CONTRIBUTED ARTICLE

Gender Differences in Academic Rank in Australian Universities

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Abstract

This study uses information on staff and student characteristics at Australian universities to examine the determinants of the career outcomes recorded for male and female academic staff in 2003. A comparison is also made with data compiled for 2002.

Significant differences exist between male and female academics in the probability that they will be employed in one of the top two academic grades. These differences persist even after account is taken of gender-based differences in age, qualifications, discipline area and institution characteristics.

The paper discusses these results in the light of human capital theory and alternative economic models of gender-based differences in employment outcomes. Several suggestions are made about future research on gender equity in the university sector.

1. Introduction

This paper explores the representation of men and women in the top two academic grades (Levels D and E) in Australian universities. These grades are the positions of Associate Professor and Professor, and in 2003 32.0 per cent of tenured male academics were employed at these levels, compared to 14.5 per cent of tenured female academics.

The study is motivated by a desire to answer persistent questions about the long observed fact of women's under-representation on the higher rungs of the university career ladder. These questions include those that are familiar to any student of gender differences in the labour market, namely: can the under-representation of women be explained by differences in the qualifications, age and discipline areas of male and female academics; or is there evidence of

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differences in the career success of male and female academics even when the comparison is made between staff with the same measured levels of qualifications, age, speciality and so forth?

The study uses the information on staff employed at each Australian university that is compiled and published by the Federal Department of Employment, Science and Training (DEST)[1]. It also utilises additional DEST data on the number and characteristics of student enrolments[2] at each university. The focus of the study is on the career outcomes of male and female academic staff in the Australian universities[3] recorded in 2003. However, a comparison is also made with data compiled for 2002.

The structure of the paper is straightforward. In the following section, a summary of the well-established literature on gender equity in higher education is presented. Section 3 provides an overview of the mainstream economic approach to the study of gender-based differences in the labour market, together with a description of the relationship between the current study of gender equity and previous empirical research on the university sector. A description of the data and the econometric method used in this study is provided in Section 4, whilst the results of this investigation are outlined in Section 5, together with some tentative explanations for the patterns that emerge. A general discussion of the results and their implications is in Section 6; and a summary and conclusion are in Section 7.

2. Background on Gender Differences in Higher Education

The persistence of large differences in career attainment between male and female academics has been documented by a large number of Australian and international studies. A recent Australian study by Carrington and Pratt (2002) identified the rise in the number of female academics in recent decades. Between 1985 and 2002 women's share of all academic positions rose from 21.6 to 39.0 per cent. This growth was concentrated, however, in the academic levels up to Level C (Senior Lecturer) and was heavily influenced by the 1988 Dawkins higher education reforms that saw the amalgamation of universities and colleges (which featured relatively high levels of female employment). Carrington and Pratt (2002, p. 6) also noted that although women in Australian universities made significant gains in recent years in terms of general representation and job security[4], their representation in senior executive positions was still limited. Indeed, in 2002 only 29 per cent of the senior executives in Australian universities were female.

Chesterman, Ross-Smith and Peters (2003, p.11) explain that these gender differences in higher education have a long history, and that they are common to both developed and developing countries. Their persistence, despite the very strong growth in the enrolment of women in university courses, has also motivated a large number of international studies of the causes of inequity in the sector (see Carrington and Pratt, 2003, for an overview of this literature).

Research has identified a range of reasons for the persistence of gender differences in the university sector. In the Australian literature, as Carrington and Pratt (2003, pp.6-7) summarise it, the key themes include: poor representation of women on key decision-making bodies, such as academic senates and councils and university promotion panels (also see Brooks, 1997); notions of merit and success in universities that are based more closely on what men do well, to the overall detriment of women (also see Burton, 1997 and Probert, Ewer and Whiting, 1998); a likelihood that women's career paths will be interrupted and their research performance adversely affected by the greater roles they take on in nurturing children (also see Castleman, Allen, Bastalich and Wright, 1995, and Probert et al, 1998); possible reticence amongst women to apply for promotion (also see Chesterman et al, 2003); a tendency for women to begin their academic careers at lower levels; lower rates of PhD completion amongst women (also see Castelman et al, 1995 and Probert et al, 1998); and the concentration of female academics in discipline areas that are less likely either to attract funding from industry partners or to be supported by government-defined national research priorities (also see White, 2003, and Probert et al, 1998).

3. Overview of the Economic Analysis of Gender Differences in Labour Market Outcomes

Most economic studies of gender differences in the labour market focus on the phenomenon of a gender wage gap, which has been widely observed to be a persistent feature of the labour market in Australia and most other countries. Across all Australian workers in 2003, the female/male ratio of average weekly ordinary time earnings (for full time employees) was only 84.2 per cent (ABS, 2003), and although this represents an improvement by comparison with recent decades, the persistence of a difference in the wage outcomes of men and women has led to a search for explanations[5].

