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Discrimination, Performance and Career Progression in Australian Public Sector Labor Markets

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DISCRIMINATION, PERFORMANCE AND CAREER PROGRESSION IN AUSTRALIAN PUBLIC SECTOR LABOR MARKETS*

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Abstract

While promotion is an important mechanism for allocating labor within organizations, relatively little is known about the determinants of promotion in the highly diverse and traditionally heavily regulated Australian labor markets. This study uses unique data from the Victorian Public Sector Census 2004 to identify the extent and nature of bias in the promotion process. Specifically, we use the promotion histories of 16,675 public sector employees to investigate the existence of discrimination in promotion on the basis of gender, disability and cultural diversity. We find that some differences exist in the rate of promotion on the basis of gender, and to a lesser extent, of birthplace, but, importantly, most of these are due to differences in endowments. There are effectively no differences in promotion on the basis of disability. We find that the main driver of promotion in Victorian public sector labor markets is worker effort and performance. Compared to labor markets elsewhere, the Australian public sector is relatively free of discrimination in promotions.

Key Words: labor markets, discrimination, public sector, promotion, career progression
JEL Classifications: J41, J45, J48

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1. Introduction

Since Doeringer and Piore (1971), economists' fascination with the operation of internal labor markets has grown.[1] While they take many forms, internal labor markets are often characterized by well-defined career ladders and the associated attachment of wages to jobs, relatively long-term employment contracts, the existence of 'ports of entry', and a pronounced use of bureaucratic mechanisms for the allocation of labor within the firm. These internal markets tend to reduce, but not eliminate, the role for external labor markets in the allocation and pricing of labor resources (see Bayo-Moriones and Ortín-Ángel 2006). Firms that rely relatively heavily on internal labor markets are known often as *career firms*.[2] An indispensable component of career firms is internal mobility and career advancement through the internal matching of workers to jobs, i.e., promotion (McCue 1996).[3] From the perspective of a worker, career progression is a collection of several individual experiences, including salary growth, advancement/vertical movement along job ladders, job opportunities in other organizations, and rising status and recognition.

An important issue is the existence of bias in promotion on the basis of worker characteristics that are independent of worker performance. Indeed, the issue of gender and racial differences in promotion is an extension of gender and racial differences in pay (for reviews see, for example, Altonji and Blank 1999 and Weichselbaumer and Winter-Ebmer 2005). With salary growth linked to promotions and responsibility levels, discrimination in promotion becomes a causal factor in pay inequity.[4]

The public sector is of particular interest in this regard. In many countries, the public sector can be seen to be a leader in advocating and implementing policies that promote equality of opportunity and the eradication of discrimination. This is at least in part because in many - but not all - countries employers in the public sector are probably more sensitive to community attitudes and policy trends, with respect to issues relating to discrimination, than their counterparts in the private sector. Indeed, an important difference between public and private sector labor markets is the ability of politicians and bureaucrats to achieve objectives for the public sector that differ from private sector firms (see Gregory and Borland 1999).

While their specific characteristics differ over time and across countries, there is evidence that internal labor markets have been an important feature of labor markets for a very long time. For example, internal labor markets have been widespread in the U.K. (Siebert and Addison 1991) and the U.S. (see for example: Jacoby 1984; Baker and Holmstrom 1995; Groshen and Levine 1998; Owen 2001; Levine 2002; and Gibbs and Hendricks 2004). Internal labor markets are also a defining feature of Japanese firms (Ariga, Brunello and Ohkusa 2000). They have also been found to exist to varying degrees in many countries, such as Taiwan (Lin 2005), Denmark (Eriksson and Werwatz 2005) and Sweden (Lazear and Oyer 2004). Presenting interesting case studies for Canada and England, respectively, Hamilton and MacKinnon (2001) and Howlett (2004) trace the emergence of internal labor markets to large railway companies. Seltzer and Merrett (2000) and Seltzer and Simons (2001) show that internal labor markets have existed in the Australian banking industry as early as the 1880s.

Virtually all large organizations (in both the public and private sectors) have now adopted some form of internal labor matching procedures. While the evidence points to the widespread existence of internal labor markets within firms, 'extended' internal labor markets have been

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[1] Internal labor markets have been a constant source of interest also for sociologists and organisation researchers (Elvira 2001).

[2] It is important to note, however, that in practice virtually all firms use a combination of internal and external labor markets and operate in more than one market, depending on the occupational groups employed.

[3] While careers obviously can progress by employees seeking opportunities outside the firm, our focus in this paper is solely on career progression within a firm or a particular public sector agency.

[4] Many studies have explored gender differences in wages arising from promotion. Examples include: Killingsworth and Reimers 1983; Olson and Becker 1983; Gerhart and Milkovich 1989; Hersch and Viscusi 1996; McCue 1996; Pudney and Shields 2000; Francesconi 2001; Johnston 2002; Booth *et al.* 2003; and Gibbs and Hendricks 2004.

found also between firms and universities (Brunel 2005) and across establishments within diverse firms (Kaplan and Pierce 2005).[5] Although there may have been some tendency to shift *away* from internal labor markets in many countries in recent years (Cappelli 1999; Magnani 2003), they remain an important institutional feature of labor markets, with millions of employees affected by them.

Despite the global importance of internal labor markets, surprisingly little is known about promotion in firms and labor markets outside the UK and the US. Correspondingly, relatively little is known about the impact of human capital on the prospects of promotion, and the role of gender and job and worker characteristics on career progression. Even less is known about promotion of either employees with a disability or those from a culturally diverse background. Most of the extant research has used data from the U.K. (Groot and van den Brink 1996; Dolton and Kidd 1998; Pudney and Shields 2000; and Booth *et al.* 2003), or the U.S. (Hersch and Viscusi 1996; Pergamit and Veum 1999; McDowell *et al.* 2001; Gjerde 2002; and Ginther and Hayes 2003). Recently, researchers have began to explore the determinants of promotion in other nations. Some examples include Garcia-Crespo (2001) and Bayo-Moriones and Ortín-Ángel (2006) for Spain, and Pekkarinen and Vartiainen (2006) for Finland.

There are currently no published empirical investigations on the determinants of promotion in Australian labor markets. The aim of this paper is to explore the key determinants of promotion within Australian public sector labor markets. Using a unique dataset (the Victorian Public Sector Census 2004), we estimate an ordered probit model to investigate the existence and magnitude of bias in promotion on the basis of gender, disability and cultural diversity, after controlling for both human capital characteristics (such as qualifications and experience) and job characteristics.[6]

This paper makes four important contributions to this literature. First, it identifies the key determinants of promotion in Australian public sector labor markets.[7] Australia presents an interesting case study. At one time, Australia was regarded as having one of the most, if not the most, regulated labor markets in the OECD (Killingsworth 1990). Freeman (2006) noted recently the importance of learning from the labor market experiences of countries like Australia. Australia has an interesting blend of a very diverse workforce (with a large intake of migrants and the promotion of multiculturalism), together with active government interventions in labor markets and initiatives against discrimination.[8]

Second, the study informs on the impact of antidiscrimination legislation on bias in promotion. Given the nature of her labor markets and the extent of regulatory intervention, Australia is a particularly interesting case for the exploration of the impact of legislation on discrimination on career differences on the basis of gender and cultural background. With such a

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[5] There are actually several types of internal labor markets, and firms can simultaneously operate more than one type (see Osterman 1984 and Bills 1987).

[6] In terms of economic importance, Victoria is the second largest Australian state and is very representative of the rest of Australia.

[7] While there are Australian studies that have expored related dimensions such as discrimination in training (Miller 1994) and occupational disadvantage (Borooah and Mangan 2002), such studies have not analyzed the determinants of promotion. The one exception is the study by Austen (2004) that was limited to gender differences in professorial positions in Australian universities.

[8] There exist an array of Australian Federal and State legislations against discrimination on the basis of race, indigenous status, gender, age and disability. Examples of Federal legislations include: the *Racial Discrimination Act 1975*; the *Sex Discrimination Act 1984*; the *Affirmative Action (Equal Employment Opportunity for Women) Act 1986*; *Disability Discrimination Act 1992*; the *Native Title Act 1993*; the *Workplace Relations Act 1996*; and the *Age Discrimination Act 2004*. Additionally, all Australian States have adopted strategies that promote EEO programs in their public sectors. Examples include: Part 9A of the *NSW Anti-Discrimination Act 1977*; the *Strategy for Employment of People with Disabilities in the South Australian Public Sector*, authorised under Section 67(2) of the *Public Sector Management Act 1995*; and the *Equal Opportunity in Public Employment Act 1992* in Queensland. Australian States are relatively homogenous and Federal legislation helps maintain this homogeneity.

wide range of antidiscrimination legislation that has existed in many countries, in many cases for decades, we would expect to find no discrimination, especially in the public sector. However, while discriminatory laws and practices have been removed, historical bias and disadvantage can still shape current stereotypes and prejudices. Moreover, bias may be conscious or unconscious. In the presence of legislation, conscious discrimination is likely to be covert. The law is unable to cover all contingencies and promotion committees frequently have some degree of discretion. As Booth et al (2003, p.302) note: "… the law cannot effectively force equal promotion rates in practice, nor does it limit the wage distribution that arises as firms respond to outside offers." Hence, even in the face of extensive legislation, the extent and nature of discrimination is an empirical issue. Further, while the main focus in the policy community is the extent of overall (or net) bias, we are interested also in identifying the existence of biases with respect to certain attributes. For example, do females receive the same benefits in terms of promotion as males from formal qualifications? Do workers with a disability get the same benefits in terms of promotion as abled-bodied workers from working full-time? These *incremental* biases are more likely to pass through the legislative net and their existence sheds important light on the channels through which bias is transmitted.

Third, existing studies have tended to use data that is: (a) exclusively related to the private sector; (b) combining observations from the private and public sectors; or (c) exploring specific public sub-sectors such as nursing (Pudney and Shields 2000), education (Eberts and Stone 1985), and health, education and welfare (Borjas 1978). We contribute to the relatively small pool of studies that explores the promotion process for the *entire* public sector (see, for example, Naff 1994).

