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THE STAIRWAY TO THE TOP: THE REMUNERATION OF ACADEMIC EXECUTIVES*

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Abstract

Australian universities have in recent times been undergoing a substantial transformation in the way in which they are managed. They have moved away from the (British-based) traditional collegiate model to one in which professional managers play a centre-stage role. This paper investigates an important element of the managerialism at Australian universities, the market for what we call "academic executives" (AEs). We analyse the remuneration of the top AEs at Australian universities over the past six years and show that institutional size is a dominant driving factor of remuneration, as has been found with compensation of CEOs in the private sector. We also find the pay-size elasticity to be about 0.25 and is the same for both the university and private sectors; and remarkably, this value has also been found in previous studies on executive remuneration for the US and the UK. The remuneration schedule for the university sector is about half as steep as that for the private sector, suggesting that it is a much harder climb to the top of the corporate ladder. We analyse the structure of remuneration among AEs and the Group of Eight universities are found to have a pay parity structure that is closest to that for the private sector.

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1. Introduction

The role of academic executives at Australian universities has recently become more prominent for several reasons. First, the complexity of the university sector has grown substantially, leading to increasing demands for administrative talent. Related to this are the growing external pressures from government and the general community for universities to be accountable and transparent in all their activities. Finally, the pressures for universities to raise funds from outside sources have come with its own administrative requirements. These factors have led to the establishment of more elaborate administrative structures at most universities, a substantial increase in the demand for senior academics possessing administrative skills, and a noticeable growth in salaries paid to academic executives (AEs). In a recent article published in the Higher Education Supplement of The Australian, Illing (2006) summarises these developments thus:

> A reshuffle at the top of the University of Sydney confirms a shift to US-style business managerialism at Australian universities in which a new layer of management, deputy vice-chancellors, wield unprecedented executive power…. Once simply the vice-chancellor's assistant, deputy vice-chancellors over the past 15 years have assumed formidable authority, often overseeing billion dollar budgets. About 150 positions in Australian universities are designated deputy and pro-vice-chancellors or their equivalents, up from 99 in 1996…

Whether or not the rise of the AE is a desirable development and if their remuneration is "appropriate" are vexed questions involving much controversy. The issues raised are more or less the same as those relating to executive compensation in the private sector: How does an institution measure and reward superior executive performance? Do executives get paid what they are really worth to the company, or is the market rigged in their favour at the expense of shareholders and other stakeholders? Do Australian companies have to compete in a global market for executive talent, and thereby have no choice but to pay what might seem to be huge amounts? Does the system promote the efficient allocation of resources, so that remuneration arrangements facilitate the best people getting to the top, at least on average?

In this paper, we analyse the remuneration of academic executives at Australian universities in order to shed some light on these issues. In particular, we analyse the remuneration structure for the top five AE levels and the parity between levels to answer the question of whether the gradient is sufficiently steep to attract academics of the required calibre to pursue administrative careers in universities. We also

analyse whether AE remuneration is determined in more or less the same manner as that for executives in the private sector. A key finding in the existing literature is that company size tends to be the dominant factor driving the remuneration of executives in the private sector. Does a similar finding hold for academic administrators? If so, this would then constitute some *prima facie* evidence that fundamental common factors are at work in both sectors, so that universities would not have to be considered a "special case" requiring a unique analytical framework to understand their workings. Our findings suggest that this is indeed the case, and interestingly, the size elasticity of pay is about the same in both sectors. The marked difference between the private and university sectors is in the gradient of the remuneration structure: the gradient is much steeper in the private sector, suggesting that it is a more difficult climb to the top. We find that the remuneration structure of the Group of Eight universities, as reflected by the gradient, is closest to that for the private sector.

We also provide evidence on how fast AE remuneration has grown in recent years, and how that compares with movements in salaries of academics who teach and conduct research and with the overall rate of inflation. Data over the last five years suggest that AE remuneration has increased at a rate almost twice that for teaching and research staff. In addition, we identify which universities consistently "pay more" and which "pay less", after controlling for size. Queensland and Monash appear to be consistently above average payers of their AEs.

The only prior work on this topic relates to the remuneration of university Vice-Chancellors/Presidents.[1] But we believe that this work can be usefully broadened to consider the role, workings and remuneration of the academic executive team as a whole. Analysing the remuneration of only one member of an academic executive team in isolation neglects the possibility of important complementarities or "synergies" among members of the team, whereby, for example, it may be possible to compensate for a poor Vice-Chancellor with a strong Deputy and vice versa.

There are three reasons for studying academic executives. Firstly, universities are now substantial businesses, with significant annual budgets, and yet there has been very little study about how their CEOs and other executives are remunerated. This is in part due to the lack of remuneration data until recently. Secondly, for various reasons, including simple gossip, there is a great deal of interest in how much VCs get paid. For example, the headline in a recent Australian Financial Review article

[1] See Soh (2004, 2007) for Australian evidence, and the references therein to studies for other countries.

screams "Top academic scores a million" (Lebihan, 2007). Thirdly, universities have moved away from having a flat structure to one that is more hierarchical with the emergence of resourcing Deans, Pro- and Deputy Vice-Chancellors, making it interesting to study the pay disparities among their top executives and the incentives they provide for academics to move into administration.

2. The Nature of Academic Executives and their Remuneration

At a typical Australian university, there would be something like six academic executives, including the Vice-Chancellor, the Deputy Vice-Chancellor and several Pro Vice-Chancellors. At a broad level, these individuals have responsibility for the overall management of the university, including functions such as leadership, representation, teaching and learning, research, staffing, legislative and compliance. In this section we discuss aspects of the nature of these positions.

As mentioned above, in recent years the number of AEs at most universities has risen substantially. Aitken (2005), former Vice-Chancellor of the University of Canberra, describes the situation rather cheekily in the following way:

> A common complaint around the campus over the past 20 years or so has been the growth of "managers" or "management". A specific version is the displacement of "real academics" (usually the speaker and friends) by "wasteful", "useless", Pro Vice-Chancellors and the like. A favourite jibe has been "plastic men", from PVC, no doubt.

Aitken then goes on to attribute the growth in AE numbers to the increased scale of operation of the typical university and the more onerous compliance requirements to which universities are subject. Expanding on Aitken's thesis, there are several other reasons for the growth in the number of AEs, including the increased regulation from Commonwealth and State governments, and associated reporting requirements; the rise of multi-campus universities (especially following mergers); the greater emphasis on foreign students and in many cases, offshore teaching programs; more fee-paying students; and the pressures to diversify sources of funding away from government. In short, the greater size and complexity of universities have increased their management requirements and consequently more AEs.

A popular explanation of executive remuneration in the private sector is "tournament theory", according to which the structure of pay within a company can be understood by analogy with a professional sports competition, such as a tennis tournament (Lazear and Rosen, 1981). Assume for simplicity that there is only one

prize, so the tournament is of "the winner-take-all" variety. All players have the common objective of winning the tournament and collecting the substantial prize money. Although only one player ends up collecting the prize, it is the possibility of winning the prize that motivates all competitors to play hard. The workings of the tournament mean that the absolute ability of players is immaterial, as in each game one player's abilities are compared to another's, with the winner being relatively better than the other. Luck and talent combine to determine the winner of the tournament. The expected value of the size of the prize provides the incentive for players to compete hard and thereby produce "exciting tennis". Accordingly, if the probability of winning falls, as would happen if additional players were permitted to enter the tournament, then in order to offset the deleterious effect on incentives and maintain the same level of tennis, organisers would have to offer a larger prize.

In a corporate setting, it is not a winner-take-all environment with executive remuneration, but one in which the spread between remuneration at various levels provides the motivation for employees to work hard and compete for a promotion. Lazear (1995, p. 4) emphasises the importance of not considering the remuneration of one executive of a company by itself, but rather comparing it with remuneration at lower levels:

> ...Compensation must be treated as an entire structure, not as a collection of separately determined components. The wage of a vice-president cannot be set independent of an assistant vice-president because the vice-president's wage affects the desire of all those below him to obtain the job.

Where luck plays an important role in determining executive success, on the basis of tournament theory we would expect to see a larger spread in remuneration in order to provide the appropriate incentive for employees. For example, in the extreme case in which promotion is determined on the basis of the toss of a coin, luck plays the only role, personal effort is irrelevant and employees have no incentive to work hard. As in many instances it is difficult, if not impossible, to get an accurate measure of the absolute worth of an employee to a company, an appealing feature of tournament theory is that it requires only relative worth -- one employee as compared to another -- something that is easier to measure.

As mentioned above, tournament theory has implications about the structure of compensation in the hierarchy to generate incentives for individuals to win the tournament prize. Tests of the theory have been conducted for sporting tournaments (Ehgenberg and Bognanno, 1990a, 1990b, and Becker and Huselid, 1992) and for

executives (Eriksson, 1999, Conyon et al., 2001, Rajgopal and Srinivasan, 2006 and Lee et al., 2005). Eriksson (1999) used data in 210 Danish firms over the period 1992 to 1995 to test various implications of tournament theory. One finding which has direct relevance to our paper is that consistent with tournament theory, the pay differential increases as one moves up the corporate hierarchy. He also finds that such disparities increase in noisier business environments.

In two recent papers, Lee et al. (2005) and Rajgopal and Srinivasan (2006) test the implications of tournament theory using recent US data on executive remuneration. Lee et al. (2005) use a sample of 1855 companies over the period 1992 to 2003 and find that firms with large dispersion in compensation among the top five executives have higher performance than comparable firms with lower dispersion. The relationship is stronger in firms with high agency costs and those with more effective governance structures. Rajgopal and Srinivasan (2006) also examine the pay disparity among the top five executives, but use even more recent data covering the period 1996 to 2004, during which there has been significant growth in executive pay. They find that on average, the maximum pay is about 4.7 times that of the minimum pay for the top five executives, suggesting relatively large pay disparities at the top. Their findings support implications of tournament theory – companies in riskier industries have greater pay dispersion than those in more stable industries. Pay disparities are also larger for larger and younger firms, and those with greater investment opportunities, higher turnover and "star executives".

