24370.52	284956.53
Sales	920067.86	1278850.87	17195.65	7364782.50
ROCE	0.2	0.10	0.04	0.56
Share return	0.57	0.74	-0.26	4.07
1978				
CEO pay	81418.20	54386.09	25818.18	516424.25
Sales	1101212.90	1452715.45	17699.50	8585227.00
ROCE	0.18	0.09	-0.03	0.53
Share return	0.3	0.42	-0.46	2.04
1986				
CEO pay	143114.27	130574.59	28046.42	970986.44
Sales	1177019.86	1713532.47	5522.75	9802708.00
ROCE	0.20	0.11	-0.12	0.47
Share return	0.56	0.64	-0.15	4.42
1989				
CEO pay	198912.18	163073.48	36124.79	1111777.88
Sales	1215050.97	1678721.86	3747.19	10813629.00
ROCE	0.21	0.18	-0.89	0.76
Share return	0.24	0.3	-0.61	1.11

Table 2. Within- and between-firm variation in returns

Variable	Mean	Standard deviation
Shareholder return		
Overall	0.27	0.57
Between		0.08
Within		0.57
Return on capital employed		
Overall	0.17	0.12
Between		0.07
Within		0.10

Table 3. Regression results [a]

	1 Between (firm means) model, real levels	Within-firm random coefficients models 3 Residual from annual cross sections	4a Real levels	4b De-mean pay,sales	4c De-mean all
Dependent variable *t-1*		0.63**	0.75**	0.57**	0.57**
		(0.041)	(0.037)	(0.043)	(0.044)
ROCE *t*	0.94*	0.067	0.29	0.15	0.19
	(0.40)	(0.13)	(0.18)	(0.15)	(0.14)
ROCE *t-1*		0.02	0.035	0.039	0.0011
		(0.14)	(0.16)	(0.15)	(0.13)
SRET *t*	0.10	0.02	0.016	0.018	0.015
	(0.33)	(0.012)	(0.013)	(0.012)	(0.018)
SRET *t-1*		0.023	0.024	0.017	0.016
		(0.013)	(0.013)	(0.012)	(0.016)
Log (sales)	0.25**		0.11	0.082	0.096
	(0.018)		(0.075)	(0.058)	(0.053)
Constant	8.03**	-0.047	1.53	-0.056	-0.019
	(0.27)	(0.025)	(0.87)	(0.10)	(0.089)
	Long-run effects				
	Between estimates	Random coefficient estimates Coefficient: $(\beta_t + \beta_{t-1})/(1-\lambda)$			
ROCE	0.94*	0.24	1.29	0.45	0.44
	(0.40)	(0.33)	(0.76)	(0.32)	(0.31)
SRET	0.10	0.12*	0.16	0.081	0.071
	(0.33)	(0.056)	(0.093)	(0.048)	(0.067)

[a] There is no R^2 for the random coefficients estimator. Regressor selection is based on Schwartz Bayesian criterion based on the sum of log likelihoods from model 3. These statistics are not reported here because the five models in the table have, between them, four different dependent variables (1: mean pay by firm, 3: residual from annual cross sectional logarithmic regressions of pay on sales; 4a: log of real pay; 4b, 4c: deviations of log of real pay from annual sample means).

Coefficients significant at 0.01 **; 0.05 *. Standard errors in parentheses. Standard errors and significance levels for long-run dynamic estimates are from Wald tests.

Table 4. Percentage changes in pay for 1 SD change in returns

	Between (1)	Within (3)
Shareholder return	0.8	6.6
Return on capital employed	6.3	2.4

Figure 1. Mean real CEO remuneration.

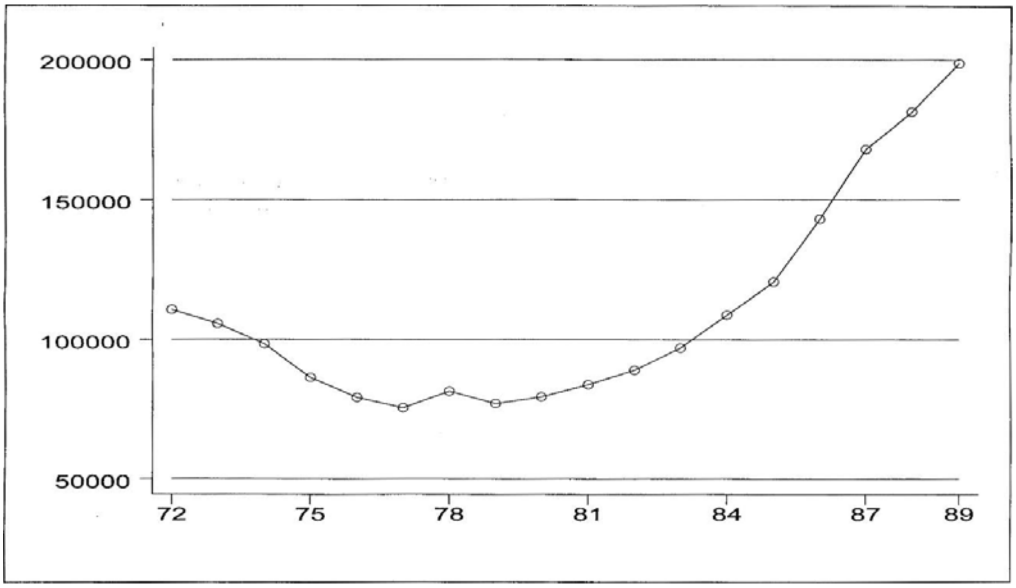
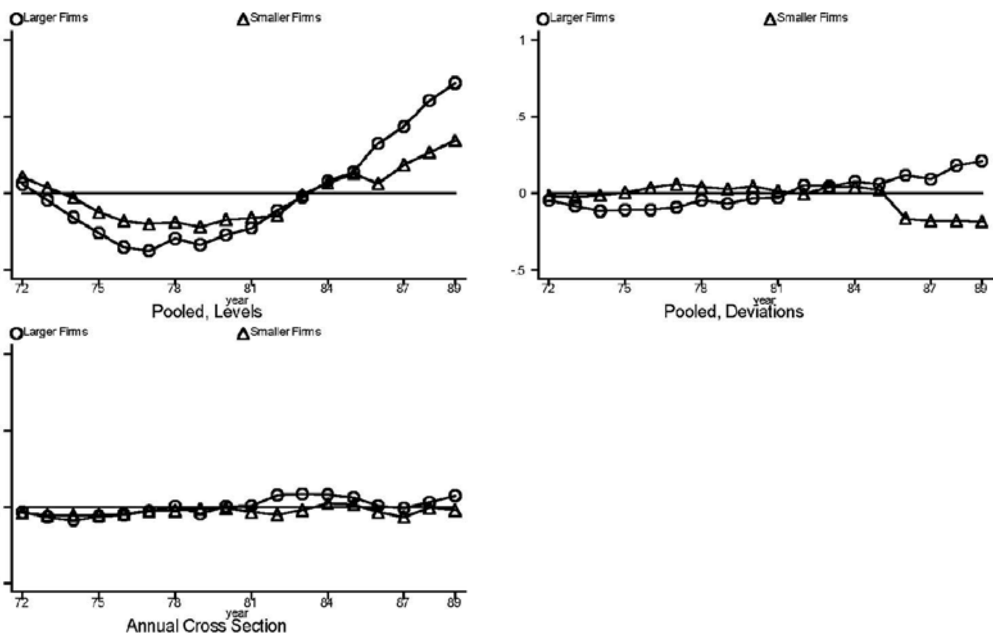