Fourth, the main focus of the existing promotion studies has been the existence of discrimination in male-female, black-white and sometimes Hispanic promotion. Our study is one of the very few to explore discrimination in promotion on the basis of disability, as well as the other Equal Employment Opportunity (EEO) variables. While several studies have explored salary differentials for workers with disabilities (see for example: Borjas 1982; Johnson and Lambrinos 1985; Baldwin and Johnson 1994; Hendricks *et al.* 1997; Kidd *et al.* 2000; DeLeire 2001; Brazenor 2002; Charles 2003; and Thoursie 2004), there is a dearth of research on the impact of disability on promotions.[9] For the U.S. there is evidence that discrimination with respect to disability has persisted even after the introduction of relevant legislation (Cesare *et al.* 1990; and Miceli *et al.* 2001). The experience of other nations is important for comparison purposes.

Section 2 reviews the theory on promotion, and discusses the nature of internal labor markets in the Victorian Public Sector. The dataset is discussed in section 3, as is the econometric methodology. The results are presented and interpreted in section 4. The paper is concluded in section 5.

2. Theory and Prior Analysis

Labor market experience in a career firm differs from that predicted by the theory of perfectly competitive labor markets (Gibbons and Waldman 1999). For example, in career firms there is a greater reliance on administrative decree for the allocation of labor rather than market forces. The effect of this on promotion is *a priori* indeterminate. Administrative decree can distort competitive market outcomes, either decreasing the extent of differences in promotion rates and wage relativities or increasing them. Thus, if there exists pre-labor market discrimination that

[9] This literature has explored employment (labor hiring and labor market participation) effects, but not promotion effects (see Baldwin and Johnson 1995, Kidd *et al.* 2000, Baldwin and Johnson 2000 and Beegle and Stock 2003). A noticeable exception is Lewis and Allee (1992) who found that in the US disabled employees had lower grades and fewer promotion rates. Our interest is on the careers of disabled workers that are hired.

would disadvantage female applicants, administrative decree can offset this by biasing promotion procedures in favor of females. Alternatively, administrative decree can reinforce broader biases against women and institutionalize bias in practice.

There is currently no accepted unifying theory of promotions. Researchers typically draw upon various strands of theory, such as the theory of tournaments, and from specific models such as Lazear and Rosen (1990) and Booth *et al.* (2003).[10] Standard economic theory establishes firmly that voluntary exchange and factor mobility is wealth and welfare enhancing. This applies equally to mobility within firms. The optimal path of a career is driven by productivity. However, this path is influenced by external and internal labor market distortions. Examples of these distortions include legislation and regulation imposed externally on the firm, and factors such as unionization, and biases and inefficiencies in the firm's own internal governance and promotion processes. Productivity is revealed to a firm through actual performance, and the potential to perform at higher levels is signaled to the firm in various ways. That is, promotability is a function of past performance and expected future performance.

Promotions have two salient features. First, promotions are by and large based on relative productivities – promotion is given to the best applicant rather than the one that is good in an absolute sense. This arises because often it is easier to observe relative productivities than it is to observe absolute productivities. Moreover, budget constraints often result in qualified applicants missing out on promotion.

Second, promotion is a mechanism for internal labor mobility within an organization and, is in many ways, a substitute to labor mobility between organizations. In a *career firm,* job allocation tends to occur from the pool of insiders, with limited competition from outsiders.[11] This preference in favor of insiders is more likely to occur the more risk adverse employers are, and the easier (harder) it is to observe the abilities of insiders (outsiders). Chan (1999) shows that in many organizations it is only when outside applicants are *substantially* better than the insiders that they will be considered for appointment.

From the employers' perspective, promotion is a sorting device, as it helps to match job requirements with worker abilities and productivities. Promotion is also an essential component of a set of pay-for-performance incentive schemes (Prendergast 1999). In this sense, promotion is both a reward for exerting extra effort, as well as a catalyst that is expected to induce greater effort (Audas, Barmby and Treble 2004).

Promotions work best as an inducer of effort if a large number of employees compete, which limits the opportunities for collusion to shirk (Lazear 1998). However, if there is too much competition for promotion, there will be less cooperation and this may hinder the on-the-job transfer of knowledge and training (Lazear 1989), a proposition supported by Australian data (see Drago and Garvey 1998). As an alternative to tournaments, promotion could be based on seniority, providing an incentive for workers to invest in firm specific human capital (Becker 1975), but potentially delaying the matching of young productive workers to higher positions.

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[10] In Lazear and Rosen' model, women have both an absolute and comparative advantage in *non-market* work (e.g. house duties). Consequently, women have less attachment to the workforce, driving employers to prefer to promote men to women. In Lazear and Rosen's model, women can get promoted, but to do so they need to be more able than men. It follows that in this model, females are likely to get higher wages than males for equivalent promotions, because the promoted females are more productive. The Booth *et al.* (2003) model also revolves around outside opportunities, but this is driven mainly by *market* opportunities. Booth *et al.* argue that if discrimination restricts female mobility or if internal labor market practices are such that female outside offers are less likely to be matched, females will receive a lower wage for each promotion, than an equivalent male. In the Lazear and Rosen model, women are less likely to be promoted but receive more than men do for each promotion. In the Booth *et al.* model females are just as likely to be promoted but receive less than men do for each promotion. Note however that the Booth *et al.* is more general and does contain the Lazear and Rosen results as a special case.

[11] Where competition with outsiders exists, it maybe token, with the insider having the front running for the job, unless the outsider is significantly better. The relative importance of competition from outsiders varies across organizations as well as over time.

From the employees' perspective, promotion enables salary growth, career progression, rising status and rising recognition. Promotion is a clear signal of recognition from the employer. Promotion often involves more challenging work with greater non-pecuniary benefits, and potentially offers greater job attachment (see, for example, Fairris 2004). Moreover, where salaries are attached to positions rather than individuals, promotion becomes an important source of salary growth (Wise 1975).

2.1 Bias in promotion

Bias, or discrimination, in promotion systems can be positive or negative, and reflects the extent to which a worker's expected returns from promotion are influenced due to personal worker characteristics or attributes that are unrelated to their effort or performance. The expected returns to the individual from the promotion process over time may be affected by a change in the prospects for promotion and/or a change in the actual return from a promotion. For example, negative discrimination in a promotion process could exclude women from some job opportunities (e.g. glass ceiling effects), reduce their rate of advancement in any classification, or reduce the pay increment for any promotion received.[12] Bias can arise at all stages of the promotion process. It can arise with respect to the short-listing of candidates, the interview stage, as well as level of placement if a promotion is awarded. Moreover, the discrimination can be institutionalized in a formal sense through administrative guidelines or it can be reflected in the attitudes and actions of employers and their agents, either overtly or covertly.

Historically, bias against females in promotion was transparent and institutionalized in the Australian public sector. A dual wage system ensured males earned more than females and the career options for females were constrained. Sawer (2001) notes that:

> "This rationale for restricting women to routine rather than career positions was still influential at the time of the Second World War. R.S. Parker wrote in his 1942 review of public service recruitment that there was some evidence that women were "more adaptable to monotonous work than men", so their employment in a separate class would free up officers "capable of and destined for more responsible tasks" *(Parker 1942: 223).*

In the past, females encountered a truncated career path in the Australian public sector. For example, a bar used to exist that prevented the employment of married women. With the advent of equal opportunity legislation and affirmative action, this situation has changed. Sawer (2001) notes that in 2000, women in the Australian Public Service constituted 24 percent of the Senior Executive Service (SES), as contrasted with 0.3 percent of the (then equivalent) Second Division in 1974.

Bias can also be less transparent, but occur through higher criteria for promotion being applied to females, resulting in fewer promotions for them. Organizations can have clearly developed policies and procedures that try to prevent discrimination in promotion and try to facilitate efficiency in the internal labor market allocation process. However, in practice there could well be a significant gap between policy adoption and policy implementation. Even if administrative decree and procedures dictate that panels be free of bias, panels have an inherent degree of discretion. With imperfect monitoring of the selection and promotions process, the principal-agent problems can lead to biased promotion outcomes. Indeed, promotion decisions may be more prone to discrimination because they tend to be less open to external scrutiny than hiring decisions (see Baldi and McBrier 1997).

There is an important difference between gender differences in promotions and differences in promotion *because* of gender. Differences in promotion can arise from *endowment*

[12] Differences in promotion outcomes may arise also through self-selection effects. For example, Naff (1995) notes that if females *perceive* that they have limited promotion opportunities, this will impact on their career paths.

effects (such as human capital) that may or may not be associated with gender differences. They can arise also because of *underlying bias* (discrimination between groups that is unrelated to the work skills and attributes possessed) and *incremental bias* (such as differences in returns to skills on the basis of gender). Total bias is the sum of underlying and incremental bias.

The endowment effect can either reinforce or cancel out the incremental bias, so that it is not possible to identify the extent and the direction of the bias in promotion by examining simple group averages. For example, if women are better educated than men they will tend to fare better in the promotion process than men. Where there is negative discrimination in the system, the bias may not be sufficient to offset the value of their superior human capital attributes. So even with significant negative bias in the process, women could be more successful in the promotion system than men. Similarly, if the bias is positive towards women, a comparison of observed male and female promotion returns will not show how much was due to human capital attributes and how much is due to positive discrimination, as both factors would tend to push up female promotion performance relative to that of males. It is for this reason that researchers analyze marginal effects and apply decomposition techniques.

2.2 Endowment Effects

The endowment effect is a measure of the differences in promotion that arise from differences in human capital. For example, if tenure and formal qualifications are important determinants of performance in the workplace and females have fewer years of tenure and lower levels of qualifications, then they will, *ceteris paribus*, experience fewer promotions. The reduced promotions in this case however do not reflect bias in the promotion process. Indeed, in these cases, the difference in probability of promotion reflects efficiency – the mechanisms of the internal labor market are allocating labor on the basis of relative productivities. Furthermore, differences in endowments that arise from pre-labor market discrimination and/or reflect individual preferences cannot be said to reflect discrimination in promotion or discrimination by the current employer.[13]

Endowment effects are important also to workers with a disability. Messer Pelkowski and Berger (2003) argue that workers with health problems are more likely to remain with their current employer as they are less mobile (see also Baldwin and Schumacher 2002), increasing the prospect of promotion. At the same time, they are less likely to be in full-time employment (Schur 2003), and consequently acquire less labor market experience, decreasing the prospects of promotion. Miceli, Harvey and Buckley (2001) note that discrimination against people with disabilities need not be conscious. Detecting discrimination is particularly difficult as exclusion from positions could be due to discrimination or due to disabilities preventing the disabled from performing the tasks, even with employers changing facilities.