A similar study conducted using UK data covering the 1990s by Conyon et al (2001) also supports the idea that the pay disparity increases as one moves higher up the corporate ladder. They find that the ratio of the level one pay to level two pay is greater than the ratio of level two to level three. The premium from moving to level one from level two is between 41 to 70 percent, and that to level two from level three is lower at between 17 to 35 percent. They also find that the prize for becoming CEO is larger when there are more "competitors" in the field, as proxied by the number of executives. Coupé et al. (2003) was one of the first to test the applicability of tournament theory to the academic market – departments of economics in 107 universities. They find that the salary gaps increases with rank, with compensation linked to performance at higher ranks.

No one could convincingly argue that the remuneration of academic executives is similar to that of corporate executives in all respects. For one thing, AEs are paid much less than their private sector counterparts: Soh (2007) finds that

after adjusting for size differences, Australian Vice-Chancellors are paid about 60 percent less than Chief Executive Officers in the private sector, which perhaps reflects the psychic income derived from being a VC. It would thus seem reasonable to think of the remuneration of AEs as being determined by an amalgam of factors, only some of which reflect the objectives of stakeholders and performance of the individuals. This mixture of determinants would seem to be consistent with the nuanced attitude towards remuneration expressed by former VC Don Aitken (2006):

> …I chose to align the VC's pay to that of my staff, feeling that the VC needed to be seen as part of the university community, not somehow apart from it. I thought I was worth twice a professorial salary and I made it clear to the union, which thought about it, and nodded. It was accepted and there was never any fuss afterwards…Of course, I had other perks, notably a car and a house to live in . On the other hand, for 12 years I seemed to work a 24-hour day and to be permanently on call…
>
> I have always felt that the dictum "if you pay peanuts you get monkeys" was rubbish. The role of the Vice-Chancellor is a difficult one but a wonderful job for the right person -- and for that person the money is incidental.
>
> But with the substantial recent growth in the remuneration of VCs, it could possibly be expected that more emphasis will be placed on their performance.

Finally, what is known about the personal characteristics of the academic executives? Given their importance and their rapid growth, it is surprising that there is little research on the nature of AEs in Australia, and what research there is deals only with Vice-Chancellors. Vice-Chancellors are 55 years old on average when appointed and occupy their positions for an average of 6 years (Soh, 2007). In comparison, Chief Executive Officers of publicly-listed companies in Australia on average are about 10 years younger when appointed, but interestingly they also have an average tenure of 6 years (Soh, 2007, Lieu, 2003). Slattery (2007) in an article which deals with a heated dispute between the current and previous VC of Macquarie University ventures the following taxonomy of the personalities and management styles of the VCs:

> There are the gruff, no nonsense Vice-Chancellors, such as The University of Western Australia's Alan Robson and the Australian National University's Ian Chubb. The University of Queensland's John Hay and Melbourne University Glyn Davis are both politically astute, urbane and frighteningly well-read. The University of NSW's Fred Hilmer is a nerdy management theorist; Sydney University's Gavin Brown is a garrulous Scot.

3. How Much do Australian Universities Pay?

Australian universities are obliged to disclose in notes to their published financial statements information regarding the remuneration of executives. This takes the form of the number of executives falling within each $10,000 band, commencing at $100,000 (Australian Accounting Research Foundation, 1993, Australian Accounting Standards Board, 1997, DEST, 2000). Our starting point is thus the annual report and financial statements that are produced by each university. There are considerable differences in the amount of additional information about the nature of remuneration given in the notes to the accounts[2]. In the vast majority of cases, the reported information is only the remuneration by band. In particular, individuals, or the corresponding positions, are not linked to the remuneration data. By consulting the organizational chart presented in the annual report of each university, we can obtain some insights into who is paid what, by assuming that those in more senior positions are paid more. This is, of course, just a first approximation as there is no iron-clad rule that says remuneration always increases as we ascend the hierarchy.[3]

We collected information on remuneration data for 1999-2004 for over 30 universities. As the data are in the form of the number of people lying in each $10,000 band, we use the mid-point of the bands. To give an example of the data, Table 1 presents remuneration in 2004 for 32 universities. On average VCs received $474,000 in 2004. The dispersion of VC pay, as measured by the standard deviation, is $169,000, or about 31 percent in logarithmic terms. As can be seen from column 2 of the table, VCs at UNSW and Quensland are the highest paid. Column 3 of the table reveals that UNSW and Queensland also pay their "number two person" higher than other universities. Column 3 also shows that on average, occupants of the second highest position receive almost 40 percent less than the VC of their institution, and that the relative dispersion of their pay is about 26 percent, a little less than that of VCs. Other features of Table 1 include (i) members of the Group of Eight (Go8) tend to be better payers of their academic executives on average (column 7); and (ii) across universities, there are considerable differences in the structure of AE pay, as can be

[2] For example, Murdoch University in their 2001 financial statements provided much more than the minimum requirements by giving full details of the remuneration of each individual position. At the other end of the spectrum, a number of universities offer no clarification to the remuneration data, while others provide some modest information. For further information, see Clements and Izan (2007).
[3] Our mapping of remuneration and positions at the various universities in our sample is available on request.

seen from the cross-sectional standard deviations given in columns 8 and 9. The pay structure is very flat at Swinburne and Victoria, while it is much steeper at Charles Sturt University, The University of Newcastle and UNSW.

Insert Table 1

Figure 1 provides a visualisation of the "spread" of remuneration by plotting the highest, mean and lowest for each university, with universities ranked in terms of the mean. To better represent the spread, we use a geometric scale for remuneration for the 21 universities that report data pertaining to both the highest and "average of 5th + highest". This figure shows that in proportionate terms, the spread is approximately constant, except at both ends of the distribution. At the bottom, the spread shrinks, while it grows at the top. On average over all universities, the VC earns about twice that of the fifth highest AE. For further details of the data, see Clements and Izan (2007).

Insert Figure 1

4. The Pay Parity Matrix

A useful way of examining the relativities in remuneration for staff at the various levels, and the progression from lower levels to the top, is through the "pay parity matrix" (Clements and Izan, 2006). The elements of the pay parity matrix enable us to make convenient comparisons of remuneration, its dispersion and the "steepness" of the stairway to the top. In this section, we discuss the nature of this matrix and its application to academic executives.

Consider the comparison of the pay at a given university of the VC with that of an AE at level i (i = 2,…,5), to be denoted by P_1 and P_i, respectively. We use the logarithmic ratio, defined as $\pi_{i1} = \log(P_i/P_1)$, which we shall call the "parity" between the remuneration of level i and the VC. The relationship between the percentage difference p_{i1} and the parity π_{i1} is $p_{i1} = 100 \times (e^{\pi_{i1}} - 1)$. While p_{i1} is approximately $100 \times \pi_{i1}$ if P_i is not too far less than P_1, as discussed in Clements and Izan (2006) the parity π_{ij} has several advantages over the percentage p_{ij} in measuring relative remuneration.[4]

[4] Briefly, there are three advantages: (i) As $\pi_{ij} = \pi_{ik} - \pi_{jk}$, the parity possesses an additivity property, making it independent of irrelevant levels. (ii) The parity is symmetric in the sense that if level i earns $-\pi_{i1} > 0$ less than the VC, then the VC earns $-\pi_{i1}$ more than level i. (iii) The parity has an

Table 2 provides the pay parities for the VC in terms of each of the lower levels, for each university in 2004. These parities are in the form of $\pi_{i1} = \log\ (P_i / P_1) < 0$, i = 2,…,5. Thus, looking at the first row, at Adelaide the AE who is second in the hierarchy earns about 28 percent less than the VC, number 3 earns 80 percent less, while 4 earns 84 percent less[5]. Surprisingly, there do not seem to be any further obvious patterns in the parities either across universities or across levels. Figure 2 gives the same information for selected universities in each year of the period 1999-2004. As the vertical scale of each Panel is the same, the graphs are directly comparable across universities in terms of both the means (the lengths of the columns) and the dispersion over time (the spread of the dots). To illustrate the interpretation of this figure, consider RMIT (Panel 3): Here as the heights of the columns decrease rapidly as we move from lower to higher levels (that is, as we move from left to right), the pay gradient is quite steep. And as within each level the dots are reasonably spread out, there is a moderate degree of dispersion of each parity over time. This is to be contrasted with the "neighbouring" University of SA (Panel 4), where the gradient is much flatter and there is little dispersion with each level. In other words, there is more inequality in the distribution of remuneration over both levels and time at RMIT as compared to SA.

Insert Table 2
Insert Figure 2

One way to visualise the workings of the parities π_{ij} for i, j = 1,…,N is in the form of an $N \times N$ matrix $\mathbf{\Pi}$. This matrix has as $(i,j)^{th}$ element $\pi_{ij} = \log\left(P_i / P_j\right)$, which is remuneration of level i relative to j. The matrix $\mathbf{\Pi}$ is skew-symmetric, that is, the diagonal elements are all zero, while $\pi_{ij} = -\pi_{ji}$. We use the 1999-2004 remuneration data for N = 5 levels to compute the $\mathbf{\Pi}$ matrix for each university and then average over the 33 universities, and Panel A of Table 3 contains the results. Thus going down the sub-diagonal immediately to the right of the main diagonal containing the zeros, and looking at $\pi_{i,i+1}$ for i = 1,…,4, we see that on average VCs earn about 42 percent more than the number 2 academic executive, number 2 about 13

unrestricted domain, so it is less likely to have a skewed distribution. None of these properties is shared by the percentage difference. For details of these and other properties of pay parity matrix, see Clements and Izan (2006).

