

Tip of the Iceberg? Organisational Foundations of Top Pay in New Zealand Listed Companies, 1995-2014

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Abstract

A unique database on numbers and pay of all employees earning more than \$150,000/year in all New Zealand listed companies between 1995 and 2014 reveals substantial increases in the pay of the CEO and in the size of the hierarchy of managers reporting to the CEO. None of the growth in Top Pay can be accounted for by growth in the size of these companies. Factors that do explain cross sectional variation in CEO pay are identified.

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1. Introduction

The lives of the men and women who run our largest organisations, the Chief Executive Officers, or CEOs, are both public and mysterious. We know who they are, even though few observers could name their immediate subordinates, the chief financial officer (CFO) or chief operating officer (COO), etc. In the case of publicly listed and state owned companies, we also know how much CEOs are paid, and are periodically reminded how large is their remuneration, and how much it has gone up, as it always seems to do, compared with ordinary wage and salary earners.¹

What is still mysterious, however, is *why* CEOs are paid what they are; why pay differs so much across firms and countries, and why, in particular, top pay across the board has, for example, almost doubled in New Zealand over the past two decades. To put it bluntly: are CEOs worth what they get paid? And, if the answer to that is yes, then were they being exploited when paid so much less twenty years ago? If the answer to that is no, then what dimensions of the difficulty of the job or the value of the output has increased so as to justify the higher pay?

This paper analyses the determinants of CEO pay in the publicly listed company sector of New Zealand. It makes two contributions: (1) expanding the fairly sparse empirical literature modelling cross sectional databases on CEO pay to another country (most studies are of the United States), and (b) making use of unique data on the numbers and remuneration of all employees earning more than \$150,000/year.

The second contribution is made possible by the 1993 revision of the NZ *Companies Act*, which now requires all substantially locally owned firms listed on the NZ stock exchange to include in their Annual Reports information on the numbers of all employees with (total) remuneration packages worth more than \$100,000/year, and these in \$10K bands all the way up to the CEO. These data, which began to appear in Annual Reports from 1995, enable us to infer the size and shape of the managerial hierarchy within each firm, the bureaucratic pyramid on which the CEO sits at the peak. They can be added to more conventionally available information on other dimensions of firms' structure and performance: sales, number of employees, profitability, to give new insights into what CEOs are paid to do, and what might justify, or, at least, explain why their pay has tended to increase over time.

In the NZ listed companies sector, in 2014, the average CEO received total compensation of \$840,000, a figure which has increased since 1995 by 85 per cent, in constant \$NZ2014, even corrected for size of company. Over the same period, real hourly wage and salary earnings in NZ have increased by just 20.4 per cent.² The ratio of CEO pay to that of the average shop-floor worker is now, on average, around 12.³

1 See 'Rich Rewards: Top CEO earnings have risen much faster than workers' wages' by Hamish Fletcher, *The New Zealand Herald*, May 13, 2016.

2 Estimates supplied by Council of Trade Unions economist Bill Rosenberg, using Statistics NZ data

3 This ratio is a lot smaller than the figures often cited for CEO/shop-floor pay ratios in US companies. However, the latter ratios are calculated just for the largest US companies, such as the Fortune 500.

The “explosion” (as some have termed it) in top pay has been documented across the English-speaking corporate world, and indeed the process probably got underway well before 1995. In NZ, for example, the income share of the top one per cent of taxpayers near-doubled in the 1985-95 period (from around five to around nine per cent), but has not increased a lot since that time.⁴

So: how has this happened, and is it a problem, either for the firms themselves (ie a governance or capital market problem) and/or for the economy and nation at large (through effects on the overall income distribution and economic prosperity)?