The human capital model dominates the conventional analysis of gender-based wage differences. It features what is known as a supply-side approach, identifying as a likely source of wage differences the personal characteristics

of working men and women (such as their education and labour market experience). These characteristics are perceived to determine fundamentally the 'productivity' of the individual in the labour market and employers are believed to reward them through wage payments and job promotions. Job characteristics are also perceived to affect employment outcomes within the model, to the extent that high levels of product demand, for example, increase the individual's ability to negotiate a higher wage rate or job grade.

An alternative economic approach to the analysis of gender wage differences is associated with the internal labour market (ILM) model[6]. This model is agnostic about the link between productivity, individual characteristics and individual labour market outcomes, such as wages and job promotions. Large organizations are perceived to exist in a social/cultural/economic environment and to have well defined rules governing labour practices such as hiring and promotion. The rules governing progression up career ladders are understood to favour people with (for example) high levels of education or long periods of completed job tenure. However, according to the ILM perspective, these rules do not necessarily imply that the most productive workers end up at the top of the organisational hierarchy or receive the highest wage payment. Rather, the rules are likely to reflect a range of cultural influences (such as societal valuing of particular types of knowledge and work experience), organisational factors (such as the need for simple decision making rules and the encouragement of the transfer of knowledge) and economic motivations (such as the rewarding and encouraging of productivity). In summary, according to the ILM model, the wages received and/or the career outcomes achieved by different workers may not directly measure their underlying productivity characteristics[7], as they are likely also to reflect the 'rules' of the institutional environment in which employers make their wage and promotion decisions.

The empirical analysis of gender wage differences in recent decades has been dominated by approaches that reflect the human capital model. This tends to reflect the primacy of neo-classical approaches in the labour economics literature of recent decades. However, the techniques also can be (and have been) applied to study the role of institutional forces in the labour market, with key differences lying in the way particular observed relationships (for example, between education and wages) are interpreted.

A useful example of the typical approach to the analysis of wage differences is the study by Probert et al (2003) of the university sector. In that study multiple

regression techniques were applied to 1996 data from 18 universities to identify, first, the relationship between the individual characteristics of academics (such as their level of education, level of appointment, discipline and work history) and their measured levels of income. These relationships were measured separately for men and women, enabling a comparison, for example, of the 'rewards' men and women got for additional qualifications. Then, in the final stage of the analysis, the predicted incomes of men and women with the same levels of qualifications and other characteristics were compared. This analysis showed that women's incomes remained less than men's, even when their labour market characteristics were the same.

Where the current study differs from other empirical examinations of gender-based differences in the Australian university sector (notably by Probert et al, 1998) is in its focus on occupational grade attainment, rather than wages. That is, it deals with gender differences in the probability of academics being employed in the uppermost occupational grades, rather than with measured wage outcomes. In this sense, the current study is similar to the approach taken by Melanie Ward (2001b) in her analysis of gender equity in the Scottish university sector. She examined the rank distribution of academics in this sector with the aim of identifying whether the observed gender-based differences in rank attainment could be explained by differing average characteristics of male and female academics or by their job characteristics, or by both.

A focus on career attainment rather than wage outcomes does suffer the drawback of under-measuring differences in wage outcomes associated with men's and women's different positions on the incremental scale within each academic grade. However, it also has important advantages. First, the discussion of results can be couched in terms that are easily understood by the people who participate in this particular part of the labour market[8]. Second, as the findings of Probert et al (1998) and Ward (2001a) show, a key determinant of wage differences in the sector is the level of employment and, thus, it makes sense to explore this factor directly. Finally, econometric models (such as the probit model, outlined below) are well suited to this alternative type of investigation[9].

4. Data and Approach

As mentioned in the introduction, this study makes use of the DEST data from 2002 and 2003 in order to provide the most up-to-date picture possible of gender equity in the Australian university sector. The DEST data are collected each year under the provisions of the *Higher Education Funding Act* of 1998 and

include details on all full time, fractional full time and casual staff at Australian universities. Those data provided by the universities to DEST that are not confidential (that is, specific to each employee's identification code) are made publicly available by DEST on its web site (http://www.dest.gov.au/highered/statdata.htm). Currently, information from staff collections made in each year since 1989 is available through this site. Data on student enrolments are available for the period 1998-2003.

The total numbers of academics included in this study were 17,595 in 2002 and 18,330 in 2003. These include only those academics who were tenured and employed in what DEST refers to as 'teaching and learning' (as opposed to 'research only' or 'teaching only') functions at the survey dates. The selection of this sub-group of academics reflects a desire to focus the study on the different career outcomes of male and female academics who had established levels of attachment to the 'traditional' (teaching and research) academic career ladder[10]. In 2003, 72.7 per cent of all academic staff were employed in teaching and research functions and 58.2 per cent were tenured.