[5] These percentages are all approximations. Using $100 \times (e^{\pi_{i1}} - 1)$, the exact percentage differences are: Number 2 earns 24 percent less than the VC; number 3, 55 percent less; and number 4, 57 percent less.

percent more than number 3, number 3 about 9 percent more than 4, and 4 earns about 9 percent above number 5. Interestingly, if we strike out the row involving the VC, we see that among the lower ranks, only one parity exceeds 32 percent, viz., π_{25}, indicating a surprising degree of equality of pay among academic administrators other than VCs.

The remaining panels in Table 3 give the equivalent matrix for each group of institutions, namely, the Group of Eight (Go8), the Australian Technology Network (ATN), the Innovative Research Universities (IRU), and the universities which do not belong to any of these groups, designated "other".[6] It is interesting to note that the Go8 universities have by far the largest disparity between the various levels, which suggests that for these universities, the "stairway to the top" is much steeper than for other universities. If we use the notion adopted from tournament theory, that the VC salary represents the "tournament prize", the ultimate prize in the case of Go8 universities is much higher, and possibly, much tougher to win, as the prize serves to attract better talent. The pecking order seems to be as follows: the Go8, followed by the IRU, then the other universities and the ATN. That is, we observe that on average, the VC at a Go8 university receives 86 percent more than the fifth highest individual, while the VC at an ATN university receives only 64 percent more.

Insert Table 3

5. Remuneration across Institutions, Levels and Time

In order to assess the impact of differences in the size of institutions on remuneration, we estimate the following regression by pooling across time, institutions and levels:

$$\log P_{ict} = \alpha + \beta \log S_{ct} + \sum_{s=1}^{5} \delta_s Y_s + \sum_{k=2}^{5} \gamma_k L_k + \varepsilon_{ict}, \quad (1)$$

where for university c and year t, P_{ict} is the remuneration for executive at level i, S_{ct} is the revenue, L_2 to L_5 are dummy variables for the four levels below the Vice-Chancellor and Y_s are the year dummies. The coefficient β is the elasticity of remuneration with respect to size (the "size elasticity" for short). The coefficients γ_2

[6] For details of the membership of each group, see http://www.australian-universities.com/groupings-of-australian-universities.php

to γ_5 measure the parity between the VC's remuneration and those of lower-level executives.

The estimates of equation (1), using pooled OLS, are presented in Table 4. In Panel B of the table, we also include a dummy for Go8 universities, and Panel C provides the results when we also include dummies for membership of the ATN and the IRU. Estimates of the year dummies indicate that on average, and after controlling for size and membership of particular groups of universities, academic executive remuneration in 2004 is approximately 29 percent higher than that in 1999. This compares with an increase of about 17 percent in the average salaries of academics at UWA over the same time period, which we take to be about the same nationwide.[7] The approximate 29 percent increase in AE earnings can also be compared with the 18 percent increase ithe Consumer Price Index over the same period.[8] Clearly, the earnings of AEs have grown almost twice as fast as those of T&L academics and the cost of living.

Insert Table 4

Panel B of Table 4 also shows that Go8 universities, on average, pay their executives about 14 percent more than other universities, after controlling for size. When the Go8 dummy is included in the regression, the sensitivity of remuneration to size decreases, suggesting that the Go8 classification may in part measure the size effect. When dummy variables for the ATN and IRU are added (Panel C), we see that on average, these universities pay lower than the Go8 universities, and about the same as other universities that are not members of any of these groups. The results for the Go8 are different to those reported by Soh (2007) for Vice-Chancellors, possibly because our data are more recent than hers (which refer to 1995 to 2002).

In Table 5, we drill down further by introducing individual institution dummies to assess who pays significantly more or less than that expected on the basis of size and time effects. Panel A refers to all levels, and the coefficients for institutions are ranked in ascending order. The dominance of the Go8 as the top-paying universities in the country is clearly evident here, with Monash, Queensland, NSW and Melbourne the leaders. For example, after allowing for size and year

[7] This is based on professors' salaries at UWA which increased from $94,788 in September 1999 to $110,748 in September 2004, and from $59,243 to $69,217 for Level B (step 6) academics.
[8] The CPI increase is from the Reserve Bank of Australia's inflation calculator, available at http://www.rba.gov.au/calculator/calc.go.

effects, AEs at Monash on average receive about 95 percent more than those at James Cook, while at Queensland they receive 7 percent less than Monash (0.88 – 0.95 = -0.07).[9] ANU pays its executives, on average, the lowest amongst the Go8 universities. Deakin is among the high payers and seems to be the outlier here, for reasons which we cannot fully explain.

Insert Table 5

The ranking of universities based on VC salaries (Panel B of Table 5) does not vary a great deal from the ranking based on all academic executives, with the correlation between the ranks estimated at 0.96. On the basis of Table 5, UQ has the highest paid VC in the country, followed by Monash, NSW and Sydney, all very large universities. The correlation between the ranking on the basis of AE remuneration and a ranking on the basis of size, proxied by revenue, is about 0.83. The correlation between the ranking of universities on the basis of AE remuneration and that based on the Melbourne Institute Index of the International Standing of Australian Universities[10] is 0.73. The estimated coefficients for the year dummies in Table 5 provide another "constant quality" index of AE remuneration over time. Controlling for size, levels and institutions, the remuneration of all AEs has increased by about 38 percent (Panel A), while that of VCs has risen by almost 50 percent (Panel B), which is again far greater than the rate of inflation and the increase in T&L academic salaries over the same time period.

6. Comparison with the Private Sector

In this section, we compare the structure of remuneration of academic executives with that of their private sector counterparts, using data on executive remuneration in the 300 public companies included in the S&P/ASX 300 index for 2004 and 2005.[11]

We pool the 2004[12] data for both the private and university sectors, and estimate the remuneration-revenue relationship for each of the executive levels, and include a "private sector" dummy. The results from this regression are presented in Table 6. Some interesting conclusions emerge from this analysis: firstly, the size

[9] Again, thse percentages are approximations. Using $100 \times (e^{\lambda} - 1)$ where λ is the estimated coefficient for the relevant institution, the exact differences are as follows: Monash AEs receive 159 percent more than those at JCU, while at Queensland, they receive 6.8 percent less than Monash.

[10] Available at http://melbourneinstitute.com/publications/reports/MelbIndex.pdf

[11] The source for these data is the Australian Financial Review Executive Salary Survey, February 2006.

[12] 2004 is the only common year for which data for both the university and private sectors are available.

elasticity for all levels range between 0.25 and 0.28. The finding that the size elasticity is approximately one-quarter is consistent with prior research as summarized by Murphy (1999, p 2493):

> It is not surprising that compensation increases with company size; larger firms, for example, may employ better-qualified and better-paid managers (Rosen, 1982; Kostiuk, 1990). More surprising, at least historically, has been the consistency of the relation across firms and industries. Baker et al. (1988) summarize Conference Board data on the relation between CEO cash compensation and firm sales from 1973 to 1983 and document pay-sales elasticities in the 0.25-0.35 range, implying that a firm that is 10 percent larger will pay its CEO about 3 percent more. Rosen (1992) summarizes academic research covering a variety of industries and a variety of time periods in both the US and the UK, concluding 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."

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Insert Table 6

Secondly, for all levels, remuneration is on average higher in the private sector as demonstrated by the positive coefficients the "private sector" dummy variables in all the regressions, a result which is not very surprising. It is interesting, however, to see that the difference is largest for the CEO/VC (level one) with the coefficient for the private sector dummy estimated at 0.90, and decreases as we move down the hierarchy, with the coefficient estimated at 0.46 for level five. The estimate for the "private sector" premium for the CEO is similar to that found in Soh (2004). Based on these estimates, we can calculate the average difference between the remuneration of private sector and university sector executives for each level. For example, at the CEO level, an estimated coefficient of 0.90 indicates that private sector executives receive, on average, a remuneration that is about 2.5 times that of Vice Chancellors[13], and the fifth highest private sector executives receive, on average, a remuneration that is 1.6 times higher than the fifth highest university executives. Note that as these multiples are "size adjusted", they refer to relative remuneration in companies and universities of a comparable size. This evidence that the differential declines for lower level executives also demonstrates that the progression to the top is much harder in the private sector, relative to the university sector.

[13] Note that this implies that VCs receive about $(2.5)^{-1} = 0.4$ times what private sector CEOs earn, or 60 percent less.

The scatter plots corresponding to Table 6 (for Levels 1 and 2 only) are given in Figure 3. The plots give the clear visual impression that (i) the relationship between remuneration and size is approximately log-linear; and (ii) the size elasticity is more or less the same across all levels in the private and university sectors. Also, differences in the levels of remuneration between the two sectors can be clearly seen from these plots. Though not reproduced here, we tested whether the size elasticities differ across the two sectors, and found that they are not.

Figure 3

Table 7 gives the pooled OLS results for the private sector with size, year, level and industry dummies included. As can be seen, the size elasticity remains at around one-quarter when we consider either the top five executives (Panel A, "Whole sample") or just the CEOs (Panel B). The industry dummy variable coefficients show that private executive remuneration, not surprisingly perhaps, is highest in the financial sector and lowest for the "other" sector. Indeed, there is a marked difference between the average CEO remuneration in the financial sector compared with the other eight industrial sectors -- CEOs in finance earn almost 20 percent more than those in the next highest group, health care. The finding with respect to the financial sector is consistent with Murphy (1999). The coefficients of the year 2005 dummy indicate that on average executive remuneration increased by about 11 percent over the 2004-2005 period while CEO remuneration increased by about 7 percent. These increases are both greater than the rate of inflation.