2.3 Incremental Bias

The incremental bias measures bias in the returns to specific endowments. For example, if the probability of promotion from possessing a PhD is lower for females than males, then the promotion process is biased against females with comparable incremental differences in endowments. Incremental biases can be seen also as a way of introducing positive discrimination, for example as a means of offsetting initial bias at the time of appointment. Numerous factors contribute to incremental bias and it is possible for one component of the incremental bias to favor one group, while a different component favors another group. Hence, identifying the

[13] However, if employers prefer to train males, then females will *ceteris paribus* possess fewer endowments. Consequently, part of the endowment effect would then result from discrimination. For our sample, 9.2% of females received employer financial support either for further study or training, compared to 9.7% of males. Running a simple binary probit of financial assistance regressed against the EEO dummy variables confirms that there are no gender differences in support for training.

endowment effect and the various incremental biases, and consequently detecting the degree and direction on net bias in promotion is an empirical issue.

2.4 Prior Empirical Research

The extant empirical research into promotions can be divided into three groups. First, there is the group of early studies that explored some of the determinants of promotion, but without considering discrimination; examples include the studies by Abraham and Medoff (1985) and Mills (1985). Second, there is a growing pool of studies that investigates the degree of discrimination in promotion. For example, Pergamit and Veum (1999) found that women, blacks and Hispanics were less likely to be promoted than white men. Third, there is a group of studies that explores the impact of discrimination in promotion on salaries (some of these are listed in footnote 4). The existing international studies produce mixed results (see Cobb-Clark 2001 for a recent review) of the empirical studies. For example, Booth *et al.* (2003) found that gender did not contribute to differences in promotion in Britain, while Gjerde (2002) found that females were less likely to be promoted in the USA.

Relatively little is known about promotions in Australia. The extant research has focused on issues such as: satisfaction with career progression (Lingard and Lin 2004); the impact of promotion opportunities on work effort (Drago 1991); the characteristics of workers receiving promotion (Fraser 2000); impact of promotions on willingness of workers to cooperate (Drago and Garvey 1998); and the impact of career interruptions on career progression (Rimmer and Rimmer, 1997), Brown and Jones (2004) and Arun, Arun and Borooah (2004). There have been some case studies (such as Brown 1997), but econometric analysis of Australian data is rare.

3. Data and Methodology

The present study involves an econometric analysis of career progression equity in the Victorian Public Sector (VPSct), using data from the recently completed Victorian Public Sector Census 2004.[14] The Census was conducted between March and May 2004, with 19,526 respondents from 105 public sector organizations and 91 government schools. The Census was distributed to all staff in the Victorian Public Service (a sub-sector within VPSct) and to selected organizations in the other sub-sectors such as Water, Health, University/TAFE and Schools, with questionnaires distributed physically at workplaces, as well as via the internet. Most (51%) of the respondents were employed by the Victorian Public Service. The overall response rate was 25.5%. However, because of missing observations for several of the key variables, the sample used for the multivariate analysis is for our preferred specification reduced to 16,675.[15]

The Census collected data on a broad range of Equal Employment Opportunity groups (EEO), individual characteristics, work and promotion histories and human capital investments.[16] Specifically, we have: 9,881 observations for the Victorian Public Service; 593 for Water; 3,769 for Health; 2,836 for the University/TAFE; and 491 for the School sub-sectors, respectively. The key advantage of the dataset is that it is not limited to a single firm. By covering an entire sector, it is easier to generalize than from single firm studies.

The key variable of interest is the number of promotions. Respondents were asked to answer the following question: *"How many times have you been promoted within the Victorian public sector since you first joined?"* Pergamit and Veum (1999) note that promotion can take many forms. Some promotions involve a position upgrade, some promotions involve no change of duties, while other promotions involve new functions and responsibilities. In the Census, the question relating to the number of promotions, gave the following definition of promotion to respondents: "*Promotion is appointment to new position at a higher level which involves increased*

[14] We are grateful to the Victorian Office of Public Employment for making the data available to us.
[15] We are confident that this attrition in the sample does not bias the estimates. For example, by omitting some of the variables, we are able to increase the sample size with no real noticeable differences in the promotion responses.
[16] The Census did not include any useable information on indigenous status.

accountability, higher level technical skills and/or increased supervisory responsibility". Hence, the data we have on promotions relates to what is normally thought of as career progression and advancement within the firm involving greater responsibility, rather than simple position reclassification. It means also that respondents have an explicit and specific definition of promotion. Some of the existing studies were forced to use existing data that had no explicit definition of promotion, but relied on a "common perception of what constitutes a promotion" (McCue 1996, p. 176).[17]

It should be noted that while promotions are defined as placements involving greater responsibility, we do not have information on the extent of changes in responsibilities as a result of promotion. This is a situation that characterizes most of the extant studies on promotion. We also do not have information on whether promotion was contested, and how much competition there was for promotion. The other limitation with our data is that in common with many other studies, we have no information on quits. If the probability of promotion for employees who remain is different to those who leave, then this will limit the degree to which our results can be generalized. Following Wise (1975) we analyzed the correlations between tenure and the other covariates. Most of the correlations are very small, suggesting that this problem is likely to be small.[18, 19]

3.1 Modeling Strategy

In the case of analysis of pay differentials, there is a well-developed economic theory commencing with Mincer (1974) and Becker (1971 and 1975), specifying both the type of variables that should be included in an earnings regression, as well as the functional form (log-linear). This is not the case for promotion. Existing investigations have relied on reduced form regressions and have been driven largely by data availability. In the absence of an accepted structural economic model of promotions, we follow the extant literature and explore the determinants of promotion by selecting a range of variables that have been identified in the literature as being important.

Our approach involves estimating an ordered probit model that identifies the determinants of promotion in the Victorian Public Sector. This involves estimating various versions of the following equation:

$$PROMOTIONS_i = \beta_0 + \beta_h \mathbf{H}_i + \beta_e \mathbf{EEO}_i + \beta_j \mathbf{J}_i + \beta_w \mathbf{W}_i + \beta_s \mathbf{S}_i + \beta_{eh} \mathbf{EEO}_i \times \mathbf{H}_i + \beta_{ej} \mathbf{EEO}_i \times \mathbf{J}_i + \beta_{ew} \mathbf{EEO}_i \times \mathbf{W}_i + \beta_{es} \mathbf{EEO}_i \times \mathbf{S}_i + u_i \quad (1)$$

where i indexes the ith public sector employee, **H** is a vector of human capital variables (including tenure), **EEO** for is a vector of Equal Employment Opportunity dummies, **J** is a vector of internal labor market characteristics, **W** is a vector of individual worker characteristics and **S** is a vector of sub-group (workplace) variables. Our primary interest lies in the EEO

[17] Like the vast majority of other promotion studies, we rely on self-reporting of promotions and are unable to match respondents to their actual positions in the hierarchy. We have no information on the extent to which respondents overstate their career advancement. However, officers from the Victorian Office of Public Employment believe that the responses were a fair and accurate representation of career progression within the public sector.

[18] The highest correlation is between tenure and the performance of higher duties (0.28), sideways movements (0.26) and permanent status (0.20).

[19] Like all other studies, we also lack any information on demotions and, hence, are unable to model this aspect of internal labour markets. Demotions are likely to be an uncommon event in the markets we are analysing. Lateral moves, however, may be more common and these are included in our estimation.

dummies and the EEO interactive terms. Definitions of all the variables as well as descriptive statistics are listed in Appendix A.

3.2 The Dependent Variable

Our dependent variable is **PROMOTIONS**, which is the number of promotions since joining the VPSct, available as 0, 1, 2, 3 and 4+. The number of promotions is constrained to 4+ on the upper bound. While the underlying data generating process for "promotability" is a continuous latent one, **PROMOTIONS** is observed as integer values. Treating the **PROMOTIONS** variable as a continuous variable would result in the assumption that the difference between 1 and 2 promotions is equivalent to the difference between 3 and 4+ promotions, which is clearly potentially misleading.

We would like to capture the probability of an event occurring (promotion), given the row vector of individual characteristics, that is "promotability". In this case, 2 promotions is superior to 1, and the relationship between 1 and 2 promotions is different than that between 3 and 4+. Once the individual passes a certain unobserved promotability threshold in his/her career given his/her characteristics, promotion occurs. Further, this promotability is observed only when the actual promotions take place, which are ordinal in ranking. Given this, it is natural to use the ordered probit model. The only disadvantage of this approach is treating all individuals with 4+ promotions as being equally talented. However, this is imposed by the data availability. Further, given the similitude of the promotions at the upper levels, it is not unreasonable to assume that the error associated with this assumption will be minimal.

The multinomial logit model is not an appropriate choice for estimation, as this model does not incorporate the ordering of the data. Cameron and Trivedi (1998, p.87) note that the multinomial logit model is valid only in cases where: "the relative probabilities of any two outcomes are independent of the probabilities of other outcomes". This is clearly not the case with respect to promotions.

In some ways, the dependent variable resembles a censored variable; that is, it is restricted to 0 from below (and many zeroes in the sample) and has observations such as 4+, meaning that promotions above 4 are censored. This would suggest a Tobit estimation. However, the Tobit model could be used only if the dependent variable could be treated as "continuous". Further, such censoring is intrinsic to the ordered probit dependent variables.

A count data model may be an option, but there are certain problems in this case. For example, the Poisson distribution upon which this model is built makes strong assumptions, such as the probability of an occurrence is constant at any point in time and that the variance of the number of events is equal to the expected number of events. These assumptions are hard to justify in the context of promotion in public sector labor markets. Moreover, the increasingly popular Negative Binomial model (Negbin) is also not appropriate (see, for example, Garcia-Crespo 2001). Cameron and Trivedi (1998) note that the Poison and the Negbin models are not valid if the data generating process is deemed to be that of a continuous latent variable. Our focus is on promotability, which is a continuous *latent* variable. This makes the use of the Poison and Negbin models inappropriate.[20] Hence, on theoretical grounds, we prefer the ordered probit model to count based models.[21]

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[20] Promotability is very different to obvious count based series such as patents, the number of children, the number of job changes and the number of unemployment spells (see Winkelmann 2003).

[21] We also converted the dependent variable into a binary choice variable, taking the value of 1 for respondents who have received a promotion and 0 for those who did not. This was estimated using a binary probit model. Binary probit and logit models have been used extensively in this literature (see for example: Groot and van den Brink 1996; Baldi and McBrier 1997; Elvira 2001; and Booth *et al.* 2003). An ordered probit models is a natural extension of a binary probit model when more information is available on one or two of the choices in the binary choice dependent variable (whether a promotion was received or not). It facilitates exploring different dimensions of the promotion question, incorporating the differences in the number of promotions.