This study of career outcomes explores the factors affecting the probability that an individual academic will be employed in the top two academic grades (D and E). Although there is a variety of ways of measuring career attainment, these two grades have the advantage of jointly representing close to the top quartile of academic staff. Furthermore, as was noted in the introduction, it is women's low representation in these grades that is currently attracting the greatest research and policy attention.

The DEST data sets provide a reasonable amount of information on the characteristics of academic staff that are likely to affect their employment/promotion chances. Individual characteristics that are measured well are sex, discipline area and age, whilst qualification levels are provided for most staff members, especially in the 2003 collections[11]. Data on other potentially relevant individual factors, such as country of birth, language skills and aboriginality are currently of poor quality (and thus excluded from this study), but are likely to improve in coming years[12].

Data can also be derived from the DEST collections to measure the characteristics of universities that might affect the employment/promotion chances of staff members. It is possible to measure the percentage of academic staff who are tenured in each university, and the percentage who are female. It is also possible to measure each university's student profile in terms (for example) of the proportions of post-graduate and fee-paying students and the total student enrolments. The details of each of the variables used in this study are listed in Table 1.

Table 1: Variable Definitions and Sample Distributions, DEST Staff and Student Collection Data, 2003

		MALE		FEMALE	
		Level A to C	Level D or E	Level A to C	Level D or E
Variable	**Definition**	**% of sample population**			
Age	Age in years				
*Less than 40		22.6	3.5	22.5	4.0
40-49		36.3	27.3	40.8	32.7
50-59		33.7	52.0	32.0	50.4
60+		7.3	17.3	4.6	12.9
Qualification	Highest qualification				
Doctorate		50.0	82.4	39.0	84.3
Masters		29.3	8.3	37.1	11.3
Bachelor's		12.2	2.6	15.6	2.9
*Other qualification/don't know		8.5	3.5	8.3	4.8
Discipline	Academic Organisational Group				
Natural & physical science*		15.1	23.4	9.7	13.2
Information technology		9.8	5.2	4.7	3.8
Engineering & related technologies		9.2	12.3	1.6	2.3
Architecture & building		1.8	1.8	3.5	1.4
Agriculture, environmental & related studies		2.5	2.7	1.2	1.1
Health		7.5	12.0	17.7	20.2
Education		5.6	4.1	11.8	10.0
Management & commerce		12.2	9.9	14.3	11.0
Society and culture		23.3	25.0	30.0	33.2
Creative Arts		9.0	4.9	9.1	2.6
Post Graduate Enrolment in Institution	% of students who are postgrad.				
High	>20%	48.7	56.2	49.5	55.2
Medium	20-25%	27.1	26.9	26.7	27.8
*Low	<20%	24.1	16.0	23.8	17.9
Fee Paying Student Enrolment in Institution	% of students who are fee paying				
High	>25%	39.2	43.3	37.1	40.2
Medium	15-25%	42.9	40.5	43.3	44.1
*Low	<15%	17.7	16.2	19.7	15.7

Table 1: Variable Definitions and Sample Distributions, DEST Staff and Student Collection Data, 2003 (cont'd)

		MALE		FEMALE	
		Level A to C	Level D or E	Level A to C	Level D or E
Variable	**Definition**	**% of sample population**			
Female Staff in Institution	% of academic staff who are female				
High	> 40%	31.4	24.1	38.0	33.6
Medium	33-40%	52.3	52.5	49.9	51.5
*Low	<33%	16.1	23.4	12.1	14.9
Tenured Staff in Institution	% of academic staff who are tenured				
High	>80%	37.9	25.7	39.7	32.2
Medium	70-80%	41.7	46.4	41.3	45.6
*Low	<70%	20.3	27.9	18.9	22.2
Student Enrolment in Institution	Number of students enrolled				
High	>20,000	69.8	68.4	71.2	74.3
Medium	10,000-20,000	25.9	28.9	24.8	22.9
*Low	<10,000	4.2	2.7	4.0	2.7
Number of Observations		7904	3720	5764	942

*Denotes the default category used in the regression analysis Data Limitations

There are important factors that are likely to affect the employment/promotion chances of academics but cannot be measured with the current data. These include the level of experience ('tenure') of the staff member, research activity and family commitments. Although some of these factors can be proxied by variables included in the study (for example, age is a common proxy for experience), the absence of direct measures is a limitation, and will affect the measured relationships between the factors included in the model, such as gender and the probability of being employed in D or E grade[13]. A further limitation of the current data set is the lack of information on the characteristics of workers who have left the university sector. It is reasonable to expect that a relationship exists between the factors affecting workers' retention in the sector and those affecting rates of career progression. For example, workers who do not have the characteristics that are rewarded via promotion to a higher academic grade may be more likely than others to leave the sector, *ceteris paribus*. In technical terms, the current sample suffers from 'sample bias', and this will affect (and typically understate) the measured relationship between individual characteristics and career outcomes.