Insert Table 7

We can contrast the pay parity matrix between universities and the private sector. To hold constant size and the other determinants of pay, we construct the generic matrix from the coefficients of the level dummies in equation (1). That is, the first element of the first column is zero, while the i^{th} element ($i \geq 2$) of this column is defined as $\pi_{i1} = \hat{\gamma}_i \ (i = 2,...,5)$, where $\hat{\gamma}_i$ is the estimated coefficient for level i. The remaining elements of the matrix can be derived from this first column. For the university (private sector), we use the estimated coefficients given in Table 4 (Table 7) and Table 8 contains the results. These results reveal that as there is a consistent difference between the parity between similar pairs of executives in the university and private sector, the stairway to the top is much steeper in the private sector. For

example, we see that the parity between the second and third highest executives in the private sector is -25 percent, while it falls by about one half when we move to the university sector, where the same parity is -13 percent. Similarly, the parity between the second and the fourth levels is -42 percent for the private sector and only -21 percent for the university sector. These differences reflect the relatively flat remuneration structure that exists within universities as compared to the private sector. In terms of tournament theory, this suggests that the contest for the top job is likely to be fought much harder in the private sector. This may come as a surprise to experienced observers of the workings of the labour market in academia. A comparison of the pay parities for the various groups of universities (Table 3) and for the private sector (Table 8) suggests that the Go8 AEs have a pay structure that is closest to the private sector.

7. Robustness Tests

In Tables 4 and 5 above, we pooled data across universities and time. As we move through time, the number of universities as well as the number of levels of AE change to give us an unbalanced panel. To check the impact of this, we redo the results with a number of balanced panel samples in which the composition is held constant. We considered all possible balanced panels, with four and five levels of AEs, and with at least three years of data available in order to preserve a reasonable number of observations. The list of possible balanced panels and the detailed results from re-estimating equation (1) using these are available from Clements and Izan (2007). We present here the results from using only one of those panels as an example, and then summarise our findings.

As an illustration, Tables 9 to 11 present the results from one of the balanced panels which exclude level 5 AEs and data from 1999 and 2000. The results are not too different from those presented using our unbalanced panels presented in Tables 3, 4 and 5 respectively.

The results from using all the balanced panels can be summarised as follows:

- When we allow for the differing commencement of dates of the various panels and express the estimated growth of remuneration on an average annual basis, the use of a balanced panel has little impact, while the coefficient of the Go8 dummy tends to rise, and the coefficients of the ATN and IRU remain insignificant.

- The ranking of institutions on the basis of their dummy variable coefficients is not greatly affected by the use of the balanced panel, with the rank correlation estimated to be at least 0.9 in all cases.
- The structure of the pay parity matrix for all universities remains broadly unchanged. The structure can be summarised by the average gradient of the remuneration schedule, which takes the form $(1/4)\pi_{14}$, when N=4 or $(1/5)\pi_{15}$, when N=5. This average gradient is more or less the same with the balanced panels.

Insert Tables 9, 10 and 11

We also reestimated the model using other proxies for size, namely total assets, total student enrolments and total staff, with the results for the first two proxies presented in Table 12[14]. We find that the estimates for the time and level dummies remain relatively unchanged, but that the sensitivity to changes in size falls from its previous estimate of 0.25. What is interesting however, is that the adjusted R^2 is highest when revenue is used as the size proxy, and that the introduction of the Go8 dummy in regressions reported in Table 12 increases the adjusted R^2 markedly. This suggests that the ability to raise revenue through research grants is a factor that appears to influence AE remuneration, especially in the Go8. This could in part explain the enthusiasm with which AEs encourage T&L academics to invest time and resources in attracting outside funding.

8. Conclusions

In recent years, universities have become more complex organisations, with the establishment of more elaborate administrative structures, and the appointment of senior academic executives to manage their affairs. The growth in the number of these positions has attracted some attention, and raises interesting issues about the operation of the academic labour market. The paper focuses on one of theses issues, namely, the nature of the remuneration structure for these executives.

We examine the remuneration provided to academic executives in Australian universities over the five-year period from 1999 to 2004, using information contained in annual reports. We were able to analyse the differences in remuneration across the sector, and identify those universities that have been "over payers" and those that have been "under payers". Our analysis reveals some very interesting results:

[14] The results from all models are available from Clements and Izan (2007).

- As for the private sector, the size of universities, as measured by revenue, is an important determinant of remuneration.
- The sensitivity of remuneration to size is about one-quarter for both the university sector and the private sector.
- On average, after controlling for size, the Group of Eight universities pay their executives more than other universities.
- Two universities -- Queensland and Monash -- appear to pay consistently above the sector average.
- Over the period 1999-2004, the remuneration of academic executives has increased by more than 30 percent, which is about twice the increase in the salaries of teaching and research academics.

The database allows us to examine the relativities in remuneration for staff at the various levels, and how remuneration progresses from one level to the next, through the construction of the "pay parity matrix". The elements of this matrix enable us to analyse the "steepness" of the stairway to the top. According to tournament theory, the steeper the slope, the greater the competition to get to the top and the harder is the progression to higher levels. We find that there are differences in the pay structure across universities, and that Go8 universities have the steepest progression to the top.

Comparisons with the private sector indicate that controlling for size differences, on average, a 'private sector' CEO earns about 2.5 times that of a university VC, and the 'private sector premium' declines to about 1.6 times for the fifth highest executive. The size elasticities for both sectors appear to be about the same and interestingly, the stairway to the top for the university sector is about half as steep as that for the private sector, suggesting that it is a much harder climb to the top of the corporate ladder. The Go8 universities have a pay parity matrix structure that is closest to that for the private sector.

In an interview broadcast on the Radio National[15], journalist Monica Attard in relating Macquarie University's former VC's remuneration of about $600,000 stated:

> [I]t is odd for most people that, essentially, an academic in a public institution can earn a salary that we normally equate with a salary that's earned in private enterprise.

To that, the former VC, Di Yerbury replied:

[15] The interview was broadcast on Sunday 18 February 2007, on the Sunday Profile program. The transcript is available at http://www.abc.net.au/sundayprofile/stories/s1847798.htm?backyard (accessed 20 February 2007).

Nowhere near what I would have earned in private enterprise.

To that we say, "Indeed!"

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TABLE 1

ACADEMIC EXECUTIVE REMUNERATION, 2004

($'000)

University	VC	2nd highest	3rd highest	4th highest	Average of 5th + highest	Mean	Standard deviation	
							Dollars	Logs (×100)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1. Adelaide	565	425	255	245	-	373	153	41
2. ANU	525	275	275	235	-	328	133	36
3. Ballarat	335	215	195	185	185	223	64	25
4. Canberra	405	225	215	215	195	251	87	29
5. CQ	405	235	225	215	-	270	90	30
6. CSU	395	245	215	115	-	243	116	51
7. Curtin	455	225	225	225	215	269	104	32
8. ECU	475	245	245	235	215	283	108	32
9. Deakin	475	355	305	265	255	331	90	25
10. Griffith	465	315	305	285	285	331	76	20
11. JCU	345	225	-	-	-	285	85	30
12. LaTrobe	425	345	335	325	275	341	54	16
13. Macquarie	525	395	245	245	245	331	126	35
14. Melbourne	545	395	355	305	-	400	103	25
15. Monash	625	375	365	355	335	411	121	25
16. Murdoch	425	265	255	225	185	271	92	31
17. Newcastle	625	285	275	-	-	395	199	46
18. NSW	1,095	435	285	255	245	463	361	63
19. Queensland	905	475	345	335	315	475	248	44
20. QUT	NA	NA	NA	NA	NA	NA	NA	NA
21. RMIT	445	415	315	275	255	341	85	25
22. SA	455	265	265	255	235	295	90	26
23. SCU	275	215	205	195	-	223	36	15
24. SQ	305	215	205	-	-	242	55	22
25. Swinburne	255	195	195	185	185	203	29	13
26. Sydney	575	425	315	295	285	379	123	30
27. Tasmania	355	215	215	205	-	248	72	26
28. USC	305	215	-	-	-	260	64	25
29. UTS	475	335	305	255	245	323	93	27
30. UWA	455	325	295	265	255	319	81	23
31. Victoria	315	285	255	245	245	269	30	11
32. Western Sydney	495	275	275	265	205	303	111	32
33. Wollongong	445	295	255	225	215	287	94	29
Mean	474	301	267	248	242	311	105	29
SD- dollars	169	81	49	50	42	68	-	-
SD-logs (× 100)	31	26	18	22	17	21	-	-

Note: The heading of column 6, "average of 5th+ highest", refers to the average of the 5th or lower-level executives if their remuneration is not too dissimilar.