Table 1 compares the percentage of males to females for each of the number of promotions. In the VPSct overall, a greater proportion of females has attained no promotions, and a smaller percentage of females attains 4 or more promotions. This pattern is confirmed in the multivariate analysis presented below. Table 1 compares also the distribution of promotions for employees with a disability to employees without a disability. Note that Table 1 presents the "raw" differences in promotion. In order to attribute these differences to bias in promotion, it is necessary to control for the impact of individual employee characteristics and productivity differences, as well as differences in jobs.

TABLE 1 ABOUT HERE

3.3 Explanatory Variables

We draw upon the extant literature and use explanatory variables that are designed to capture a range of individual, productivity, job and sub-sector characteristics. Ideally, we should include expected future performance, as this is an important aspect when workers are promoted. However, this is unobserved. Hence, we assume that past performance and observable worker characteristics are a sufficient proxy for future performance.

EEO dummies: The first set of explanatory variables is a series of dummies for EEO status. These are dummies for gender (**Female**), disability (**Disability**)[22], whether the respondent was born outside Australia in an English speaking country (**Born OA English**), and whether the respondent was born outside Australia in a non-English speaking country (**Born OA non-English**).[23] The distinction between English and non-English background is introduced to test whether cultural and linguistic differences play a role in promotion. Our key focus in this paper, and most of the interpretation of the results, is on the association between EEO status and promotion.[24]

Given the nature of public sector labor markets, we expect relatively little bias in promotion associated with EEO status. *Officially*, given the extent of legislation, there should be no bias against, or for, any of these groups. Hence, we expect that these coefficients should not be statistically significantly different from zero, once all other factors have been controlled for. *Unofficially*, however, bias can still arise in the promotions process. If promotion panels are biased towards a particular EEO group, it should be detectable in the data.

Human Capital: It is customary to include variables that capture educational attainment. With regard to promotion, however, it is important to net out the contributions of human capital at the time of entry and the acquisition of additional human capital whilst employed in the public sector. Most existing studies do not control for the timing of qualifications and merely include the highest qualifications attained. For example, variables such as the highest level of education qualification attained at the time of entry into the public sector, represent the rewards to education from the external labor market. Workers are employed on the basis of actual and potential productivity and this is, at least, in part reflected in qualifications at time of entry. An argument can be made that it is reasonable to assume that qualifications held at the time of entry

[22] The actual question relating to disability was: "Do you have any sort of disability that restricts you in performing everyday activities and which is long-term (lasting six months or more)?" Respondents were also given some examples of what constitutes a disability.

[23] There is a fairly large literature on the earnings of immigrants to Australia (see, for example, Chiswick, Lee and Miller (2005), but these studies do not consider the career progression of migrant workers.

[24] In unreported regressions, disability status was separated into disability at the time of entry and disability whilst employed at the VPSct. This does not lead to results that differ from using an aggregate disability measure.

translate into the level of initial appointment, a separate variable outlined below. This suggests that qualifications at the time of entry should not be used as a control variable. Thus, we construct a set of dummy variables that show qualifications *attained* while employed in the VPSct. This involves the following set of dummy variables: **PhD Gained**, **Masters Gained**, **Bachelor Gained**, **Graduate Diploma Gained**, **Advanced Diploma Gained** and **Certificate Gained**. These variables measure whether a respondent acquired a degree/diploma/certificate while employed in the VPSct. For example, the PhD Gained variable shows the returns to an existing employee from successfully pursuing further studies (in the form of a PhD), while employed in the VPSct. Such human capital acquisition can be expected to increase the prospects for promotion and, hence, the corresponding salary. Therefore, this variable represents the rewards to formal education that arise from internal labor markets.

However, at least three arguments can also be made for including entry level qualifications. First, it is true that qualifications at the time of entry should be reflected in the initial appointment. However, this assumes an efficient job matching process and one that is free of discrimination. If discrimination does exist in promotion and pay, it could exist also in the initial job placement (see Olson and Becker 1983). Second, the inclusion of entry level qualifications also serves to capture the so-called 'overeducation' effects. Sicherman and Galor (1990) argue that promotion is an important part of the returns to education. According to their model, employees may accept positions for which they are overqualified if these positions will lead to faster promotion. Evidence in favor of this hypothesis has been found by Sicherman (1991), Robst (1995) and Hersch (1995), but not by Buchel and Mertens (2004). Third, there may exist unobserved worker characteristics and these may be correlated with entry level qualifications. Hence, the addition of entry level qualifications in the promotions equation has the effect of serving as a proxy for: (a) unobserved skills/abilities; (b) inefficiency in the sorting/matching of workers to jobs; (c) discrimination in the sorting/matching of workers to jobs; and (d) overeducation effects.

After formal qualifications, length of service is the other important human capital variable. The variable **Tenure** serves as a proxy for job experience and on-the-job training. The tenure variable was constructed by calculating the number of years employed with the Public Sector, net of career breaks.[25] The number of years worked was reduced by the number of years of a break in a career. This term is introduced also as a squared term. Tenure is also a proxy for seniority. Those staff who have worked the longest are the more senior, even when they have not been promoted.[26] Dolton and Kidd (1998) note that tenure need not reflect firm-specific human capital, but could merely be a proxy for the matching of jobs to workers. In practice, it is likely to be all three. Hence, we interpret the tenure variable to represent the net effect of seniority, firm specific skills, as well as the matching process.[27]

One way to view age at entry is as a proxy for general human capital skills brought to the public sector from an entrant. Tenure, on the other hand, is a proxy for specific skills acquired whilst working in the public sector. Together, these two variables capture general and specific skills brought into the workplace and the coefficients on these two variables can be used to identify the impact of skills on promotions.

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[25] That is, tenure is not the total number of years of work experience. It is the number of years of work experience with the Public Sector.

[26] Abraham and Medoff (1985) argue that if a simple promotion equation is estimated and a positive coefficient on tenure revealed, then seniority is important in promotion. A negative coefficient indicates a merit based promotion process, although this is also consistent with discrimination against older employees. Following Abraham and Medoff (1985) we estimated also a simple version of the promotion process, involving only the tenure and tenure squared variables. In this case, the coefficient on tenure is +0.13 (z=44.56) and for tenure squared it is -0.002 (z=-22.38), using a sample size of 18,001 observations.

[27] In our framework, we separate out age at entry and tenure with the public sector. An alternative approach would be to include a total experience variable that combines age and tenure (see Borjas 1978).

The positive association between tenure (in 5 year intervals) and the average number of promotions, and the noticeable gender differences in this association, are illustrated in Figure 1.

FIGURE 1 ABOUT HERE

Internal Labor Market Characteristics: We add controls for the level of initial appointment, by including three dummy variables, namely appointment at a middle level (**VPSMID**), a high level (**VPSHIGH**) and an executive level (**VPSEXEC**), with appointment at a low level (**VPSLOW**) as the base. It is to be expected that the promotions will be negatively associated with the level of initial appointment. We test also whether full-time workers (**Full-time**) are more likely to be promoted than part-time workers, as well as whether permanent workers (**Permanent**) have an advantage over casuals. **Sidewayjob** is a variable included to capture experience acquired within the internal labor market. This is the number of times an employee has moved to a new job at their current level within the VPSct. **Higherduties** is a variable that is included to capture experience at higher levels, and is constructed by counting the number of times an employee acted in a job at a higher level for a period of more than one month. **Sidewayjob** and **Higherduties** can be interpreted also as experience and, hence, human capital variables.

Individual Characteristics: The final set of control variables are added to control for worker specific attributes, such as the worker's age at the time of entry into the VPSct (**Age Entry**) and marital status (**Married**). Career breaks include time off for family commitments, time off for study, and for other reasons. They affect earnings, and can even affect the gender wage gap (Spivey 2005). Moreover, career breaks are especially relevant in the context of gender differences in promotion. Dolton and Kidd (1998) found that 'time off' had an adverse effect on careers. Hence, we include a separate variable for career breaks as a result of family commitments (**Home Duties**). This enables us to test whether taking time off from work for family commitment has a detrimental impact on promotion. The other individual characteristics added in the regressions are marital status, the number and the age of children, all of which reflect non-market opportunities.

Other variables: A key challenge for researchers is to separate productivity from discrimination in earnings and promotions. Unobserved worker characteristics and abilities will affect the results of any analysis. Our approach is to use a broad range of variables that proxy for productivity and ability differences, incentives to work and potential to perform greater responsibilities. In addition to these variables, we consider one additional proxy for abilities. The Census collected information on employer financial support for study. If we assume that this support is given to staff who are more able, then this variable can capture some of the unobserved differences in ability. For example, Dolton and Kidd (1998) found that training had a positive effect on the probability of promotion.[28]

Our specification is general enough to capture most of the hypothesized determinants of promotion. One notable omission is unionization. The issue of union status and promotion has been explored in several papers (e.g. Abraham and Medoff 1985, Mills 1985, and Pergamit and Veum 1999). However, we do not have any information on union status and, hence, are unable to explore this dimension.

The Census data offers information on EEO status and industry of employment. Instead of running separate regression for different groups, we chose to pool the data and use dummy variables and dummy variables interacted with covariates to capture the associations of interest. The pooling of data in the analysis of gender and racial differences is recommended strongly by Jackson and Lindley (1989), Gaynor and Durben (1995), Booth *et al.* (2003), and Gupta *et al.* (2006).

[28] There is of course an associated problem of the possibility of discrimination in training. We abstract from this issue and simply explore the impact of *observed* training support on promotion.

Table 2 provides a summary of the average values of some of the variables, for each of the EEO groups. On average, females were younger than males, occupied fewer executive positions, had fewer years of experience, were less likely to be in a full-time position and were less likely to possess a higher degree. Employees born outside Australia are more likely to possess a higher degree and those from an English speaking background are more likely to occupy executive positions. These employees however have fewer years experience within the Victorian public sector. As our analysis shows, these differences in endowments play a pivotal role in differences in promotions.