Although attrition rates in the university sector are relatively low[14], the context of the current study, namely gender differences in employment rates, makes these concerns about sample bias important to keep in mind. It is well

understood that women are more likely, over an extended period of time, to leave their jobs. Many women spend time out of the paid workforce caring for young children, and women, on average, retire from paid work earlier than men. One consequence is that the sample of all workers (and older workers in particular) who are currently employed is likely to under-represent the career experiences of the women who have been part of the organization at some time. The measured effects of gender on career outcomes will thus be distorted. The nature of these effects is discussed in the presentation of results below.

It should also be noted that the exclusion of research-only and teaching-only academics from the study may under-state the full extent of differences in career attainment between male and female academics. This will be especially the case if women, more often than men, are sidetracked into these positions and if the opportunities for promotion from them are limited.

5. Model

The econometric model that is most relevant to the analysis of the chances of a worker achieving a particular occupational grade is the probit model. The binomial probit procedure examines the impact of changes in the values of the independent variables on the probability that the response category relating to the academic grades D or E will be observed (see Greene, 1997 for a full account of the procedure). The approach works with the concept of an index function. The likelihood that an individual will have a particular academic level is seen to depend, first, on the influence of the various measured personal and job characteristics, denoted by $\cdot\cdot x$ (this is the index function); and, second, on the influence of unmeasured factors, represented by $\cdot$. The combined influence of the measured factors and unmeasured factors is represented by:

$$y_i^* = \cdot\cdot x_i + \cdot_i \qquad (1)$$

This model assumes that $\cdot$ is distributed normally with unit variance. Hence, the probability that an individual will be employed in academic grade D or E (denoted by Y = 1) can be expressed as

$$\text{Prob}[Y_i = 1] = \int_{\int}^{\beta' x} \int (t)dt = \beta(\beta' x) \qquad (2)$$

where $\cdot(\cdot)$ indicates the standard normal cumulative distribution function and μ_{ij} is a threshold parameter which represents the value of $\cdot\cdot x_i$ that creates a boundary between the levels.

The coefficients (the · 's), together with the threshold parameters, are estimated using maximum likelihood. The coefficients provide information about the direction and significance of each relationship. However, it is necessary to calculate marginal effects to see the extent to which changes in the value of each explanatory factor affect the probability that a particular academic grade will be achieved[15].

In summary, the model, controlling for a number of personal and job characteristics, examines whether there are gender differences in career attainment. In addition to a binary variable that equals one for males, explanatory variables included in the model relating to personal characteristics are the person's age and education (holding a doctorate or masters qualification). Job characteristics are measured by discipline area, postgraduate enrolment, the fee-paying characteristics of the institution, the proportion of staff that is female and the proportion of staff that is tenured.

Education is a standard measure of a person's productivity characteristics. Age can be viewed as a rough proxy for workforce experience, which is also commonly associated with individual productivity. The university sector is also characterised by strong 'rules' relating to academic promotion, with these being tied especially to education and, to a lesser extent, to experience. Thus, with respect to both the human capital and institutional models, the coefficients on these variables in the male and female samples are of particular interest.

Several of the job characteristics included in the model (discipline area, post-graduate enrolment, the fee-paying characteristics of the institution) are possible determinants of the constraints on promotion within particular workplaces. The final two variables (the proportion of staff that is female and the proportion that is tenured) are included in the model to represent, respectively, the possibility that women's chances of career success are affected by the gender make-up of the institution and the possibility that rates of promotion among tenured staff are themselves affected by the incidence of tenure in the institution.

6. Findings

The following tables show the measured relationships between the various explanatory factors listed in Table 1 and the probability that an employee will be in academic grade D or E. Table 2 reports these results for the model used to examine the relationships across the sample as a whole and for men and women separately, using 2003 data. Table 3 shows the results, largely for comparison, derived from the analysis of the 2002 data.

Table 2: Maximum Likelihood Estimates of the Probability of Being Employed in AcademicGrade D or E, 2003 DEST data