FIGURE 1

ACADEMIC EXECUTIVE REMUNERATION SPREAD, 2004

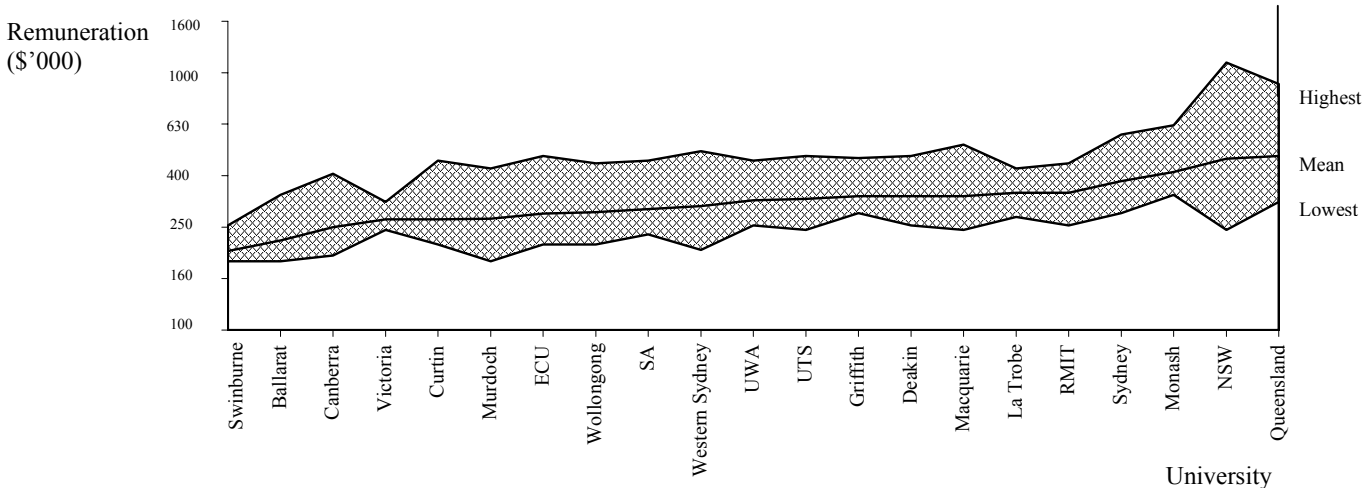


TABLE 2

REMUNERATION PARITIES

AUSTRALIAN UNIVERSITIES, 2004

(Logarithmic ratios ×100)

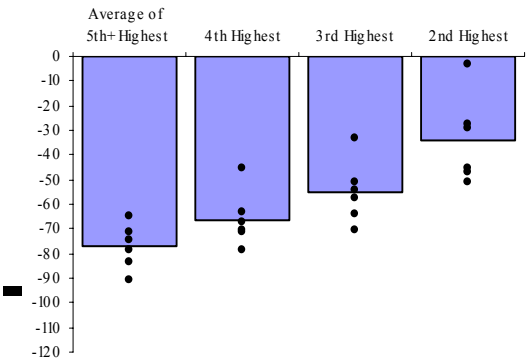
University	Pay relative to VC				Mean	Standard deviation
	2nd highest	3rd highest	4th highest	Average of 5th + highest		
1. Adelaide	-28	-80	-84	-	-64	31
2. ANU	-65	-65	-80	-	-70	9
3. Ballarat	-44	-54	-59	-59	-54	7
4. Canberra	-59	-63	-63	-73	-65	6
5. CQ	-54	-59	-63	-	-59	4
6.CSU	-48	-61	-123	-	-77	40
7. Curtin	-70	-70	-70	-75	-72	2
8. ECU	-66	-66	-70	-79	-71	6
9. Deakin	-29	-44	-58	-62	-48	15
10. Griffith	-39	-42	-49	-49	-45	5
11. JCU	-43	-	-	-	-43	-
12. LaTrobe	-21	-24	-27	-44	-29	10
13. Macquarie	-28	-76	-76	-76	-64	24
14. Melbourne	-32	-43	-58	-	-44	13
15. Monash	-51	-54	-57	-62	-56	5
16. Murdoch	-47	-51	-64	-83	-61	16
17. Newcastle	-79	-82	-	-	-80	3
18. NSW	-92	-135	-146	-150	-131	26
19. Queensland	-64	-96	-99	-106	-91	18
20. QUT	NA	NA	NA	NA	NA	NA
21. RMIT	-7	-35	-48	-56	-36	21
22. SA	-54	-54	-58	-66	-58	6
23. SCU	-25	-29	-34	-	-29	5
24. SQ	-35	-40	-	-	-37	3
25. Swinburne	-27	-27	-32	-32	-29	3
26. Sydney	-30	-60	-67	-70	-57	18
27. Tasmania	-50	-50	-55	-	-52	3
28. USC	-35	-	-	-	-35	-
29. UTS	-35	-44	-62	-66	-52	15
30. UWA	-34	-43	-54	-58	-47	11
31. Victoria	-10	-21	-25	-25	-20	7
32. Western Sydney	-59	-59	-62	-88	-67	14
33. Wollongong	-41	-56	-68	-73	-59	14
Mean	-44	-56	-65	-69	-56	12
Standard deviation	19	23	26	26	22	-

FIGURE 2

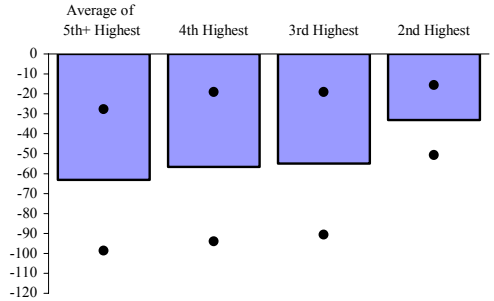
STAIRWAY TO THE TOP
SELECTED UNIVERSITIES, 1999-2004

(Logarithmic ratios ×100)

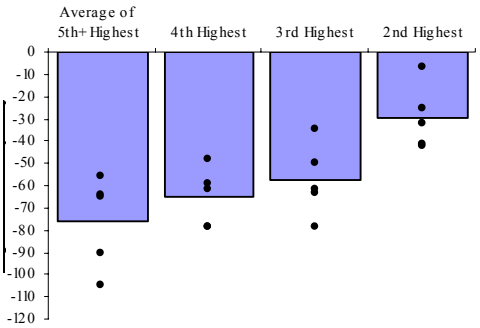
1. Murdoch



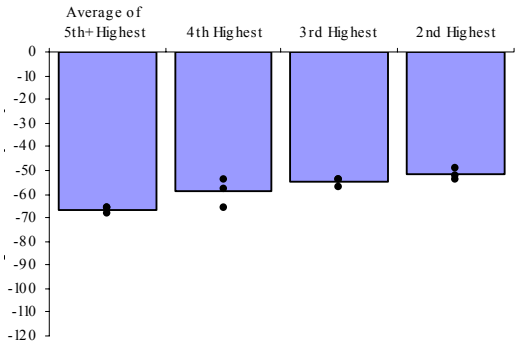
2. NSW



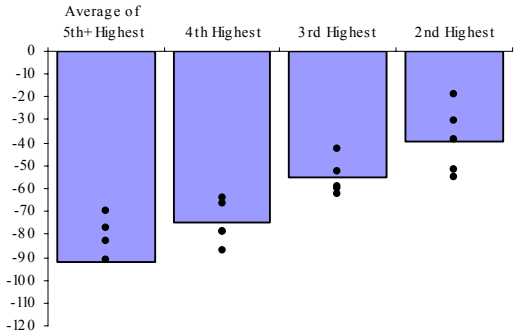
3. RMIT



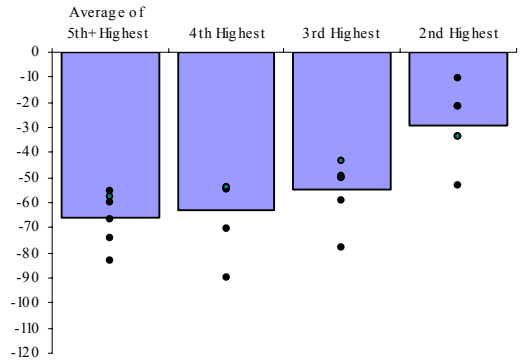
4. SA



5. Sydney



6. UWA



Notes: 1. For a given institution and a given level in the organisational hierarchy, the length of the corresponding column is the average over time of the log ratio (×100) of remuneration of this position to that of the top position. The solid dots indicate the values of this log ratio in the individual years.

2. For NSW, 2004 is excluded as in that year the VC's remuneration was abnormally high.

TABLE 3
PAY PARITY MATRICES,
AUSTRALIAN UNIVERSITIES, 1999-2004

(Logarithmic ratios × 100)

Level i	Level j: VC	2nd highest	3rd highest	4th highest	Average of 5th + highest
A. All Universities					
1. VC	0	42.47	55.80	64.85	74.05
2. 2nd Highest	-42.47	0	13.33	22.38	31.58
3. 3rd Highest	-55.80	-13.33	0	9.05	18.25
4. 4th Highest	-64.85	-22.38	-9.05	0	9.20
5. Average of 5th + Highest	-74.05	-31.58	-18.25	-9.20	0
B. Group of Eight					
1. VC	0	43.94	62.37	71.93	85.73
2. 2nd Highest	-43.94	0	18.44	27.99	41.80
3. 3rd Highest	-62.37	-18.44	0.00	9.55	23.36
4. 4th Highest	-71.93	-27.99	-9.55	0.00	13.81
5. Average of 5th + Highest	-85.73	-41.80	-23.36	-13.81	0
C. Australian Technology Network					
1. VC	0	36.36	50.33	57.70	63.97
2. 2nd Highest	-36.36	0	13.97	21.35	27.61
3. 3rd Highest	-50.33	-13.97	0	7.37	13.64
4. 4th Highest	-57.70	-21.35	-7.37	0	6.27
5. Average of 5th + Highest	-63.97	-27.61	-13.64	-6.27	0
D. Innovative Research Universities					
1. VC	0	48.42	59.82	67.59	75.82
2. 2nd Highest	-48.42	0	11.40	19.17	27.40
3. 3rd Highest	-59.82	-11.40	0	7.77	16.00
4. 4th Highest	-67.59	-19.17	-7.77	0	8.23
5. Average of 5th + Highest	-75.82	-27.40	-16.00	-8.23	0
E. Other					
1. VC	0	41.48	51.26	61.06	70.41
2. 2nd Highest	-41.48	0	9.78	19.58	28.93
3. 3rd Highest	-51.26	-9.78	0	9.80	19.15
4. 4th Highest	-61.06	-19.58	-9.80	0	9.35
5. Average of 5th + Highest	-70.41	-28.93	-19.15	-9.35	0