The pay and performance of CEOs, and sometimes of their most senior executives, has received considerable attention in the economics and finance literatures, from basically two analytical perspectives: changes in what could be termed ‘horizontal’ bargaining power of CEOs (especially English-speaking CEOs) with the onset of globalisation and the advent of the practice of benchmarking, what is also called the “rent extraction model” (Bebchuk and Fried, 2004; Laschever, 2013), and changes in the “upward-vertical” relationship between CEOs and their Board, reflected in the structuring of remuneration packages, in particular with respect to performance incentives and their impact on company profitability in the short- and long-term. A powerful recent synthesising survey of the theoretical literature is Edmans and Gabaix (2016), which focuses on assignment models to explain the link between firm size and CEO pay, and incentive mechanisms to elicit more or more appropriate “effort” from chief executives. Smeets and Warzinski (2000), who were not referenced by Edmans and Gabaix, provide explanations for the bureaucratic hierarchical form typical of large private and public sector, and list some underlying theoretical models: information processing model, supervision model, knowledge-based model, and well as incentive and assignment models.

Empirical studies are relatively sparse, being largely limited to case studies using confidential data for unnamed companies.⁵ Edmans and Gabaix do survey this literature, and conclude that:

[A]ssigning causality is very difficult, as there are very few instruments for CEO incentives. Even the very basic question of whether CEO incentives positively affect firm value has not yet been satisfactorily [empirically] answered.’ (2016, p1273)

Edmans and Gabaix also note that longitudinal studies following individual CEOs from firm to firm find substantial unexplained managerial fixed effects in both pay and incentives, for which multiple possible explanations might be offered: ‘talent, ability to extract rent, preferences, or other characteristics’ (2016, p1275).

The present short paper will not resolve these empirical questions, and in a sense will add to them. With our data on the full tranche of managerial employees, we will be able to explore another possibility: what if CEO pay actually hasn’t risen at all (or not much), in the following sense. If there has been a trend to larger managerial bureaucracies (for a given revenue size of firm), then this could naturally be reflected in increases in the pay of the person at the peak of the pyramid.

4 Max Rashbrooke, “Inequality in New Zealand, Chapter 2 in Rashbrooke (2013), p26.

5 Ortin-Angel (2002). An impressive study which does use a database on 300 large U.S. firms is Rajan and Wulf (2006).

The database used to explore the determinants of CEO pay in NZ is built from information in the earliest (most often 1997) and recent (2014) Annual Reports in which the managerial pay information is provided. Section 2 describes the data and its sources. Section 3 presents descriptive statistics and reports some simple trend regressions of the variables. Section 4 reports our econometric modelling of CEO pay. Section 5 concludes.

2. Data and Sources

Most data were sourced from listed company Annual Report Financial Statements, downloaded from the New Zealand stock exchange (NZX) database (companyresearch.nzx.com) available from the University of Auckland Library database website. For each company, the most recent (usually FY 2014) year's data were gathered, along with corresponding data from the earliest year in which the company was (a) listed, and (b) reported top pay salaries, the earliest of these being 1995, and the most common, as noted above, 1997.

The NZX is a long established institution, dating from the gold rush of the 1870s, but it has always struggled to achieve scale. Whereas the Australian stock exchange (ASX) has around 2,400 listings, the companies on the NZX can always be comfortably listed on one tabloid-sized newspaper page. Although our database is complete; including all companies listed over the 1995-2014 period, excepting only shell companies and "penny stocks", plus the big Australian banks and other foreign-owned corporates which are not required to report the salary data we need, it has only 262 rows of data, of which 228 are pairs of earliest/latest observations on 114 companies, when these observations were at least three years apart. The other 34 rows are for listed companies appearing only once, because the company either delisted soon after 1995 (eg Feltex), or listed for the first time very recently (Airworks), such that no more than three consecutive years of Reports are available (of which we usually choose the latest).