TABLE 2 ABOUT HERE

4. Results

Several versions of equation 1 were estimated in order to explore the sensitivity of the results.[29] The results are presented in Table 3. The results presented in column 1 are derived from including the EEO dummies, the five industry dummies (not included in the table) and the industry-EEO interactive terms (also unreported).[30] The second set of results (column 2) includes controls for individual employee characteristics. Human capital terms are included in column 3 and internal labor market variables are included in column 4. The key results from estimating the full model (with all variables and interactive terms added) are reported in column 5. In the process of generating the results presented in column 5, we do not control for any potential endogeneity in the qualifications variables. It is possible that unobserved worker specific characteristics drive the acquisition of new human capital skills. That is, workers with higher unobserved ability might be selected into the public service and these workers are also assisted to acquire additional human capital. This would have the effect of creating an upward bias in the estimates for the human capital skills acquired. One way to control for this effect is to include in the regressions human capital skills at the time of hiring. These are added as regressors in the results presented in column 6. The results presented in column 7 are our preferred specification. These results are derived by including employer support for training as an explanatory variable. The last row reports the likelihood ratio (LR) statistic, testing the hypothesis that all variables in the estimated equations have coefficients equal to zero. This hypothesis is rejected in all cases. Note that table 3 presents only some of the parameter estimates. The full set of coefficients for all the models including the interactive terms, are available from the authors (but two of the models – relating to columns 5 and 7 - are presented in Appendix A).

With the exception of column 3, the coefficient for females is always negative and strongly statistically significant. The coefficient on disability becomes statistically insignificant once human capital or internal labor market variables are introduced. The coefficient for employees born overseas from an English speaking country is always negative and statistically significant. The coefficient for employees born overseas from a non-English speaking country becomes statistically insignificant once individual employee characteristics are controlled for. In the full set of results, we find no evidence of discrimination for these employees.

TABLE 3 ABOUT HERE

It is difficult to make direct interpretations from the coefficients of an ordered probit model (see Greene 2000, p. 878). However, the coefficients from the full model (column 7) can be used to calculate the expected number of promotions for workers with specific

[29] Eviews 5.1 was used for all the econometric analysis.

[30] Regressing the number of promotions on *only* the EEO dummies produces the following results: Female (-0.354, t=-20.76), Disability (-0.076, t=-2.07), Born OS English (-0.156, t=-5.12) and Born OS Non- English (-0.155, t=-5.58).

characteristics, and they can be used to calculate the *marginal* impact of EEO status on the prospects of promotion.[31]

4.1. Decomposition

A common approach in the economics of wage discrimination is the use of various decomposition techniques designed to identify the various compositions that make up raw differences in wages between different types of workers. These techniques typically decompose the raw wage differential into differences that can be attributed to productivity and those that can be attributed to discrimination. These techniques have been devised primarily for the analysis of wage differentials (see Oaxaca and Random 1994). While decomposition techniques can be used also to decompose promotion, they have only rarely been used to do so (for exceptions see Jones and Jackson 1992 and Garcia-Crespo 2001).

Our decomposition draws upon the approach of Garcia-Crespo (2001).[32] First, we calculate the actual or observed differential in the actual Census data. These were reported in Table 1 and are repeated in column 1 of Table 4. Second, we use the estimated coefficients from the ordered probit model (reported in Table 2, column 7) to calculate the mean number of promotions for males, females, workers with a disability, workers without a disability, workers born overseas and workers not born overseas. These are presented in column 2 of Table 4. The third step involves decomposing the predicted number of promotions into those due to endowment differences and those due to a residual (which includes the underlying and incremental biases). Promotion differences due to discrimination are included as part of this residual. It should be noted that the decomposition involved calculating the endowment and residual effects by solving the promotions equation for each individual and then averaging the results.[33]

The productivity effect (also known as the endowment effect) is calculated by comparing the number of promotions of males (using the coefficients for males) to the number of promotions for females (also using the coefficients for males).[34] That is, we compare the number of promotions *assuming* that aspects such as human capital are rewarded equally across EEO groups. As Garcia-Crespo (2001, p. 610) notes, the underlying assumption is that: "in a world without discrimination regarding internal mobility opportunities, women would be treated in the same way as men and so we use the male coefficients … to evaluate the endowment differential by gender". The differences in promotions due to endowment effects are reported in column 3, Table 4.

The final column reports the residual. Interpreting the residual is complicated by the fact that it includes both discrimination as well as unobserved and unmeasured differences in abilities and expected future performance. Olson and Becker (1983, p. 628) note that the problem is: "… whether the residual difference reflects discrimination or average differences in unmeasured abilities between the groups that are not the result of the job-placement practices and training investments of firms."

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[31] We present only the results for the public sector in general. Detailed sub-sector results are available from the authors.

[32] Oaxaca and Ransom (1999) point out that a major problem with decomposition techniques is that the contribution of individual groups of dummy variables to the unexplained portion of decomposition (from which discrimination is inferred) is not invariant to the choice of the reference group. However, our focus is on the overal decomposition, which Oaxaca and Random (1999) show is *not* affected by the choice of a reference group. Consequently, we do not attempt any of the recent suggested modifications (e.g. Gardeazabal and Ugidos 2004 and Yun 2005). Moreover, the invariance problem has been identified, and solutions devised, for estimations where the dependent variable is continuous (e.g. wage equations). This literature has not assessed the detailed decomposition of ordinal based estimations and, hence, we prefer to focus on the overal decomposition.

[33] An alternative approach is to use the average values and solve the equations for this. That is, instead of evaluating at the mean of the sample, we follow Garcia-Crespo (2001) and evaluate for all individuals using the observed distribution of endowments.

[34] There is little difference to the results if females are used as the benchmark.

As can be seen from Table 4, the ordered probit model generates predicted differences in promotions that are strikingly similar to the observed differences, although it does marginally understate the promotion differences for workers born overseas in a non-English speaking country.[35] The largest observed differences in promotions are associated with gender. The important point, however, is that the endowment effect suggests that most (85 percent) of the gender difference in promotions can be explained by differences in endowments.[36] All of the differences in the number of promotions for workers with disability is due to differences in endowments.[37] Indeed, the residual component for employees with a disability is a small *positive* number. That is, if workers with a disability had the same endowments as able-bodied workers, they would receive slightly more promotions. Virtually all (91 percent) of the promotion differential for workers born overseas from an English speaking country is due to the endowment effect. In contrast to this, the endowment effect for workers born overseas from a non-English speaking county exceeds the predicted differential. As in the case of workers with a disability, the results indicate a positive residual in favor of these workers. However, as already noted, only the gender promotion differential is of clear economic significance. The residual column suggests that there is in effect minimal discrimination in promotion in Victorian public sector labor markets, once endowment effects are controlled for. We conclude that promotion in the VPSct is driven mainly by factors relating to work performance and work experience rather than EEO status, and that the processes of promotion in the VPSct are in net terms effectively free of bias.

While there are numerous studies on promotion, there exist only a handful of studies that have applied decomposition techniques to promotions. Hence, comparisons with other studies are necessarily limited. However, our results are qualitative similar to those found by other researchers, although the proportion attributable to endowments is significantly greater in our sample. For example, Garcia-Crespo (2001) found that the observed gender differential in Spain was 0.419, of which 0.271 (or 66 percent) was due to endowments. For their sample of college of business graduates, Jones and Jackson (1992) found that the endowment effect accounted for only 31 percent of the differential. In sharp contrast, Booth *et al.* (2003) found no gender differences in promotions for the U.K.

TABLE 4 ABOUT HERE

4.2 Marginal Effects

For the sake of brevity we discuss only some of the marginal effects, and because promotion differences are more pronounced for gender, we focus mainly on the associations between promotion, human capital and gender.[38, 39] In this regard, two sets of impacts merit discussion. First, we are interested in the incremental gender bias, measured as the marginal effect of human capital on promotion for males minus the marginal effect of human capital on promotion for females. Second, we are interested in the incremental timing biases in the returns to human

[35] Given the number of dimensions which the model is covering, it is not surprising that it may do better at predicting some dimensions than others. Note that the forecasting ability of the model is fairly robust to changes to the sample size.

[36] The broader question of what causes the endowment differences – some of which are reported in Table 2 – is beyond the scope of this paper and cannot be addressed by our dataset. If we take the endowment differences to be strictly exogenous to the firm, then the differences will arise from individual choice and pre-labor market discrimination.

[37] The endowment effect is here calculated by using the coefficients for abled-bodied employees.

[38] Note that the marginal effects are not detailed decomposition effects and, hence, are not affected by the choice of reference group. The full set of marginal effects is available from the authors.

[39] The text presents only marginal effects relating to the expected number of promotions. Details on the probabilities of receiving 0, 1, 2, 3 or 4 promotions are available from the authors.

capital, measured as the marginal effect of entry level qualification on promotion minus the marginal effect of qualifications gained on promotion.

The impact of acquiring formal qualifications on promotion is highlighted in Table 5, which reports the marginal impact (marginal effects) of formal education, classified by gender, both at the time of entry and those acquired during tenure.[40] All the marginal effects from qualifications acquired are positive.[41] The successful completion of a PhD, a Masters or a Bachelors degree *after* joining the VPSct increases the expected number of promotions for all employees, with the highest increase in the probability of promotion for female employees who complete a PhD qualification. Gaining formal qualifications increases the prospects of promotion, facilitating career progression within the VPSct internal labor markets, and consequently contributing to salary growth. The third row reports the incremental gender biases. In all cases, the incremental bias favors females; males can expect fewer promotions from gaining qualifications than equivalent females with equivalent qualifications.

Qualifications at the time of entry are also important to promotion. [42] That is, qualifications at the time of entry do no determine just the level of initial appointment, but also the subsequent career path.[43] Earlier, we presented three theoretical reasons for including qualifications at time of entry into the public sector: (a) bias in the initial placement; (b) a proxy for unobserved skills/abilities; and (c) overeducation effects. Unless all employees with qualifications are discriminated against, the results presented in Table 5 are inconsistent with discrimination at the time of entry hypothesis. The results are, however, consistent with the existence of inefficiency at the initial point of recruitment. The results are consistent also with both the overeducation hypothesis and the existence of unobservable attributes.[44] Employees with qualifications may be more productive and, hence, are rewarded by a greater number of promotions.

TABLE 5 ABOUT HERE

Comparing the returns at entry to those during tenure with the VPSct, it is clear that in all cases more promotions can be expected from acquiring a qualification than at the time of entry.[45]

Table 6 presents some of the other marginal effects. Both tenure variables are statistically significant in the ordered probit regressions. The negative sign on the tenure squared term indicate that promotion prospects increase with tenure, but do so at a decreasing rate. Table 6 shows that tenure is incrementally biased against females. Furthermore, the incremental bias against females arising from tenure widens over time (this result can be seen also in Figure 1).