TABLE 4

REMUNERATION AND SIZE, AUSTRALIAN UNIVERSITIES,
POOLED ACROSS LEVELS AND YEARS, 1999-2004

$$\log P_{ict} = \alpha + \beta \log S_{ct} + \text{year, level and group dummies} + \varepsilon_{ict}$$

Variable	A. No University group dummies			B. Go8 dummy			C. Dummies for University groups		
Intercept	8.0265	(37.32)	[<0.001]	9.3046	(38.54)	[<0.001]	9.3303	(3.59)	[<0.001]
log S	0.2414	(21.57)	[<0.001]	0.1730	(13.17)	[<0.001]	0.1716	(10.95)	[<0.001]
Year dummies (Base = 1999)									
2000	0.0713	(2.84)	[0.0046]	0.0743	(3.03)	[0.0028]	0.0744	(3.00)	[0.0028]
2001	0.1047	(3.92)	[<0.001]	0.1194	(4.59)	[<0.001]	0.1199	(4.42)	[<0.001]
2002	0.1592	(6.47)	[<0.001]	0.1789	(7.36)	[<0.001]	0.1794	(7.17)	[<0.001]
2003	0.2396	(9.36)	[<0.001]	0.2625	(10.46)	[<0.001]	0.2631	(10.21)	[<0.001]
2004	0.2666	(10.80)	[<0.001]	0.2915	(11.93)	[<0.001]	0.2922	(11.49)	[<0.001]
Level in hierarchy after VC (Base = VC)									
Level 2	-0.4247	(-18.24)	[<0.001]	-0.4247	(-18.88)	[<0.001]	-0.4247	(-18.97)	[<0.001]
Level 3	-0.5568	(-25.30)	[<0.001]	-0.5543	(-25.97)	[<0.001]	-0.5543	(-26.04)	[<0.001]
Level 4	-0.6348	(-28.60)	[<0.001]	-0.6328	(-29.26)	[<0.001]	-0.6328	(-29.38)	[<0.001]
Level 5	-0.7047	(-29.61)	[<0.001]	-0.6921	(-30.18)	[<0.001]	-0.6922	(-30.42)	[<0.001]
University group (Base = Other)									
Go8	-			0.1419	(7.10)	[<0.001]	0.1439	(5.21)	[<0.001]
ATN	-			-			0.0039	(0.21)	[0.8320]
IRU	-			-			-0.0010	(-0.06)	[0.9546]
Adjusted R^2	0.7555			0.7719			0.7713		
No. of obs.	734			734			734		
F-statistic	227.55	[<0.001]		226.56	[<0.001]		191.19	[<0.001]	

Note: t-values, based on White's standard errors, are given in parentheses and p- values are given in brackets.

TABLE 5

REMUNERATION, SIZE AND INSTITUTIONS AUSTRALIAN UNIVERSITIES
POOLED ACROSS LEVELS AND YEARS, 1999-2004

$$\log P_{ict} = \alpha + \beta \log S_{ct} + \text{year and level dummies} + \text{institution dummies} + \varepsilon_{ic}$$

Variable	A. Whole sample			B. Vice-Chancellors only		
Intercept	14.7023	(7.61)	[<0.001]	17.8042	(3.76)	[<0.001]
Log S	-0.1236	(-1.21)	[0.2278]	-0.2898	(-1.15)	[0.2537]
Year dummies (Base = 1999)						
2000	0.0845	(3.87)	[<0.001]	0.1026	(1.89)	[0.0612]
2001	0.1581	(5.12)	[<0.001]	0.2655	(2.63)	[0.0095]
2002	0.2363	(7.48)	[<0.001]	0.3238	(3.46)	[<0.001]
2003	0.3317	(9.12)	[<0.001]	0.4525	(4.46)	[<0.001]
2004	0.3813	(8.75)	[<0.001]	0.4878	(4.03)	[<0.001]
Level in Hierarchy after VC (Base = VC)						
Level 2	-0.4247	(-21.45)	[<0.001]	-		
Level 3	-0.5581	(-29.30)	[<0.001]	-		
Level 4	-0.6454	(-33.80)	[<0.001]	-		
Level 5	-0.7218	(-36.47)	[<0.001]	-		

(Continued on next page)

TABLE 5 (Continued)

REMUNERATION, SIZE AND INSTITUTIONS AUSTRALIAN UNIVERSITIES
POOLED ACROSS LEVELS AND YEARS, 1999-2004

$$\log P_{ict} = \alpha + \beta \log S_{ct} + \text{year and level dummies} + \text{institution dummies} + \varepsilon_{ic}$$

Variable	A. Whole sample			B. Vice-Chancellors only		
Universities (Base = JCU)						
1. USC	-0.2201	(-1.22)	[0.2210]	-0.5708	(-1.36)	[0.1778]
2. SQ	-0.0780	(-1.17)	[0.2434]	-0.2947	(-1.97)	[0.0512]
3. Ballarat	-0.0537	(-0.76)	[0.4479]	-0.2530	(-1.67)	[0.0981]
4. SCU	0.0534	(0.60)	[0.5507]	-0.0343	(-0.16)	[0.8758]
5. CSU	0.0918	(2.26)	[0.0240]	0.1123	(2.10)	[0.0374]
6. Murdoch	0.1103	(2.71)	[0.0069]	0.0630	(0.97)	[0.3317]
7. Tasmania	0.1272	(3.20)	[0.0014]	0.0487	(0.46)	[0.6458]
8. Canberra	0.1457	(2.26)	[0.0241]	-0.0019	(-0.01)	[0.9891]
9. Swinburne	0.1583	(3.63)	[<0.001]	0.1190	(1.02)	[0.3082]
10. Newcastle	0.2109	(3.69)	[<0.001]	0.2639	(1.76)	[0.0808]
11. CQ	0.2653	(5.25)	[<0.001]	0.0446	(0.48)	[0.6298]
12. ECU	0.3104	(7.95)	[<0.001]	0.3152	(4.38)	[<0.001]
13. Griffith	0.3266	(4.73)	[<0.001]	0.4067	(2.51)	[0.0134]
14. SA	0.3461	(6.28)	[<0.001]	0.3895	(2.98)	[0.0034]
15. Wollongong	0.3609	(7.84)	[<0.001]	0.4339	(4.08)	[<0.001]
16. Victoria	0.3787	(6.00)	[<0.001]	0.5235	(2.33)	[0.0211]
17. Curtin	0.3905	(5.22)	[<0.001]	0.4677	(2.41)	[0.0172]
18. UTS	0.4100	(6.16)	[<0.001]	0.3694	(2.21)	[0.0288]
19. Western Sydney	0.4157	(6.72)	[<0.001]	0.5687	(3.83)	[0.0002]
20. La Trobe	0.4174	(6.47)	[<0.001]	0.5384	(3.24)	[0.0015]
21. RMIT	0.4368	(3.96)	[<0.001]	0.5676	(2.12)	[0.0359]
22. QUT	0.4617	(6.24)	[<0.001]	0.5293	(2.86)	[0.005]
23. Macquarie	0.4774	(7.67)	[<0.001]	0.6521	(4.51)	[<0.001]
24. Deakin	0.5167	(7.76)	[<0.001]	0.5721	(3.26)	[0.0014]
25. ANU	0.5346	(4.96)	[<0.001]	0.6455	(2.38)	[0.0191]
26. Adelaide	0.5416	(4.83)	[<0.001]	0.7779	(2.13)	[0.0353]
27. UWA	0.5517	(6.96)	[<0.001]	0.6136	(3.00)	[0.0033]
28. Sydney	0.6796	(4.45)	[<0.001]	0.9569	(2.49)	[0.0139]
29. Melbourne	0.7534	(4.51)	[<0.001]	0.9199	(2.21)	[0.0289]
30. NSW	0.7686	(4.55)	[<0.001]	1.1419	(2.51)	[0.0133]
31. Queensland	0.8780	(6.07)	[<0.001]	1.3201	(3.70)	[0.003]
32. Monash	0.9462	(6.16)	[<0.001]	1.2078	(2.92)	[0.0042]
Adjusted R^2	0.8301			0.5999		
No of observations	734			164		
F-Statistic	86.27	[<0.001]		7.43	[<0.001]	

Note: t-values, based on White's standard errors, are given in parentheses and p-values are given in brackets.