Data on total revenue ('turnover' or 'receipts from customers') and for total variable costs ('payments to suppliers and employees') are generally easy to locate, although, to a naïve economist there seems to be a surprising variety of accounting/auditing conventions, and there are often decisions to be made about what is or should be included.⁶

In nearly all instances, the most recent Annual Report broke down variable costs into wages & salaries, and materials and service supplies, though not usually in the early year. Employee numbers are almost never reported in the Financial Statements, but in just under 118 instances were gleaned from the texts of the Report (or, occasionally, from company websites or news stories). For two thirds of the companies employment data was available for at least one year, including all but six of the 114 companies for which we measure financial and other data over two end years. Gaps in wage & salary and employment numbers data were filled in assuming constancy over time of the share of wages in total costs, and/or constancy across firms in the same industry.

⁶ For example, for companies not in the business of lending money (ie not in the Finance sector), I excluded from total revenue any small incoming interest payments as being likely incidental to the company's main market activity.

Profitability, measured in principle by ‘EBIT’ (earnings before interest and tax), is of course available from Financial Statements, but not always reliably so, in the sense of following a standard definition. Figures on book value of assets often appear (to an economist) implausible. As a result rate of return calculated as the ratio of EBIT to Assets does not seem reliable enough to be used as a continuous variable, and will be expressed as a series of dummy variables (i.e., RORHIGH, RORMED, RORLOW and RORNEGATIVE, which are equal to one if the EBIT/Assets ratio is greater than 15 per cent; between 15 per cent and 8 per cent; greater than zero but less than 8 per cent, and less than zero, respectively). We also will include another dummy variable, FIRE, set equal to one if the firm’s main line of business is in the Finance, Insurance or Property (real estate) sector.⁷

Information in the texts of Annual Reports, along with, in some cases, data on the names and remuneration of the company’s board members (who are not included in this study unless they are executive directors) is adequate to reassure us that, in almost every case, the person receiving the salary listed as the highest salary in the Table included in the Annual Report under the Companies Act (1993). Occasionally, it is clear that the highest pay was received by a departing CEO, including a severance package, such have generally been included in the database, which will be a source of “noise” in the econometric analysis.

Note that these data are required by law to include: salary, bonuses, company pension and health insurance contributions, and any fringe benefits, such as a company car. They do not include stock or option awards, which Boyle and Roberts (2013) report are infrequent and minor in New Zealand. Because the database is essentially cross sectional rather than year-on-year, we have no use for data on changes in share prices or other stock market information, as used in the difference-of-differences analysis of Boyle and Roberts⁸.

All those earning more than the equivalent of \$150,000 in 2014 dollars are here designated to be “managers”, even though there will inevitably be some non-managerial professionals amongst them.⁹ ¹⁰ We can’t do anything about this, except in the undoubted extreme case of Air New Zealand and its highly paid pilots. I have used website information on the numbers of pilots employed by Air New Zealand to estimate top pay numbers excluding aircrew.

7 Mean values for the four EBIT dummies are 0.25, 0.31, 0.25, 0.19, respectively. The FIRE dummy has a mean value of 0.054, meaning that just over five per cent of companies in the database are in this sector.

8 These authors use the NZ pay data over the 1997-2005 period to investigate, in particular, whether the presence or not of the CEO on the company’s Board compensation committee is linked to changes in CEO compensation, and find, interestingly, a significant *negative* correlation.

9 An income of \$150K in 2014 would put the recipient at about the 98th percentile of the overall income distribution, in New Zealand. Although many self-employed professionals, and those in partnerships, earn well over \$150K, it is probably reasonable to assume that such people in large private sector bureaucracies will generally be required to take on substantive management duties.

10 Why cut off at \$150K when the data go down to \$100K? This is because \$100K in 1996 is worth \$150K in 2014, the CPI increased by 50 per cent over that period.

3. What the data look like

Table 1 gives us an overview of the NZ listed company sector, with summary statistics for the 262 observations of data from all the observed years; all monetary values being converted into \$NZ2014. The highest paid CEO (at Spark, part of the former Telecom) received a remuneration package in 2014 worth \$3.8 million. The lowest paid, at the start-up Windflow Technology in 2005, was actually below our \$150,000 cut-off, at just \$110,000. The average, for all the years, was just over \$670,000.