On average, full-time employees are more likely to be promoted than employees working part-time. To the extent that full-time employment reflects individual choices, and full-time

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[40] The ordered probit model conveniently provides, based on the row vector of characteristics, **X**, the expected number of promotions for each individual *i* with the following formula: $\hat{y}_i = \sum_{j=0}^{J-1} \Pr ob(y_i = j).j$, where $\hat{y}_i$ is the predicted number of promotions, *j=0. 1. 2.....J-1* and *J* is the number of choices, and $\Pr ob(y_i = j)$ is the probability of choice *j* occuring. For details on the derivation of these probabilities, see Greene (2000, pp. 876-8).

[41] Similar findings on the benefits of education have been established by other researchers (see, for example, Wise 1975 and Montgomery and Powell 2003).

[42] Note that the marginal effects are calculated by comparing individuals with and without the associated degrees. Hence, for Masters at Entry, we compare individuals whose highest qualifications was a masters at the time of entry to individuals whose highest qualification was a Bachelor degree.

[43] However, while there is effectively no difference in the gender returns to a Bachelor degree at the time of entry in terms of expected promotions (the incremental bias is only +0.01), females can expect slightly fewer promotions from possessing a PhD.

[44] Both of these are observationally equivalent.

[45] This does not, however, mean that workers earn more from qualifications acquired than qualifications at the time of entry.

workers are more productive than part-time staff, this is not bias. Rather it reflects the consequence of an effective endowment. However, the marginal effects show that males gain more than females from full-time status, and this is an example of an incremental bias against females.

Employees who are appointed at an executive level can expect fewer subsequent promotions. Males appointed to an executive level position face an even lower probability of additional promotion than females do (when compared to people of the same gender who hold low level positions in the system). [46]

Hence, we conclude that while there is relatively little discrimination in Victorian public sector labor markets, there do exist incremental biases against women (principally arising from full-time status and tenure), and there exist also incremental biases in favor of women (mainly those associated with formal qualifications).

TABLE 6 ABOUT HERE

5. Summary

The allocation and pricing of resources are fundamental themes in economics. Organizations working in public sector labor markets rely recurrently on internal labor markets to allocate and price resources. The aim of this paper was to explore promotion within the Victorian Public Sector in Australia, using the cross-sectional 2004 Census. The analysis of the raw data on rates of promotion for this sample shows that while the differences in promotions for most EEO groups were small and of little economic significance, the raw data do show that, on average, women received fewer promotions than men. However, the multivariate analysis used here reveals that when one controls for human capital factors, individual characteristics and internal labor market characteristics, a different picture emerges. The results show that the main drivers of promotion for all EEO groups – even in the presence of gender differences - are differences in measured human capital, rather than discrimination in the promotion processes. In particular, formal education qualifications and job tenure are the dominant determinants. Differences in promotions due to factors other than endowments which could be attributed to discrimination are relatively small.

Our overall conclusion from this study is that promotion in the Victorian Public Sector, at least over this period, is driven mainly by factors relating to work performance and work experience rather than attitudes of management and fellow workers to different EEO groups. The results are consistent with a public sector that, in response to a combination of changing community attitudes and regulatory requirements, is effectively free of any substantial net bias in promotions. Nevertheless, potentially important incremental biases were detected. Hence, while it is true that on average there is no net discrimination in the promotion process, it is possible to identify groups of employees whose career progression is not rewarded equally. Particularly noteworthy in this regard is the greater returns to females from the acquisition of higher formal qualifications and the greater returns to males from full-time work and from tenure.

These findings suggest that the research reported in this paper can be extended profitably in several directions. First, analyzing the sources of the incremental biases with respect to tenure and formal qualifications is an important line of future research. Second, the results are suggestive of some degree of inefficiency in the recruitment process, with subsequent attempts to redress this through the promotions process. This inefficiency also warrants further investigation. Third, the Census did not offer any usable information on indigenous employees.

[46] Some other interesting marginal effects include: age of entry into the VPSct is negatively correlated with promotion prospects, with older workers less likely to be promoted; taking time off from employment to nurture children and the number of children have no effect, and certainly have no detrimental effect on promotion prospects.

Hence, it was not possible to investigate career progression and pay equity issues relating to this important EEO group. Fourth, the specification of our model does not pick up any pre-employment bias, which itself will understate the extent of disadvantage faced by females. Finally, our data is cross-sectional and exclusively focused on the public sector. Comparisons with earlier time periods and with the private sector would also be important extensions for future research.

6. References

Abraham, K and Medoff, J.L. (1985), "Length of Service and Promotions in Union and Nonunion Work Groups", *Industrial and Labor Relations Review*, 38(3):408-20.

Altonji, J.G. and R.M. Blank (1999), 'Race and Gender in the Labor Market', In Ashenfelter, O. and Layard, R. (Eds), *Handbook of Labor Economics*, vol. 3:3143-259.

Ariga, K., G. Brunello and Ohkusa, Y. (2000), *Internal Labor Markets in Japan*, Cambridge University Press, Cambridge.

Arun, S.V., Arun, T.G., Borooah, V.K. (2004), 'The Effects of Career Breaks on the Working Lives of Women', *Feminist Economics*, Mar, 10(1):65-85.

Asch, B.J. and J.T. Warner (2001), 'A Theory of Compensation and Personnel Policy in Hierarchical Organizations with Application to the United States Military', *Journal of Labor Economics*, 19(3):523-62.

Audas, T.B., Barmby, T. and Treble J. (2004), 'Luck, Effort, and Reward in an Organizational Hierarchy', *Journal of Labor Economics*, 22(2):379-95.

Austen, S. (2004), 'Gender Differences in Academic Rank in Australian Universities', *Australian Bulletin of Labour,* 30(2):113-33.

Baldi, S. and D. B. McBrier (1997), 'Do the Determinants of Promotion Differ for Blacks and Whites? Evidence from the US labor market' *Work and Occupations*, 24(4):478-97.

Baldwin, M.L. and Johnson, W.G. (1994), 'Labor Market Discrimination Against Men With Disabilities', *Journal of Human Resources*, 29(1):1-19.

Baldwin, M.L. and Johnson, W.G. (1995), 'Labor Market Discrimination Against Women With Disabilities', *Industrial Relations*, 34(4):555-77.

Baldwin, M.L. and Johnson, W.G. (2000), 'Labor Market Discrimination Against Men With Disabilities in the Year of ADA', *Southern Economic Journal*, 66(3):548-66.

Baldwin, M.L. and Schumacher E.J., (2002), 'A Note on Job Mobility among Workers with Disabilities'*, Industrial Relations,* 41(3):430-41.

Baker, G. and Holmstrom, B. (1995), 'Internal Labor Markets: Too many theories, too few facts', *American Economic Review*, 85(2):255-59.

Bayo-Moriones, A. and Ortín-Ángel, P. (2006) 'Internal Promotion Versus External Recruitment: Industrial Plants in Spain', *Industrial and Labor Relations Review*, 59(3):451-70.

Becker, G. (1971), *The Economics of Discrimination*, University of Chicago Press, Chicago, IL.

Becker, G. (1975), *Human Capital*, University of Chicago Press, Chicago,IL.

Beegle, K. and Stock, W.A. (2003), 'The Labor Market Effects of Disability Discrimination Laws', *Journal of Human Resources*, 38(4):806-59.

Bills, D.B. (1987), 'Costs, Commitment and Rewards: Factors influencing the design and implementation of internal labor markets', *Administrative Science Quarterly*, 32(2):202-21.

Borjas, G.J. (1978), 'Discrimination in HEW: Is the doctor sick or are the patients healthy?', *Journal of Law and Economics*, 21(1):97-110.

Borjas, G.J. (1982), 'The Politics of Employment Discrimination in the Federal Bureaucracy', *Journal of Law and Economics*, 25:271-99.

Booth, A.L., Francesconi M. and Frank J. (2003), 'A Sticky Price Floors Model of Promotion, Pay and Gender', *European Economic Review*, 47:295-322.

Booth, A. and M. L. Bryan (2005) 'Testing Some Predictions of Human Capital Theory: New training evidence from Britain', *The Review of Economics and Statistics*, 87(2):391-94.
Borooah, V.K. and Mangan, J. (2002), 'An Analysis of Occupational Outcomes for Indigenous and Asian Employees in Australia', *The Economic Record*, 78(1):31-49.
Brazenor, R. (2002), 'Disabilities and Labour Market Earnings in Australia', *Australian Journal of Labour Economics*, 5(3):319-34.
Brown, K. (1997), 'Evaluating Equity Outcomes in State Public Sectors: A Comparison of Three Housing Agencies', *Australian Journal of Public Administration,* 56(4):57-66.
Brown, C. and Jones L. (2004), 'The Gender Structure of the Nursing Hierarchy: the role of human capital', *Gender, Work and Organization*, 11(1):1-25.
Brunel, U. (2005), "Work Roles and Careers of R&D Scientists in Network Organizations", *Industrial Relations*, 44(2): 242-75.
Buchel, F. and A. Mertens. (2004), 'Overeducation, Undereducation, and the theory of Career Mobility', *Applied Economics*, 36:803-816.
Cabral, R., Ferber, M, and Green, C.A. (1981), 'Men and Women in Fiduciary Institutions: A study of sex differences in career development', *Review of Economics and Statistics*, 63(4):573-80.
Cameron, A. C. and Trivedi, P.K. (1998), *Regression Analysis of Count Data*, Cambridge University Press, Cambridge.
Cappelli, P. (1999), *The New Deal at Work: Managing the market driven workforce*, Harvard Business School Press, Boston, Massachusetts.
Cesare, S., Tannenbaum, R. and Dalessio, A. (1990), 'Interviewer's decisions related to applicant handicap type and rater empathy', *Human Performance*, 3:157-71.
Chan, W. (1996), 'External Recruitment versus Internal Promotion', *Journal of Labor Economics*, 14(4):555-70.
Charles, K.K. (2003), 'The Longitudinal Structure of Earnings Losses Among Work-Limited Disabled Workers', *Journal of Human Resources*, 38(3):618-46.
Chiswick, B.R., Lee, Y.L. and Miller, P.W. (2005), 'Immigrant Earnings: A Longitudinal Analysis' *Review of Income and Wealth*, 51(4):485-503.
Cobb-Clark, D. and Dunlop Y. (1999), 'The Role of Gender in Job Promotions', *Monthly Labor Review*, 122(12):32-38.
Cobb-Clark, D. (2001), 'Getting Ahead: The Determinants of and Payoffs to Internal Promotion for Young Men and Women', *Research in Labor Economics*, 20:339-372.
DeLeire, T. (2001), 'Changes in Wage Discrimination Against People With Disabilities: 1984-93', *Journal of Human Resources*, 36:144-58.
Doeringer, P. and Piore M. (1971), *Internal Labor Market and Manpower Analysis*, Lexington, Mass.:Heath.
Dolton, P.J. and Kidd, M.P. (1998), 'Job Changes, Occupational Mobility and Human Capital Acquisition: An empirical analysis', *Bulletin of Economic Research*, 50(4):265-95.
Drago, R., (1991), 'Incentives, Pay, and Performance: a study of Australian employees', *Applied Economics*, 23:1433-46.
Drago, R. and Garvey G.T., (1998), 'Incentives for Helping on the Job: theory and evidence', *Journal of Labor Economics*, 16(1):1-25.
Eberts, R.W. and Stone, J.A. (1985), 'Male-Female Differences in Promotions: EEO in public education', *Journal of Human Resources*, 20(4):504-21.
Elvira, M. M. (2001), 'Pay Me Now or Pay Me Later: Analyzing the relationship between bonus and promotion incentives', *Work and Occupations*, 28(3):346-70.
Eriksson, T. and Werwatz, A. (2005), 'The Prevalence of Internal Labor Markets: New evidence from panel data', *International Journal of Economic Research*, 2(2):105-24.
Fairris, D. (2004). 'Internal Labor Markets and Worker Quits', *Industrial Relations*, 43(3):573-94.