Variable	All		Male		Female	
	Marginal Effect	T stat	Marginal Effect	T stat	Marginal Effect	T stat
Constant	-0.606 *	22.794	-0.578 *	15.432	-0.391 *	12.176
Male	0.118 *	19.387				
Age is 40-49 years	0.243 *	18.233	0.299 *	16.549	0.137 *	8.522
-50-59 years	0.394 *	31.201	0.463 *	29.77	0.249 *	12.769
- 60+ years	0.563 *	32.701	0.585 *	33.582	0.457 *	11.803
Qualification is Doctorate	0.162 *	13.55	0.178 *	10.797	0.132 *	7.452
- Masters	-0.104 *	9.039	-0.142 *	8.488	-0.044 *	3.075
- Bachelor's	-0.109 *	9.26	-0.146 *	8.006	-0.055 *	4.281
Discipline area is Information technology	-0.0550 *	4.694	-0.083 *	5.038	0.001	0.036
-Engineering and related technologies	0.005	0.421	-0.067	0.041	0.038	1.148
-Architecture and building	-0.037	1.927	-0.072 *	2.856	0.037	1.006
-Agriculture, environmental and related studies	-0.044 *	2.491	-0.055 *	2.166	-0.035	1.592
-Health	0.066 *	4.948	0.106 *	5.295	0.024	1.686
-Education	-0.074 *	7.023	-0.111 *	6.622	-0.032 *	2.967
-Management and commerce	-0.020	1.859	-0.032 *	2.051	-0.002	0.155
-Society and culture	-0.021 *	2.312	-0.026 *	1.994	-0.011	1.045
-Creative Arts	-0.091 *	8.35	-0.140 *	8.712	-0.027 *	2.048
Post Graduate Enrolment in Institution is medium	0.047 *	4.492	0.056 *	3.694	0.033 *	2.722
- high	0.100 *	9.792	0.136 *	9.166	0.043 *	3.878
Fee Paying Student Enrolment in Institution is medium	0.011	1.099	0.005	0.362	0.013	1.234
-high	-0.003	0.252	-0.015	0.845	0.007	0.502
% of Staff in Institution that is Female is medium	0.012	1.169	0.015	0.984	0.014	1.091
- high	-0.025 *	2.141	-0.040 *	2.388	0.001	0.066
Student Enrolment in Institution is medium	-0.002	0.13	0.015	0.544	-0.015	0.75
- high	-0.022	1.129	-0.021	0.726	-0.012	0.549
% of Staff in Institution that is Tenured is medium	-0.026 *	2.937	-0.044 *	3.382	0.001	0.076
- high	-0.076 *	8.239	-0.109 *	8.071	-0.024 *	2.276

Notes: a

significant at the 5 per cent level. The results reported in this table are based on unweighted probit regression procedures using Limdep. Number of observations: ALL: 18330; MALE: 11624; FEMALE: 6706; Restricted Log-L: ALL: 10394; MALE: 7287; FEMALE: 2721; Correct Prediction Rate: ALL: 78.8%; MALE: 74.6%; FEMALE: 85.9%

Table 3: Maximum Likelihood Estimates of the Probability of Being Employed in Academic Grade D or E, 2002 DEST data

Variable	All		Male		Female	
	Marginal Effect	T stat	Marginal Effect	T stat	Marginal Effect	T stat
Constant	-0.585 *	20.298	-0.485 *	12.543	-0.436 *	11.469
Male	0.140 *	22.07				
Age is 40-49 years	0.231 *	17.586	0.263 *	15.251	0.157 *	8.869
-50-59 years	0.379 *	29.905	0.428 *	27.891	0.270 *	12.499
- 60+ years	0.531 *	31.01	0.540 *	30.575	0.476 *	11.923
Qualification is Doctorate or Masters	0.098 *	8.826	0.104 *	6.475	0.080 *	6.204
- Bachelor's	-0.095 *	6.736	-0.132 *	6.556	-0.037	1.902
Discipline area is Information technology	-0.090 *	8.391	-0.121 *	8.064	-0.031	1.847
-Engineering and related technologies	-0.010	0.762	-0.021	1.326	0.040	1.137
-Architecture and building	-0.112 *	8.016	-0.161 *	8.543	-0.014	0.486
-Agriculture, environmental and related studies	-0.069 *	4.015	-0.096 *	4.122	-0.019	0.641
-Health	-0.011	0.912	0.016	0.851	-0.018	1.374
-Education	-0.120 *	13.076	-0.165 *	11.843	-0.058 *	5.474
-Management and commerce	-0.084 *	8.797	-0.107 *	7.937	-0.042 *	3.41
-Society and culture	-0.059 *	6.64	-0.074 *	5.988	-0.029 *	2.425
-Creative Arts	-0.156 *	19.609	-0.220 *	19.163	-0.067 *	6.235
Post Graduate Enrolment in Institution is medium	0.038 *	4.11	0.058 *	4.404	0.009	0.846
- high	0.046 *	3.523	0.063 *	3.379	0.019	1.236
Fee Paying Student Enrolment in Institution is medium	-0.030 *	2.809	-0.050 *	3.278	-0.004	0.339
-high	-0.037 *	2.644	-0.055 *	2.782	-0.011	0.652
% of Staff in Institution that is Female is medium	-0.022 *	2.038	-0.029	1.903	-0.004	0.298
- high	-0.068 *	5.906	-0.089 *	5.506	-0.025	1.673
Student Enrolment in Institution is medium	0.065 *	3.035	0.080 *	2.813	0.040	1.477
- high	0.068 *	3.822	0.081 *	3.178	0.049 *	2.322
% of Staff in Institution that is Tenured is medium	-0.014	1.671	-0.026 *	2.113	0.002	0.2
- high	-0.070 *	7.359	-0.096 *	7.039	-0.028 *	2.503