Table 1 - Variable Definitions & Descriptive Statistics: full sample (262 observations)

		<i>Maximum</i>	<i>Average</i>	<i>Minimum</i>
Size	Larger of firm's total revenue or total costs, in \$NZ2014, \$millions	8426	520	1.7
Ceopay	Remuneration, in \$NZ2014, of the highest paid person, \$000s	3815	673	110
Toppay	Total remuneration of all employees earning more than \$150,000 (in \$2014), \$millions, excluding CEO	257	10	0
Managers	Number of employees earning more than \$150,000 (in \$2014), excluding CEO	1078	43	0
Empx	Total number of employees, excluding the CEO and Managers	17671	1226	3

Any idea that there is a rigid relation between company size and CEO pay is at least qualified by the fact that the total revenues of Spark in 2014, at just under \$3.7 billion, were less than half that of the largest listed company by revenues, Fletcher Building (\$8.4 billion)¹¹, even though, at \$1.9 million, Fletcher's CEO was paid only one half of the Spark boss. Fletcher also had the most staff over the \$150K threshold, and the largest salary bill for those staff, 1078 people pulling in \$257 million in total.

The average NZ listed company had a non-managerial workforce (EMPX) of 1226, with Fletcher Building (in 2014) and Augusta Capital Ltd (also in 2014) at the extremes of 17,671 and 3 employees. The average wage paid to these employees (EMPXWAGE) was \$64,000, with the highest-paying firm, at \$136,000 being Zintel (a quite small IT company), and the lowest, at a meagre \$15,000/year, SKYCITY Entertainment Group, a casino operator. Perhaps the latter employees relied largely on tips.

Table 2 reports time trends, using the sample of 228 observations on 114 firms with two years of data. The log of a variable of interest is simply regressed on the year, so that the coefficient on year is the annual rate of growth of the variable. Given the large cross sectional variation in size of firm and related variables, we would not of course

¹¹ Fletcher Building is however itself just about half the size of New Zealand's largest (non-listed) company, the dairy cooperative Fonterra, of which the CEO was the highest paid person in New Zealand (as far as we know), at \$4.18 million in 2014.

expect the points to lie close to a trend line, but this exercise can at least reveal whether or not there is a noticeable tendency for all or most firms to change in the same direction over time. All monetary variables are deflated by the Consumer Price Index.

Table 2 - Annual trend rates of growth, constant \$NZ2014: sample of 228 observations on 114 companies with two years of data

	<i>Size,</i> <i>\$Millions</i>	<i>Ceopay,</i> <i>\$000S</i>	<i>Toppay,</i> <i>\$Millions</i>	<i>Managers,</i> <i>Number</i>	<i>Empx,</i> <i>Number</i>	<i>Empx</i> <i>Wage, \$</i>
Coefficient on YEAR	0.008	0.033	0.046	0.046	-0.007	0.006
t-statistic of coefficient	0.5	5.2	3.2	3.4	-0.5	1.4

Size itself turns out to have no noticeable trend. CEO pay tends to grow at 3.3per cent, and quite statistically significantly so, implying a doubling in twenty one years. The total pay bill for employees earning more than \$150,000/year, TOPPAY, grows even faster, but its trend coefficient is exactly matched by the trend in the number of employees in this pay group (MANAGERS), implying, interestingly, no increase in the real salary of a typical manager, on average.

In contrast to the quite brisk growth in management ranks, there is no discernible trend in the size of the remaining workforce (EMPX), though there is a faint indication that their average pay has slightly increased. Thus, we do find evidence of expansion in the ranks of the highest paid employees (though not in their average pay), relative to firm size and to numbers of lower-paid workers.