TABLE 6

REMUNERATION AND SIZE:

AUSTRALIAN COMPANIES AND UNIVERSITIES, BY LEVEL, 2004

$$\log P_c = \alpha + \beta \log S_c + \text{private sector dummy} + \varepsilon_c$$

	Level One	Level Two	Level Three	Level Four	Level Five
Intercept	7.9669 (20.53) [<0.001]	7.6841 (22.48) [<0.001]	7.4616 (22.11) [<0.001]	6.9501 (20.29) [<0.001]	6.9428 (19.10) [<0.001]
log S	0.2580 (13.69) [<0.001]	0.2501 (15.05) [<0.001]	0.2555 (15.64) [<0.001]	0.2767 (16.75) [<0.001]	0.2758 (15.85) [<0.001]
Private sector dummy	0.8977 (7.06) [<0.001]	0.7643 (6.87) [<0.001]	0.6207 (5.60) [<0.001]	0.5354 (4.72) [<0.001]	0.4606 (3.66) [<0.001]
Adjusted R^2	0.4477	0.4891	0.5004	0.5350	0.5269
No. of obs	289	282	271	260	237
F-statistic	117.74 [<0.001]	135.48 [<0.001]	136.23 [<0.001]	149.96 [<0.001]	132.43 [<0.001]

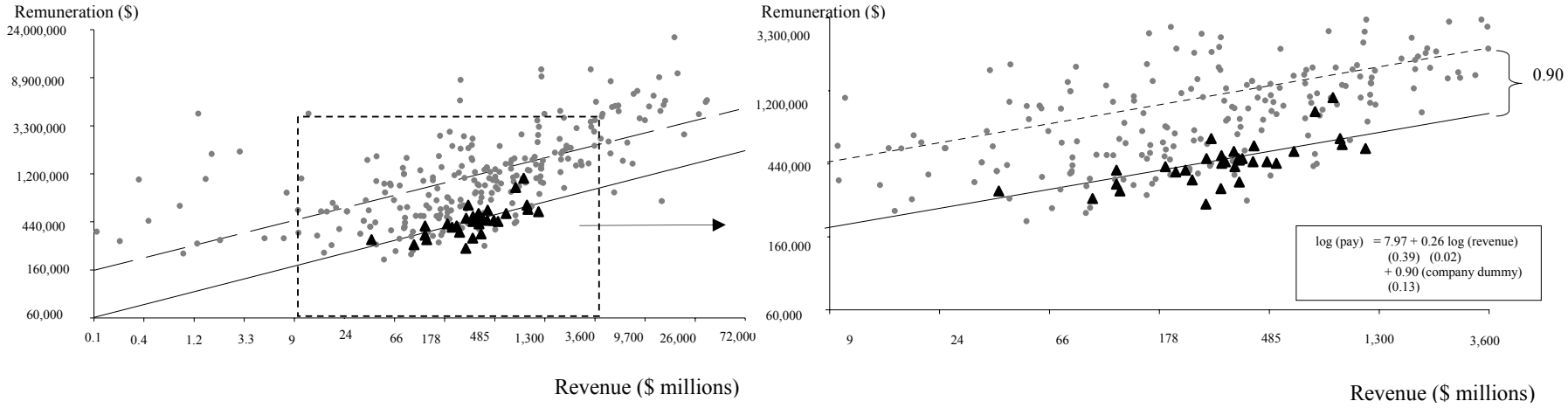
Note: t-values, based on White's standard errors, are given in parentheses and p-values are given in brackets

FIGURE 4
REMUNERATION AND SIZE:
AUSTRALIAN COMPANIES AND UNIVERSITIES, 2004
(Legend: # = university; • = company)

I. ALL OBSERVATIONS

II. CENTRE OF GRAVITY

A. Level One



B. Level Two

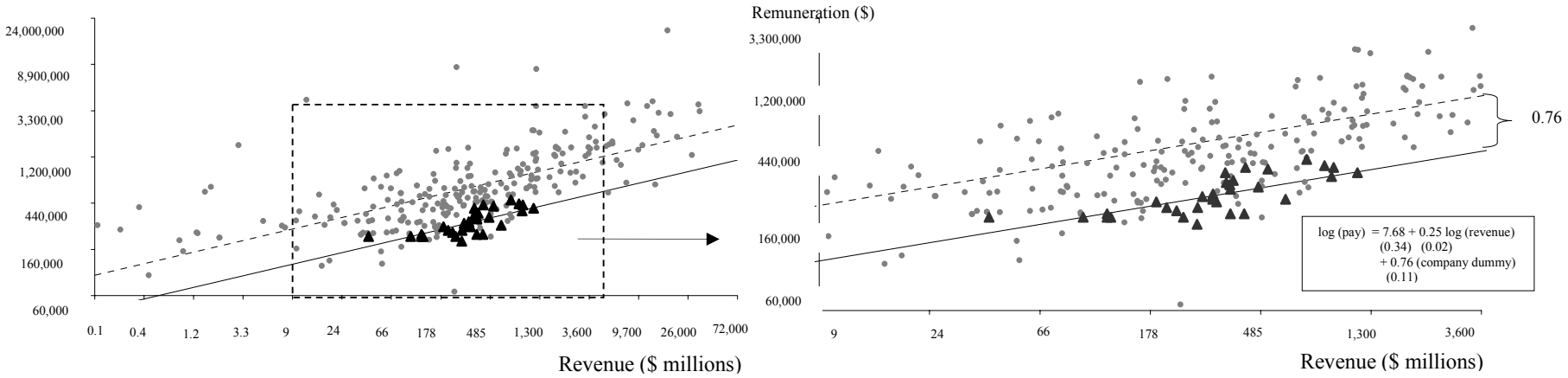

Remuneration ($)
24,000,000
8,900,000
3,300,00
1,200,000
440,000
160,000
60,000
0.1
0.4
1.2
3.3
9
24
66
178
485
1,300
3,600
9,700
26,000
72,000
Revenue ($ millions)
3,300,000
1,200,000
440,000
160,000
60,000
0.76
log (pay) = 7.68 + 0.25 log (revenue)
(0.34) (0.02)
+ 0.76 (company dummy)
(0.11)
9
24
66
178
485
1,300
3,600
Revenue ($ millions)

TABLE 7

REMUNERATION AND SIZE, AUSTRALIAN COMPANIES,
POOLED ACROSS YEARS AND LEVELS, 2004-2005

$$\log P_{ict} = \alpha + \beta \log S_{ct} + \text{year, level and industry dummies} + \varepsilon_{ict}$$

Variable	A. Whole sample			B. CEOs		
Intercept	8.9254	(52.23)	[<0.001]	8.7037	(21.66)	[<0.001]
log S	0.2417	(30.10)	[<0.001]	0.2536	(13.50)	[<0.001]
2005 dummy (Base = 2004)	0.1108	(4.27)	[<0.001]	0.0726	(1.16)	[0.2470]
Level dummies (Base = CEO)						
Level 2	-0.5537	(-13.03)	[<0.001]	-		
Level 3	-0.7990	(-19.11)	[<0.001]	-		
Level 4	-0.9728	(-23.15)	[<0.001]	-		
Level 5	-1.0928	(-25.43)	[<0.001]	-		
Industry Dummies (Base = Other)						
IT	0.0823	(1.36)	[0.1747]	-0.0398	(-0.25)	[0.8042]
Materials	0.1383	(2.25)	[0.0243]	0.1110	(-0.75)	[0.4535]
Industrials	0.1609	(2.61)	[0.0090]	0.2440	(-1.54)	[0.1234]
Energy	0.1988	(2.80)	[0.0052]	0.2149	(-1.22)	[0.2214]
Consumer Discretionary	0.2314	(3.77)	[0.0002]	0.2494	(1.67)	[0.0962]
Consumer Staples	0.2643	(3.60)	[0.0003]	0.3230	(1.75)	[0.0813]
Health care	0.3247	(4.92)	[<0.001]	0.3981	(2.40)	[0.0166]
Financial	0.5887	(8.22)	[<0.001]	0.5508	(2.40)	[0.0009]
Adjusted R^2	0.5433			0.4327		
No. of observations	2478			519		
F-statistic	211.53	[<0.001]		40.52	[<0.001]	

Note: t-statistics, based on White's standard errors, are given in parentheses and p-values are given in brackets.

TABLE 8

PAY PARITY MATRICES

(Logarithmic ratios × 100)

Level i	Level j: Highest	2nd highest	3rd highest	4th highest	Average of 5th + highest
A. Australian Universities					
1. VC	0	42.27	55.68	63.48	70.47
2. 2nd Highest	-42.27	0	13.41	21.21	28.20
3. 3rd Highest	-55.68	-13.41	0	7.80	14.79
4. 4th Highest	-63.48	-21.21	-7.80	0	6.99
5. Average of 5th + Highest	-70.47	-28.20	-14.79	-6.99	0
B. Private Sector					
1. CEO	0	55.37	79.90	97.28	109.28
2. 2nd Highest	-55.37	0	24.53	41.91	53.91
3. 3rd Highest	-79.90	-24.53	0	17.38	29.38
4. 4th Highest	-97.28	-41.91	-17.38	0	12.00
5. Average of 5th + Highest	-109.28	-53.91	-29.38	-12.00	0
C. Private Sector- Australian Universities					
1. CEO – VC	0	13.13	24.38	33.98	39.06
2. 2nd Highest	-13.13	0	11.25	20.85	25.93
3. 3rd Highest	-24.38	-11.25	0	9.60	14.68
4. 4th Highest	-33.98	-20.85	-9.60	0	5.08
5. Average of 5th Highest	-39.06	-25.93	-14.68	-5.08	0

Notes: 1. Panel A is based on Table 4, Panel A.
2. Panel B is based on Table 7, Panel A.