Notes:
a - significant at the 5 per cent level. The results reported in this table are based on unweighted probit regression procedures using Limdep.
Number of observations: ALL: 17595; MALE: 11279; FEMALE: 6316; Restricted Log-L: ALL: 9973; MALE: 7062; FEMALE: 2539;
Correct Prediction Rate: ALL: 76.7%; MALE: 87.5%; FEMALE: 86.2%

The regression analyses of the DEST data provide useful insights into the level of gender equity and the possible sources of gender-based differences in career outcomes in Australian universities. A key result shown in the above tables is that, even once differences in factors such as age, qualification and discipline area are taken into account, and even when the focus is only on tenured academics in teaching and learning units, significant gender-based differences exist in the probability of being employed in the academic grades of D or E. In 2003, male academics were, on average, 11.8 per cent more likely to be employed at this level on the academic career ladder than their female colleagues; in 2002 the difference was 14.0 per cent. Although it is not possible to compare directly the magnitude of measured effects produced from different country samples, it is interesting to note that a significant gender-based difference in career attainment, after account was taken of personal and job characteristics, was also identified by Ward (2001b) in her study of Scottish universities.

The results relating to the role of the measured personal characteristics of age and education were strong, but not unexpected. The probability of being employed in academic level D or E clearly increases with age. Across all the tenured academics in teaching and learning units in 2003, those aged 60 or more had a 56.3 per cent higher chance of being in one of the top academic grades than did their counterparts aged less than 40 years. The effect of age appears to be particularly strong amongst male academics (those aged over 60 years had a 58.5 per cent higher chance of being in levels D or E than those aged less than 40). For women, the difference was 45.7 per cent.

The observed difference between men and women in the measured relationship between age and career outcomes is likely to be due, in part, to the greater incidence of career breaks amongst women. For men, age tends to be a fairly reliable proxy for their level of labour market experience (an attribute that is commonly rewarded in the labour market). However, career breaks and the tendency for women to enter academic careers later in their lives (see Probert et al, 1998, p. 53) imply that they are unlikely to have the same amount of *labour market* and *sector specific* experience as their male colleagues of the same age. To test the importance of these experience factors requires data such as the date of first employment in the sector, which are not available in the published DEST data sets.[16]

The figures in the above tables also demonstrate that qualification levels have a strong effect on measured career outcomes. In 2003, academics with doctorates had a 16.2 per cent higher chance of being in one of the two top academic levels than their colleagues whose qualifications were non-academic or whose qualification type was not recorded. Amongst men, this difference

was 17.8 per cent, whilst for female academics the difference between the two qualification groups was 13.2 per cent.
These findings about the role of qualifications reflect the importance attached to qualifications in the 'rules' applying to academic career progression. The lower measured relationship between qualification and career outcomes for women may indicate the existence of barriers to their converting the benefits of a doctorate into career progression (for example, by pursuing post doctoral research). However, it is important to keep in mind the sample bias problems alluded to earlier, as these are also likely to have contributed to the lower measured results for women on this variable[17].

We turn to the job-related measures. The discipline areas of academic staff appear to have important and substantial effects on their chances of being employed in high career grades. Across all tenured academics, those employed in health had the highest measured likelihood of being in one of the top two academic grades. Compared to academics in the area with the lowest probability of this type of career outcome - the creative arts - those employed in health had a 15.7 per cent higher chance of being in the D or E grade.

The pattern of relationships between discipline area and career outcomes differs between male and female academics, suggesting a degree of occupational segregation within the sector. For example, although male academics in health in 2003 recorded the highest probability of all male academics of being employed in D or E grade, women in this discipline area had a probability of equivalent career success that was not statistically different from the probabilities in a range of other discipline areas (including natural and physical science, engineering, information technology, agriculture and environmental science, architecture, management and commerce, and society and culture). Women employed in education had the lowest recorded probability of being employed in D or E grade. What is most striking in these results, however, is the lack of difference in the measured probabilities of career outcomes for women in a range of different discipline areas.

The reasons for these results are unclear. In the broader economics literature, occupational segregation is identified as an important source of wage differences between men and women and is often linked to different patterns of valuing the work that men and women do. In the university sector, additional explanations that might be advanced for the different patterns of career outcomes of men and women across discipline areas include differences in outside (or market) wage opportunities in specific, segregated occupations; and different patterns of men's and women's involvement in research in particular discipline areas. More detailed data are needed to cast light on these possibilities.

The characteristics of the universities in which academic staff are employed also appear to have a bearing on their chances of being employed at high levels. Staff employed in universities where post-graduate students make up a relatively high proportion (more than 25 per cent) of total student enrolments appear to enjoy better career outcomes than staff where post-graduates comprise a small proportion (less than 20 per cent) of enrolments. In 2003, this difference was 10.0 per cent across all academic staff - 13.6 per cent for males and 4.3 per cent for females. This measured relationship may reflect an opposite causal effect, namely, the influence that the presence of highly qualified/recognised staff has on the recruitment of postgraduate students. It may also be indicative of the importance of research activity (which can be linked to the presence of postgraduate students) in determining career outcomes.