4. Modelling Top Pay

Can the expansion in managerial numbers account for some of the increase in CEO pay? We turn to econometric modelling of the determinants of CEOPAY in NZ listed companies. We will make use of what could be called the usual variables, firm size¹², employee numbers, profitability, and bring in the new factor enabled by our unique data on numbers and remuneration of ‘managers’, employees earning more than \$NZ150,000/year, with which we will be able to test whether the number of direct or indirect ‘reports’ to the CEO are a factor in the determination of his or her remuneration package. We use the Eviews 8 statistical package.

The first OLS regression model shown on Table 3, with regressors in log or linear form and the log of CEO pay the dependent variable, reveals estimates of a firm size effect on CEO pay, with a moderately significant elasticity of 0.155. The number of managers is more significant and has a larger elasticity. There is evidence of a time trend. However, there are obvious multicollinearity issues with this model: in a cross section setting we would surely expect the number of managers to itself be at least in part determined by firm size (which we are here assuming to be an exogenous variable,

¹² Our firm size variable performs better than two other possible size measures: value added and value of assets.

noting in particular from Table 2 the absence of a significant time trend), and we have already seen on Table 2 evidence of a time trend in manager numbers, suggesting that there have been systematic changes in organisational technology.

So, in the third column we show a simple regression of managers on firm size and the year, and do the same, for good measure, with the number of non-managerial employees, as shown in the fourth column. These regressions reveal unsurprisingly large and highly significant effects of firm size on manager and other-employee numbers, and also trend effects: positive for managers; negative for other employees. The annual trend growth in manager numbers comes out exactly the same as in the univariate trend model of Table 2, but the t-statistic is nearly doubled, because controlling for firm size allows the OLS regression package to express much more confidence in the precision of the trend coefficient estimate. The trend coefficient of 0.046 implies that, overall, and controlling for firm size, the managerial cohort grew by 140 per cent ($\exp [19 \times 0.046] = 2.40$) from 1995 to 2014.

Table 3 - OLS Regression models, 262 observations

<i>Dependent variable</i>	<i>Log(Ceopay)</i>		<i>Log(Managers)</i>		<i>Log(Empx)</i>			
	<i>coeff.</i>	<i>t-stat.</i>	<i>coeff.</i>	<i>t-stat.</i>	<i>coeff.</i>	<i>t-stat.</i>		
<i>Constant</i>	-34.81	-5.1	-60.51	-9.6	-97.35	-6.9	38.91	2.4
<i>Log(Size)</i>	0.155	4.8	0.304	23.3	0.714	26.6	0.875	28.4
<i>Log(Managers)</i>	0.251	9.2						
<i>Log(Managers/ Managersf)</i>			0.251	9.2				
<i>Log(Empx)</i>	-0.034	-1.3						
<i>Log(Empx/Empxf)</i>			-0.034	-1.3				
<i>Year</i>	0.019	5.7	0.031	10.0	0.046	6.5	-0.022	-2.7
<i>Fire</i>	0.206	2.5	0.206	2.5				
<i>Rorhigh</i>	0.144	2.2	0.144	2.2				
<i>Rorred</i>	0.063	1.1	0.063	1.1				
<i>Rornegative</i>	0.052	0.8	0.052	0.8				
<i>R-Squared</i>	0.771		0.771		0.741		0.760	
<i>Adjusted R-Squared</i>	0.764		0.764		0.739		0.758	

Note that the elasticities with respect to firm size do imply that larger firms benefit from economies of scale: a firm twice as large as another firm will not need to employ twice as many managers or non-managerial workers.

We next use these two models to compute the predicted or “forecast” (as EViews terms it) values of both MANAGERS and EMPX, divide these into their actual values and use these, the multiplicative residuals of the two models, as regressors for CEOPAY, knowing that, by construction, neither will be correlated with SIZE or YEAR, and so will not interfere with getting good estimates of the full effects of these variables.¹³

¹³ I am grateful to the Editor for suggesting this procedure. Note that the time trend estimate shown on Table 2 suggests that there is not a collinearity problem between SIZE and YEAR.