Francesconi, M. (2001), 'Determinants and Consequences of Promotions in Britain', *Oxford Bulletin of Economics and Statistics*, 63(3):279-310.
Fraser, C. (2000), 'The Influence of Personal Characteristics on Effectiveness of Construction Site Managers', *Construction Management and Economics*, 18:29-36.
Freeman, R.B. (2006), 'Learning from Other Economies: The Unique Institutional and Policy Experiments Down Under', *NBER Working Paper* No. 12116.
Garcia-Crespo, D. (2001), 'Promotions in the Spanish Labour Market: Differences by Gender', *Oxford Bulletin of Economics and Statistics*, 63(5):599-615.
Gardeazabal, J. and R. Ugidos. (2004), 'More on Identification in Detailed Wage Decompositions', *The Review of Economics and Statistics*, 86(4):1034-36.
Gaynor, P. and G. Durben, 1995, 'Measuring the Extent of Earnings Discrimination: an update', *Applied Economics*, 27:669-76.
Gerhart, B.A. and Milkovich, G.T. (1989). 'Salaries, Salary Growth and Promotions of Men and Women in a Large, Private Firm'. *In Pay Equity: Empirical Inquiries*, ed. Michael, R.T., Hartmann, H.I. and O'Farell, B. Washington, D.C: National Academy Press, pp. 23-43.
Gibbs, M. and Hendricks, W. (2004), 'Do Formal Salary Systems Really Matter?' *Industrial and Labor Relations Review*, 58(1):71-93.
Gibbons, R. and Waldman M. (1999), 'A Theory of Wage and Promotion Dynamics Inside Firms', *Quarterly Journal of Economics*, 114(4):1321-58.
Ginther, D.K. and Hayes, K.J. (2003), 'Gender Differences in Salary and Promotion for Faculty in the Humanities 1977-95', *Journal of Human Resources*, 38(1):34-73.
Gjerde, K.A.P. (2002), 'The Existence of Gender-Specific Promotion Standards in the U.S', *Managerial and Decision Economics*, 23:447-59.
Greene, W.H. (2000), *Econometric Analysis*, 4th edition, Prentice Hall International, London.
Gregory, R. and Borland, J. (1999) 'Recent Developments in Public Sector Labor Markets', in O. Ashenfelter and D. Card (ed.) *Handbook of Labor Economics*, pp. 3573-3630.
Groot, W. and van den Brink, H. M. (1996), 'Glass Ceilings or Dead Ends: Job promotion of men and women compared', *Economics Letters*, 53:221-26.
Groshen, E. and Levine, D. (1998) 'The Rise and Decline (?)_of U.S. Internal Labor Markets', *Federal Reserve Bank of New York*, Research Paper: 9819.
Gupta, N.D., Oaxaca, R.L. and Smith, N. (2006), 'Swimming Upstream, Floating Downstream: Comparing women's relative wage progress in the United States and Denmark', *Industrial and Labor Relations Review*, 59(2):243-66.
Hamilton, B. and MacKinnon (2001), 'An Empirical Analysis of Career Dynamics and Internal Labor Markets During the Great', manuscript.
Hendricks, W., C. Schiro-Geist and Broadbent, E. (1997) 'Long-Term Disabilities and College Education', *Industrial Relations*, 36(1):46-60.
Hersch, J. (1995), 'Optimal 'mismatch' and promotions', *Economic Inquiry*, 33:611-24.
Hersch, J. and Viscusi, W.K. (1996), 'Gender Differences in Promotion and Wages', *Industrial Relations*, 35:461-72.
Howlett, P. (2004), 'The Internal Labour Dynamics of the Great Eastern Railway Company, 1870-1913', *Economic History Review*, 2:396-422.
Jacoby, S.M. (1984), '"The Development of Internal Labor Markets in American Manufacturing Firms', in P. Osterman (ed), *Internal Labor Markets*, MIT Press, Cambridge, Mass, pp. 23-69.
Jackson, J. D. and J. T. Lindley (1989), 'Measuring the Extent of Wage Discrimination:A statistical test and a caveat', *Applied Economics*, 21:515-40.
Johnston, J. (2002), 'Tenure, Promotion and Executive Remuneration'. *Applied Economics* 34: 993-7.
Johnson, W.G. and Lambrinos, J. (1985), 'Wage Discrimination against Handicapped Men and Women', *Journal of Human Resources*, 20:264-77.

Jones, E.B. and Jackson, J.D. (1992), 'Gender Differences In Business School Graduates' Opportunity To Advance', *Journal of Socio-Economics*, 21(2):125-41.
Kaplan, D.S. and Pierce, B. (2005), 'Firmwide Versus Establishment-Specific Labor Market Practices', *The Review of Economics and Statistics*, 87(3):569-78.
Kidd, M.P., P. J. Sloane and Ferko, I. (2000), 'Disability and the Labour Market:An analysis of British Males', *Journal of Health Economics*, 19(6):961-81.
Killingsworth, M.R. and Reimers, C.W. (1983), 'Race, Ranking, Promotions and Pay at a Federal Facility: a logit analysis', *Industrial and Labor Relations Review*, 37(1): 92-107.
Killingsworth, M.R. (1990), *The Economics of Comparable Worth*, W.E. Upjohn Institute for Employment Research, Kalamazoo, Michigan.
Krowas, J.C. (1993), 'Time-Dependent Changes in Gender-Based Promotion Differences' *Economics Letters*, 42(1):87-90.
Lazear, E.P. (1989), 'Pay Equality and Industrial Politics', *Journal of Political Economy*, 87, 1261-84.
Lazear, E.P. and Rosen S. (1990), 'Male-Female Wage Differentials in Job Ladders', *Journal of Labor Economics*, 8(1, part 2), S106-S123.
Lazear, E. P. (1998), *Personnel Economics for Managers*, John Wiley and Sons, New York.
Lazear, E.P. and Oyer, P. (2004), 'Internal and External Labor Markets: A personnel economics approach', *Labour Economics*, 11(5):527-54.
Levine, D. (2002), *How New is the "New Employment Contract?": Evidence from North American pay practices*, Kalamazoo, Mich.: W. E. Upjohn Institute for Employment Research.
Lewis, G.B. and Allee, C.L. (1992), 'The Impact of Disabilities on Federal Career Success', *Public Administration Review*, 52(4):389-97.
Lin, M-J. (2005), "Opening the Black Box: The internal labor markets of company X', *Industrial Relations*, 44(4):659-706.
Lingard, H. and Lin J. (2004), 'Career, Family and Work Environment Determinants of Organizational Commitment Among Women in the Australian Construction Industry', *Construction Management & Economics*, 22(4):409-20.
McCue, K. (1996), 'Promotions and Wage Growth', *Journal of Labor Economics*, 14(2):175-205.
McDowell, J.M, L. D. Singell and Ziliak, J.P. (2001), 'Gender and Promotion in the Economics Profession', *Industrial and Labor Relations Review*, 54(2):224-44.
Mangan, J. and Tunny, G. (2004), 'Stepping Stones to Permanent Employment in the Public Service', *Labour*, 18(4):591-614.
Magnani, E, (2003), 'The Productivity Slowdown, Sectoral Reallocations and the Growth of Atypical Employment Arrangements', *Journal of Productivity Analysis*, 20(2):121-42.
Messer Pelkowski, J and Berger M.C. (2003), 'The Onset of Health Problems and the Propensity of Workers to Change Employers and Occupations', *Growth and Change*, 34(3):276-98.
Miceli, N.S., Harvey, M.G. and Buckley, M.R. (2001), 'Potential Discrimination in Structured Employment Interviews', *Employee Responsibilities and Rights Journal*, 13(1):15-38.
Miller, P.W. (1994), 'Gender Discrimination in Training: an Australian perspective', *British Journal of Industrial Relations*, 32(4):539-65.
Mills, D. Q. (1985), 'Seniority Versus Ability in Promotion Decisions", *Industrial and Labor Relations Review*, 38(3):421-25.
Mincer, J. (1974), *Schooling, Experience and Earnings*, New York: National Bureau of Economic Research.
Montgomery, M. and Powell, I. (2003), 'Does an Advanced Degree Reduce the Gender Wage Gap? Evidence from MBAs', *Industrial Relations*, 42(3):396-418.
Naff, K. C. (1994) 'Through the Glass Ceiling: Prospects for the advancement of women in the Federal civil service', *Public Administration Review*, 54(6):507-14.
Naff, K. C. (1995) 'Subjective vs. Objective Discrimination in Government: Adding to the picture of barriers to the advancement of women', *Political Research Quarterly*, 48(3):535-57.