Figure 2. Mean residuals, 1st and 4th quartiles.



Appendix 1. Firms in sample

600 GROUP PLC (THE)
AARONSON BROS PLC
ALLIED LYONS PLC
ASSOCIATED PAPER INDUSTRIES PLC
B S G INTERNATIONAL PLC
BARRATT DEVELOPMENTS PLC
BASS PLC
BERISFORD INTERNATIONAL PLC
BICC PLC
BLUE CIRCLE INDUSTRIES PLC
BOC GROUP (THE)
BODDINGTON GROUP PLC
BOOSEY & HAWKES PLC
BOOTS COMPANY PLC (THE)
BOWATER INDUSTRIES PLC
BOWTHORPE HOLDINGS PLC
BPB INDUSTRIES PLC
BRAMMER PLC
C H BAILEY PLC
CADBURY SCHWEPPES PLC
CAFFYNS PLC
CHLORIDE GROUP
COOKSON GROUP PLC
COURTAULDS PLC
D R G PLC
DAVY CORPORATION PLC
DE LA RUE CO PLC
DELTA PLC
DOWTY GROUP PLC
E R F (HOLDINGS) PLC
FISONS PLC
FITCH LOVELL PLC
FOSECO PLC
G K N PLC
GENERAL ELECTRIC COMPANY PLC (THE)
GLYNWED INTERNATIONAL GROUP PLC
GRAMPIAN HOLDINGS PLC
GRANADA GROUP PLC
GRAND METROPOLITAN PLC
GREAT UNIVERSAL STORES PLC (THE)
GREENALL WHITLEY PLC
GUINNESS PLC
HARDYS & HANSON PLC
HAWKER SIDDELEY GROUP PLC
HELENE PLC
HICKSON INTERNATIONAL
HOPKINSONS HOLDINGS PLC
IMPERIAL CHEMICAL INDUSTRIES PLC
J A DEVENISH PLC
JOHNSON MATTHEY PLC
LAIRD GROUP
LINREAD PLC
LOW & BONAR PLC
LUCAS INDUSTRIES PLC
MACARTHYS PLC
MANGANESE BRONZE HOLDINGS PLC
MARKS & SPENCER PLC
MARLEY PLC
NORCROS PLC
NORTHERN FOODS PLC
PITTARD GARNAR PLC
POWELL DUFFRYN
R M C GROUP PLC
RACAL ELECTRONICS PLC
REED INTERNATIONAL PLC
RENTOKIL GROUP PLC
ROCKWARE GROUP PLC
RUGBY GROUP PLC
S & u STORES PLC
SCOTFISH & NEWCASTLE BREWERIES PLC
SEARS HOLDINGS PLC
SMITH & NEPHEW PLC
SMITHS INDUSTRIES PLC
STAVELEY INDUSTRIES PLC
T & N PLC
TARMAC PLC
TATE & LYLE PLC
TESCO PLC
THE BURTON GROUP PLC
THE STEETLEY COMPANY LTD
THORN EMI PLC
TI GROUP PLC
TOOTAL GROUP PLC
TOZER KEMSLEY & MILBOURN (HOLDINGS) PLC
TRANSPORT DEVELOPMENT GROUP PLC
TRUST HOUSE FORTE PLC
UNIGATE PLC
UNILEVER PLC
UNITED BISCUITS (HOLDINGS) PLC
VAUX GROUP PLC
VICKERS PLC
WAGON INDUSTRIAL HOLDINGS PLC
WESTLAND GROUP PLC
WHITBREAD & CO PLC
WHITECROFT PLC
WILLIAM BAIRD PLC
WOLVERHAMPTON & DUDLEY BREWERIES PLC
YOUNG & CO'S BREWERY PLC
J BIBBY & SONS PLC