The results in Tables 2 and 3 also indicate that the gender profile of the institution has a significant effect on academics' career outcomes. In 2003, the probability of an academic being in one of the top two occupational grades was, other things being equal, 2.5 per cent lower in those universities where women comprised more than 40 per cent of total academic staff numbers than in universities where women accounted for less than 33 per cent of staff. In 2002 the difference was 6.8 per cent. These results may reflect the history of several Australian universities. As was identified by Carrington and Pratt (2003), a number of the newer universities are characterised by relatively high proportions of female staff. The relative youth of these universities may help account for the lower number of staff in the top two academic grades[18]. However, it is interesting to note that the gender composition of the academic workforce at a university appears to have a stronger effect on the career chances of male academics than it does for females. In 2003, the probability that a male would be in one of the top two academic grades was lower by 4.0 per cent if the percentage of staff that was female was high (more than 40 per cent) rather than low (less than 33 per cent). The measured effect of this factor on women's career chances was not statistically significant in either 2002 or 2003.

The results also indicate that the probability of a tenured academic staff member's being employed at level D or E falls as the proportion of all academic staff with tenure rises. In 2003, tenured academics in universities where a relatively small (less than 70 per cent) proportion of all academic staff were tenured had, on average, measured probabilities of being in Level D or E that were 7.6 per cent higher than was the case for tenured academics where the proportion of academic staff with tenure was relatively high (more than 80 per cent). A possible explanation for this relationship is that universities with high tenure rates are also more likely to have relatively high proportions of

tenured academics at the junior level. Another possibility, however, is that some universities encounter budgetary uncertainties that limit the creation of new tenured positions, and that these same circumstances cause the academics with tenure to be older and, thus, higher up the career ladder.

Other characteristics of the universities – such as the proportion of the student body made up of fee paying students and the size of the student body – were not significant determinants of the probability of being employed in Level D or E in 2003. In 2002, however, academic staff in universities with a student enrolment of more than 20,000 students had a measured probability of being in Level D or E that was 6.8 per cent higher than those recorded by staff in universities with less than 10,000 students. Given the available data, we cannot draw strong conclusions as to the reasons for this measured change.

7. Discussion

The findings presented in the above section provide some up-to-date insights on the pattern of employment of male and female academics in Australian universities. They suggest that, even after differences in education, age (which can also be related to experience), discipline area and several university characteristics are controlled for, significant gender-based differences exist in the probability of employment in the top two academic ranks. The results also indicate that the pattern of 'rewards' to factors such as education differs between men and women in the sector, raising concerns that women have been less able than men to translate their labour market skills into improved wages and working conditions.

Some important caveats apply to these findings. First, the figures that have been produced should not be seen as completely identifying the extent of women's disadvantage in this part of the labour market. For one, questions about the effects that structures and practices within the sector have on the incentives for women and men to acquire additional qualifications or to remain in the sector are not addressed. In her critique of similar quantitative studies of wage discrimination, Barbara Bergmann (1986) observes that if discrimination is present in a labour market, it is likely to reduce the incentive for women to invest in education or to remain with their employers. However, these reductions in education or tenure (and the resulting reductions in women's wages) would not be counted in the measures of gender difference produced by such models.

The Internal Labour Market perspective on the relationships between employment outcomes and explanatory factors such as education and long work hours should also be kept in mind. Thus far we have not questioned the

legitimacy or gender neutrality of the observed relationships (such as that between education and employment outcomes). Yet these relationships are likely to reflect managers' (often male) valuation of what constitutes a productive/committed worker and thus, in turn, also reflect prevailing gender-based and often discriminatory norms and stereotypes.

Drago et al (2001) apply these ideas directly to the university sector in their discussion of the 'ideal worker' norm[19]. In the context of universities, the ideal worker is 'someone who enters profession immediately upon receiving the relevant credential, works his or her way up the career ladder by putting in long hours without interruptions beyond short vacations, and continues in this fashion until retirement age'. (Drago, et al, 2001, p.3) Systems of tenure, pay and promotion tend to reward ideal workers, and the scheduling of courses and allocation of resources within institutions typically supports the retention of these workers and their chances of career success. As the norm (with the associated structures that reflect and support it) was developed in a period when few women were involved in academia, it also typically results in substantial barriers to women's career success.

Drago et al (2001, p.4) advance an alternative concept of discrimination against women that centres on the difficulty of women with children ever being considered 'ideal workers'. This discrimination 'would occur not because of any dislike of children or other dependents, but rather because caregiving activities signal that the faculty member is not an ideal worker and is therefore a substandard academic'.