TABLE 9
PAY PARITY MATRICES

AUSTRALIAN UNIVERSTIIES
BALANCED PANEL, FOUR LEVELS

2001-2004

Level i	Level j			
	VC	2nd highest	3rd highest	4th highest
	A. All Universities			
1	0	45.00	58.14	67.28
2	-45.00	0	13.14	22.28
3	-58.14	-13.14	0	9.14
4	-67.28	-22.28	-9.14	0
	B. Group of Eight			
1	0	46.65	64.12	75.5
2	-46.65	0	17.47	28.85
3	-64.12	-17.46	0	11.38
4	-75.50	-28.84	-11.38	0
	C. Australian Technology Network			
1	0	35.00	50.85	59.63
2	-35.00	0	15.85	24.63
3	-50.85	-15.85	0	8.78
4	-59.63	-24.62	-8.77	0
	D. Innovative Research Universities			
1	0	46.52	60.84	67.46
2	-46.52	0	14.32	20.94
3	-60.84	-14.31	0	6.62
4	-67.46	-20.94	-6.63	0
	E. Other			
1	0	46.55	54.3	62.88
2	-46.55	0	7.75	16.33
3	-54.30	-7.75	0	8.58
4	-62.88	-16.32	-8.57	0

TABLE 10

REMUNERATION AND SIZE, AUSTRALIAN UNIVERSITIES
POOLED ACROSS LEVELS AND YEARS, 2001-2004

BALANCED PANEL, FOUR LEVELS

$\log P_{ict} = \alpha + \beta \log S_{ct}$ + year, level and group dummies + ε_{ict}

Variable	A. No University group dummies			B. Go8 dummy			C. Dummies for University groups		
Intercept	7.9131	(25.77)	[<0.001]	9.7290	(22.69)	[<0.001]	9.8698	(18.67)	[<0.001]
log S	0.2550	(16.33)	[<0.001]	0.1594	(7.40)	[<0.001]	0.1513	(5.59)	[0.0120]
Year dummies (Base = 2001)									
2002	0.0437	(1.52)	[0.1292]	0.0505	(1.89)	[0.0591]	0.0511	(1.91)	[0.0566]
2003	0.1300	(4.51)	[<0.001]	0.1419	(5.45)	[<0.001]	0.1429	(5.58)	[<0.001]
2004	0.1327	(4.90)	[<0.001]	0.1494	(5.97)	[<0.001]	0.1508	(6.18)	[<0.001]
Level in hierarchy after VC (Base = VC)									
Level 2	-0.4586	(-13.79)	[<0.001]	-0.4586	(-14.51)	[<0.001]	-0.4586	(-14.55)	[<0.001]
Level 3	-0.5838	(-18.69)	[<0.001]	-0.5838	(-19.44)	[<0.001]	-0.5838	(-19.46)	[<0.001]
Level 4	-0.6729	(-21.39)	[<0.001]	-0.6729	(-22.22)	[<0.001]	-0.6729	(-22.28)	[<0.001]
University group (Base = Other)									
Go8	-			0.1743	(5.22)	[<0.001]	0.1956	(4.47)	[<0.001]
ATN	-			-			0.0086	(0.28)	[0.7814]
IRU	-			-			0.0492	(2.00)	[0.0459]
Adjusted R^2	0.7373			0.7618			0.7627		
No. of obs.	368			368			368		
F-statistic	148.11	[<0.001]		147.68	[<0.001]		118.95	[<0.001]	

Note: t-values, based on White's standard errors, are given in parentheses and p-values are given in brackets.

TABLE 11

REMUNERATION, SIZE AND INSTITUTIONS, AUSTRALIAN UNIVERSITIES
POOLED ACROSS LEVELS AND YEARS, 2001-2004
BALANCED PANEL, FOUR LEVELS

$$\log P_{ict} = \alpha + \beta \log S_{ct} + \text{year and level dummies} + \text{institution dummies} + \varepsilon_{ic}$$

Variable	A. Whole sample			B. Vice-Chancellors only		
Intercept	12.2020	(3.58)	[0.0004]	16.6859	(1.69)	[0.0960]
Log S	0.0214	(0.12)	[0.9037]	-0.2145	(-0.42)	[0.6773]
Year dummies (Base = 2001)						
2002	0.0603	(2.33)	[0.0201]	0.0648	(0.83)	[0.4098]
2003	0.1590	(5.13)	[<0.001]	0.1895	(2.01)	[0.0481]
2004	0.1736	(4.48)	[<0.001]	0.1506	(1.33)	[0.1890]
Level in Hierarchy after VC (Base = VC)						
Level 2	-0.4586	(-16.28)	[<0.001]	-		
Level 3	-0.5838	(-22.29)	[<0.001]	-		
Level 4	-0.6729	(-26.00)	[<0.001]	-		
Universities (Base = Swinburne)						
1. Tasmania	0.0037	(0.06)	[0.9489]	-0.0871	(-0.46)	[0.6485]
2. SCU	0.0914	(0.52)	[0.6044]	-0.0188	(-0.04)	[0.9714]
3. CQ	0.0953	(1.49)	[0.1374]	-0.0908	(-0.47)	[0.6426]
4. Murdoch	0.1264	(1.49)	[0.1365]	0.0306	(0.12)	[0.9086]
5. Canberra	0.1364	(0.93)	[0.3512]	0.0055	(0.01)	[0.9901]
6. Griffith	0.1653	(2.15)	[0.0320]	0.3125	(1.32)	[0.1922]
7. ECU	0.1839	(3.86)	[0.0001]	0.3173	(1.76)	[0.0830]
8. RMIT	0.2172	(1.45)	[0.1486]	0.4016	(0.96)	[0.3385]
9. Curtin	0.2234	(2.55)	[0.0112]	0.3834	(1.31)	[0.1956]
10. Wollongong	0.2417	(5.70)	[<0.001]	0.3681	(2.10)	[0.0394]
11. Victoria	0.2605	(4.00)	[<0.001]	0.4557	(2.53)	[0.0139]
12. Western Sydney	0.2787	(4.42)	[<0.001]	0.4907	(2.26)	[0.0270]
13. UTS	0.2931	(4.04)	[<0.001]	0.3439	(1.45)	[0.1510]
14. La Trobe	0.2999	(4.17)	[<0.001]	0.4732	(2.21)	[0.0303]
15. ANU	0.3294	(2.40)	[0.0170]	0.5663	(1.35)	[0.1817]
16. Macquarie	0.3402	(5.24)	[<0.001]	0.5747	(2.68)	[0.0093]
17. UWA	0.3791	(4.05)	[<0.001]	0.5283	(1.82)	[0.0734]
18. Sydney	0.4148	(1.81)	[0.0713]	0.7939	(1.18)	[0.2422]
19. Adelaide	0.4355	(3.06)	[0.0024]	0.7605	(2.85)	[0.0059]
20. Melbourne	0.5034	(2.04)	[0.0426]	0.8254	(1.15)	[0.2564]
21. Queensland	0.6601	(3.22)	[0.0014]	1.1722	(1.97)	[0.0533]
22. Monash	0.6818	(3.09)	[0.0021]	1.0895	(1.73)	[0.0877]
Adjusted R^2	0.8184			0.4711		
No of observations	368			92		
F-Statistic	58.04	[<0.001]		4.11	[<0.001]	

Note: t-values, based on White's standard errors, are given in parentheses and p-values are given in brackets

TABLE 12
REMUNERATION AND SIZE, AUSTRALIAN UNIVERSITIES,
POOLED ACROSS LEVELS AND YEARS, 1999-2004
ALTERNATIVE SIZE MEASURES

$$\log P_{ict} = \alpha + \beta \log size_{ct} + \text{year, level and group dummies} + \varepsilon_{ict}$$

Variable	Size = Total assets						Size = Total Student Enrolments					
	A. No University group dummies			B. With Go8 dummy			C. No University group dummies			D. With G08 dummy		
Intercept	8.8967	(48.89)	[<0.001]	10.2342	(43.91)	[<0.001]	11.5118	(78.46)	[<0.001]	11.4978	(98.04)	[<0.001]
Log sSize	0.1875	(20.90)	[<0.001]	0.1188	(10.38)	[<0.001]	0.1180	(8.03)	[<0.001]	0.1135	(9.78)	[<0.001]
Year dummies (Base = 1999)												
2000	0.0782	(3.04)	[0.0025]	0.0810	(3.17)	[0.0016]	0.0965	(3.14)	[0.0018]	0.0644	(2.39)	[0.0171]
2001	0.1319	(4.91)	[<0.001]	0.1412	(5.33)	[<0.001]	0.1221	(3.61)	[0.0003]	0.1138	(3.89)	[<0.001]
2002	0.1914	(7.75)	[<0.001]	0.2052	(8.24)	[<0.001]	0.1830	(6.39)	[<0.001]	0.1776	(6.76)	[<0.001]
2003	0.2750	(10.62)	[<0.001]	0.2920	(11.37)	[<0.001]	0.2958	(9.40)	[<0.001]	0.2940	(10.58)	[<0.001]
2004	0.3009	(12.28)	[<0.001]	0.3210	(12.91)	[<0.001]	0.3137	(10.86)	[<0.001]	0.3163	(11.97)	[<0.001]
Level in hierarchy after VC (Base = VC)												
Level 2	-0.4249	(-17.75)	[<0.001]	-0.4248	(-18.53)	[<0.001]	-0.4223	(-13.97)	[<0.001]	-0.4223	(-17.04)	[<0.001]
Level 3	-0.5545	(-24.36)	[<0.001]	-0.5520	(-25.28)	[<0.001]	-0.5468	(-19.22)	[<0.001]	-0.5509	(-23.25)	[<0.001]
Level 4	-0.6315	(-27.48)	[<0.001]	-0.6295	(-28.48)	[<0.001]	-0.6177	(-22.66)	[<0.001]	-0.6276	(-27.22)	[<0.001]
Level 5	-0.7035	(-28.54)	[<0.001]	-0.6881	(-29.64)	[<0.001]	-0.7060	(-24.03)	[<0.001]	-0.6958	(-26.85)	[<0.001]
University group (Base = Non Go8												
Go8	-			0.1674	(6.99)	[<0.001]	-			0.2668	(14.20)	[<0.001]
Adjusted R^2	0.7326			0.7545			0.6512			0.7691		
No. of obs.	734			734			551			551		
F-statistic	201.85	[<0.001]		205.79	[<0.001]		103.67	[<0.001]		167.50	[<0.001]	

Note: t-values, based on White's standard errors, are given in parentheses and p-values are given in brackets.