The results of applying this procedure to the CEOPAY model are quite striking, as shown on the second column of Table 3. The coefficient on log (SIZE) is now an estimate of all the effects of firm size on CEO pay, direct and indirect, and this net effect has an elasticity of 0.3, in line with the stylised fact emerging from investigations in other countries. The full time trend effect is revealed to be just over 3 per cent per year: that is, the whole relationship between CEO pay and firm size and the other variables is seen to secularly shift up by 3% each year

The procedure does not change the coefficients and significance of the two employee numbers variables. Our new data tell us that, for example, a firm with a managerial cadre twice the size of another firm's would, other things equal, pay its CEO 25 per cent more. But a firm with more sub-managerial employees than another would not thereby feel the need to better compensate its CEO, if anything, the effect goes slightly the other way. This seems likely to mean that the supervision and direction of "shop floor" workers is fully delegated to lower-tier managers, and is not considered a direct responsibility of the CEO.

So, the econometric results imply (a) that none of the increase in CEO pay in NZ listed companies is due to an increase in the overall size of the companies, because there is no trend in size; and (b) at least some of the increase can be attributed to the strong positive trend in manager numbers, given that manager numbers do have a stable relationship with CEO pay. How much? Our observation period spans nineteen years, from 1995 to 2014. The trend growth in CEO pay over nineteen years is 80 per cent ($\exp[19 \times 0.031] = 1.80$). The growth accounted for by increases in number of managers is 25 per cent ($\exp[19 \times 0.046]^{0.251} = 1.25$). Thus, we could say that about 31 per cent ($25/80 = 0.31$) of the increase in average CEO pay in the NZ listed company sector can be accounted for by the swelling of the ranks of high-paid staff.

Looking now at the dummy variables in the model: we ask if the "FIRE" (Finance, Insurance, Real Estate) sector plays by different rules, as numerous overseas studies have found or suggested. The FIRE dummy comes in with a moderately significant coefficient of 0.206, which implies that, *ceteris paribus*, CEOs in this sector can expect to be about 20 per cent better rewarded than their peers in the 'real' economy, perhaps a premium less than is found in the more adventurous Finance sectors of the US and Europe.

Finally, we note the coefficients of the dummies for the rate of return on assets earned by the company. Their coefficients are quite large, but not precisely determined statistically. For what they are worth it seems that, relative to the omitted dummy category of low-but-positive rates of return, CEOs in both highly profitable and highly unprofitable (loss-making) firms do the best, in compensation terms.

5. Conclusion

In the New Zealand publicly listed company sector over the 1995-2014 period, remuneration of chief executive officers shows a strong upward trend: about an 80 per cent increase in total over the nineteen years. CEO pay is closely related to firm size (measured by turnover or sales), with an elasticity of 0.3, which is in line with findings from other countries. However, growth in firm size cannot account for any of the trend, because there was no systematic firm size growth over this period.

What we can do is examine how much of the overall trend in CEO pay can be accounted for statistically by growth in the numbers of high-paid employees who might be expected to report to the CEO, on which we use data on all such employees earning \$150,000/year or more, whom I assume can plausibly be called “managers”. The elasticity of CEO pay with respect to numbers of employees earning over \$150K is 0.251 and the trend growth in the numbers of these employees from 1995 to 2015 is 140 per cent; these numbers together accounting for a 25 per cent elevation in average CEO pay, which is just under one third of the total trend in this number.

We cannot know from these data what accounts for the other two thirds of CEO pay growth. And we do not know how to explain what appears on the surface to be a striking decline in the productivity of management, that is, the more than doubling over just nineteen years in the numbers of managers needed to run a company of a given size. Could part of it be due to some CEOs using their discretion to inflate the managerial bureaucracy, knowing that such will eventually justify higher pay for them? Such questions could fruitfully be the subject of further research, as could be the rather interesting empirical finding that, although managerial numbers have greatly increased, their average pay has not.

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