The current study has *not* taken up these important questions about the meaning and various effects of discrimination. Rather, it has explored the relationship between current levels of education and age, together with a range of job-characteristics, and the career outcomes of male and female academics in Australian universities. These 'quantitative' findings need to be complemented by detailed research on the possible cultural and other impediments to women's career progression in the sector.

8. Summary/Conclusion

The results from this analysis of the 2002 and 2003 DEST data on academics employed in Australian universities indicate that significant differences exist between males and females in the probability that they will be employed in one of the top two academic grades. These differences are shown to persist even after account is taken of differences in age, qualifications, discipline area and institution characteristics. The results also point to a range of factors that are likely to contribute to the achievement of higher levels of gender equity in the sector. Within the context of existing norms about 'ideal workers', these

factors include improvement in levels of qualifications amongst women, the retention of more women in the sector and a reduction in the level of occupational segregation within the discipline areas.

These findings are not novel or startling. What they do, primarily, is add another piece of evidence on gender difference in career progression in Australian universities. They also demonstrate the potential to use the DEST data to answer in a more complete manner some questions that are commonly asked about gender equity (such as, are gender based differences only reflective of different levels of education or experience?).

There is a range of opportunities to extend this study. Even within the confines of the existing published DEST data sets, there is the potential to study also the career outcomes for general staff; to measure the influence of some other factors (such as the presence of female deans and vice chancellors) on measured career outcomes for academic and general staff; to study more fully the gender differences within each of the discipline areas; to explore differences between groups of universities (such as the 'group of eight' and other universities); and to explore alternative ways of measuring career attainment[20].

The greatest prospect for improving the quantitative analysis of career progression in the sector lies in gaining access to additional data on the career experiences of Australian academics. Some of this information is already compiled by each university on an annual basis, but is not made publicly available because of confidential requirements relating to access to staff records. Should access to these data be provided, the 'tracking' of individual academics' career progressions over time would be possible. This would enable researchers to control for some of the sample bias problems that affected this study, to identify the effect of career absence or periods of part time work on career chances, and to ascertain the lengths of time involved in gaining promotion for men and women.

Endnotes

[1] The DEST staff and student collections can be accessed at http://www.dest.gov.au/highered/statinfo.htm

[2] Student characteristics are based on 'submission 1' figures for 2002 and 2003, made in March of each year.

[3] A total of 39 universities were included in the study. Three universities were excluded because they either had no tenured academic staff or no female academics.

[4] There was a substantial increase in the proportion of academic staff who were tenured (and thus benefited from employment security) over the 1985-2002 period.

According to Carrington and Pratt (2002, p.5), women accounted for the majority of the increase in tenured positions over this period.

[5] See Austen, Birch, Cabalu and Kenyon (2003) for an overview of the many recent Australian studies.

[6] See, especially, Doeringer and Piore (1971). Probert et.all (1998, p.6) explain that sociological theories of gender relations pursue similar themes.

[7] Thurow's (1983) work highlights that this is never a constant anyway

[8] When wages are used the discussion is usually in terms of average wage outcomes for men and women. Typically, understanding these differences involves the participants drawing their own inferences about women's position on particular career ladders, as compared to men's. The current approach eliminates that step.

[9] Probert et al (1998) attempted to study the determinants of the level of employment using a standard multiple regression model. As the dependent variable is limited to a range of 1 to 5, the standard regression model is not well suited to this type of analysis (see Greene, 1997, p.871)

[10] There are likely to be very few non-tenured academics in levels D and E, limiting the ability to integrate casual staff into the analysis.

[11] In 2002, in particular, the qualifications of many staff were reported as 'unknown'.

[12] Questions on country of birth and language were only introduced in 2003 and the information provided by the universities on these staff characteristics was patchy at best

[13] Barbara Bergmann (1986) cautions against assuming that the inclusion of additional factors in such models would reduce the measured effects of gender on labour market outcomes. She notes that measures of factors that could be reasonably assumed to affect negatively men's productivity, such as higher rates of alcohol consumption and accidents, are also absent from these models.

[14] As an example, the resignation rate (i.e. the number of resignations expressed as a proportion of the total number employed) for academic staff at the University of Technology Sydney was 3.4 per cent in 2002 (UTS, 2003)

[15] The model was estimated with LIMDEP version 8. (Greene, 2002)

[16] It is important to note that the data provided by each university do give this information. I hope that future studies will be able to access these data.

[17] Specifically, as it is likely to be the case that more women (especially those without higher degrees) would have left the sector due to family commitments and other reasons, the number of women without higher qualifications could be expected to be lower and, as a result, the measured difference in career outcomes associated with qualifications would be reduced.

[18] Extension of the current study should directly control for this possible effect.

[19] This norm was originally discussed/described by Joan Williams (1999).

[20] For example, an ordered probit model could be used to examine the determinants of the probability of being employed in each academic level (from A to E).

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