Oaxaca , R.L. and M. R. Ransom. (1994), 'On Discrimination and the Decomposition of Wage Differentials', *Journal of Econometrics*, 61(1):5-21.
Oaxaca , R.L. and M. R. Ransom. (1999), 'Identification in Detailed Wage Decompositions', *The Review of Economics and Statistics*, 81(1):154-57.
Olson, C.A. and Becker, B.E. (1983). 'Sex Discrimination in the Promotion Process'. *Industrial and Labor Relations Review* 36:624-41.
Osterman, P. (1984), 'White Collar Internal Labour Markets', in P. Osterman (ed.) *Internal Labor Markets*, MIT Press, Cambridge, Mass.
Owen,L.J. (2001), 'Gender Differences in Labor Turnover and the Development of Internal Labor Markets in the United States', *Enterprise and Society*, 2:41-71.
Pekkarinen, T. and Vartiainen, J. (2006), 'Gender Differences in Promotion on a Job Ladder: Evidence from Finnish Metalworkers', *Industrial and Labor Relations Review*, 59(2):285-301.
Pergamit, M.R. and Veum, J.R. (1999), 'What is Promotion?', *Industrial and Labor Relations Review*, 52(4):581-601.
Prendergast, C. (1999), 'The Provision of Incentives in a Firm', *Journal of Economic Literature*, 37(1):7-63.
Pudney, S. and M.A. Shields, 2000, 'Gender and Racial Discrimination in Pay and Promotion for NHS Nurses', *Oxford Bulletin of Economics and Statistics*, 62, Special Issue, 801-35.
Reiter, J.P., Zanutto, E. L. and Hunter, L. W. (2005), 'Analytical Modeling in Complex Surveys of Work Practices', *Industrial and Labor Relations Review*, 59(1):82-100.
Rimmer, R. and Rimmer S. (1997), 'Employment Breaks, Pay, and Career Development among Australian Women', *Gender, Work and Organization*, 4(4):202-17.
Robst, J. (1995), 'Career Mobility, Job Match and Overeducation', *Eastern Economic Journal*, 21:539-50.
Sawer, M. (2001), 'Women and Government in Australia', *Year Book Australia*, 2001 Centenary Article. ABS Catalogue No. 1301.01.
Schur, L.A. (2003), 'Barriers or Opportunities? The Causes of Contingent and Part-Time Work among People with Disabilities', *Industrial Relations,* 42(4):589-622.
Seltzer, A. and Merrett D. (2000), 'Personnel Policies at the Union Bank of Australia: Evidence from the 1888-1900 entry cohorts', *Journal of Labor Economics*, 18(4):573-613.
Seltzer, A. J. and Simons K.L. (2001), 'Salaries and Career Opportunities in the Banking Industry: Evidence from the Personnel Records of the Union Bank of Australia', *Explorations in Economic History*, 38(2):195-224.
Sicherman, N. (1991), '"Overeducation" in the Labor Market', *Journal of Labor Economics*, 9(2):101-122.
Sicherman, N. and Galor, O. (1990), 'A Theory of Career Mobility', *Journal of Political Economy*, 98(1):169-92.
Siebert, S. and Addison, J. (1991), 'Internal Labor Markets: Causes and consequences', *Oxford Review of Economic Policy*, 7(1):76-92.
Spivey, C. (2005), 'Time Off at What Price? The effects of career interruptions on earnings', *Industrial and Labor Relations Review*, 59(1):119-40.
Stanley, T.D. and Jarrell, S.B. (1998) 'Gender Wage Discrimination Bias? A meta-regression analysis', *Journal of Human Resources*, 33: 947-73.
Stern, S. (1989), 'Measuring the Effect of Disability on Labor Force Participation', *Jorunal of Human Resources*, 24:361-96.
Thoursie, P.S. (2004), 'Occupational Attainment and Earnings: The case of the disabled', *Labour*, 18(3):415-42.
Weichselbaumer, D. and Winter-Ebmer, R. (2005), 'A Meta-Analysis of the International Gender Wage Gap'. In Roberts, C.J. and Stanley, T.D. (eds), *Meta-Regression Analysis: Issues of publication bias in economics*, Blackwell, Cornwall.
Winkelmann, R. (2003), *Econometric Analysis of Count Data*, Springer-Verlag, Berlin.

Wise, D. (1975), 'Personal Attributes, Job Performance, and Probability of Promotion', *Econometrica*, 43(5-6):913-31.

Yun, M-S. (2005), 'A Simple Solution to the Identification Problem in Detailed Wage Decompositions', *Economic Inquiry*, 43(4):766-72.

Table 1: Distribution of Promotions, Males and Females, Victorian Public Sector

Number of promotions	Percentage of males	Percentage of females	With Disability	Born OA English speaking	Born OA non-English speaking	Without disability
0	38%	48%	44%	49%	49%	45%
1	19%	23%	22%	20%	22%	21%
2	14%	14%	14%	15%	12%	14%
3	10%	8%	7%	7%	8%	9%
4 +	18%	7%	10%	9%	9%	11%

Cell entries show the percentage of employees receiving a particular number of promotions. OA: Outside Australia

Table 2: Sample Averages of Selected Variables

Variable	Males	Female	Disabled	Born OA English speaking	Born OA non-English speaking
Age	45.5	41.5	46.4	46.7	44.6
Executive (%)	1.8%	0.5%	0.07%	2.1%	1.7%
Years Experience	14.9	10.9	14.3	11.4	11.5
Full-time	90%	65%	70%	75%	80%
Masters or PhD	12.2%	8.6%	9.6%	14.6%	18.6%
Number of observations	7,210	12,259	1,025	1,523	1,837

OA: Outside Australia

Table 3: EEO Status and Promotions, Ordered Probit Regressions, Key Coefficients [Dependent Variable = Number of Promotions]

Variable	Basic (1)	Individual (2)	Human capital (3)	Internal labor market (4)	(1)-(4) Combined (5)	Full model, with entry level human capital (6)	Full model, with employer assisted training (7)
			EEO Status				
Female	-0.353 (-14.64)***	-0.752 (-9.86)***	0.041 (0.89)	-0.365 (-4.76)***	-0.354 (-2.87)***	-0.358 (-2.76)***	-0.356 (-2.74)***
Disability	-0.128 (-2.71)***	-0.308 (-2.05)***	-0.058 (-0.54)	0.073 (0.58)	0.110 (0.46)	0.092 (0.37)	0.098 (0.39)
Born OA English	-0.191 (-4.47)***	-0.154 (-1.06)	-0.167 (-2.07)**	-0.248 (-2.25)**	-0.554 (-2.64)**	-0.605 (-2.74)***	-0.606 (-2.74)***
Born OA Non-English	-0.127 (-3.34)***	0.017 (0.14)	-0.007 (-0.94)	-0.094 (-2.43)**	0.107 (0.69)	-0.018 (-0.11)	-0.010 (-0.06)
			Individual Characteristics				
Age Entry	-	-0.043 (-26.43)***	-	-	-0.019 (-9.98)***	-0.017 (-8.71)***	-0.017 (-8.59)***
Married	-	0.109 (4.21)***	-	-	0.116 (4.30)***	0.105 (3.86)***	0.103 (3.81)***
Home Duties	-	0.006 (1.45)	-	-	-0.006 (-1.30)	-0.005 (-1.12)	-0.005 (-1.14)
Number Children	-	0.119 (10.98)***	-	-	-0.012 (-0.90)	0.000 (0.23)	0.002 (0.19)
			Human Capital				
Tenure	-	-	0.126 (29.94)***	-	0.121 (24.03)***	0.127 (24.67)***	0.127 (24.68)***
Tenure squared	-	-	-0.002 (-17.56)***	-	-0.003 (-16.10)***	-0.003 (-16.29)***	-0.003 (-16.21)***
PhD Gained	-	-	0.696 (5.45)***	-	0.737 (5.42)***	0.577 (4.21)***	0.580 (4.23)***
Masters Gained	-	-	0.624 (11.03)***	-	0.600 (10.40)***	0.510 (8.59)***	0.515 (8.70)***
Bachelor Gained	-	-	0.372 (7.18)***	-	0.336 (6.10)***	0.429 (7.56)***	0.435 (7.67)***
Graduate Diploma Gained	-	-	0.501 (12.41)***	-	0.481 (11.57)***	0.435 (10.16)***	0.437 (10.19)***
Advanced Diploma Gained	-	-	0.290 (5.11)***	-	0.226 (3.79)***	0.344 (5.59)***	0.351 (5.71)***
Certificate Gained	-	-	-0.034 (-0.65)	-	-0.022 (-0.39)	0.072 (1.22)	0.075 (1.26)
Study	-	-	0.096 (3.10)***	-	0.045 (1.41)	0.051 (1.56)	-0.077 (-1.55)
PhD Entry	-	-	-	-	-	0.174 (1.00)	0.171 (0.98)
Masters Entry	-	-	-	-	-	0.230 (2.79)***	0.231 (2.80)***
Bachelor Entry	-	-	-	-	-	0.336 (9.81)***	0.337 (9.82)***
Graduate Diploma Entry	-	-	-	-	-	0.095 (1.99)*	0.099 (2.07)**
Advanced Diploma Entry	-	-	-	-	-	0.016 (0.33)	0.018 (0.37)

Table 3: EEO Status and Promotions, Ordered Probit Regressions, Key Coefficients [Dependent Variable = Number of Promotions]- continued

Certificate Entry	-	-	-	-	-	-0.108 (-2.49)**	-0.108 (-2.49)**
Study Financial Support	-	-	-	-	-	-	0.222 (3.73)***
				Internal Labor Market Characteristics			
Full-Time	-	-	-	0.248 (9.86)***	0.359 (12.33)***	0.366 (12.46)***	0.358 (12.18)***
Permanent	-	-	-	0.426 (12.16)***	0.123 (3.26)***	0.132 (3.48)***	0.123 (3.24)***
VPSExec	-	-	-	-0.987 (-5.33***	-0.865 (-3.98)***	-0.927 (-4.07)***	-0.943 (-4.15)****
VPSHigh	-	-	-	-0.591 (-8.96)***	-0.356 (-4.73)***	-0.421 (-5.55)***	-0.420 (-5.53)***
VPSMid	-	-	-	-0.168 (-6.62)***	-0.049 (-1.71)*	-0.086 (-2.93)***	-0.089 (-2.96)***
Sidewayjob	-	-	-	0.106 (14.29)***	0.041 (6.04)***	0.039 (5.85)***	0.040 (5.87)***
Higherduties	-	-	-	0.065 (9.84)***	0.043 (7.83)***	0.043 (7.81)***	0.044 (7.81)***
Sample Size	18,459	17,130	17,531	18,063	16,775	16,675	16,675
LR Statistic	3284***	3284***	6676***	3676***	7848***	8110***	8135***

*, **, ***, statistically significant at the 10%, 5% and 1% level, respectively. t-statistics in brackets, using robust standard errors.

Table 4: Endowments and Discrimination

	Observed Differential (1)	**Predicted Differential (2)**	**Due to Productivity (Endowment Effect) (3)**	**Residual (includes discrimination)† (4)**
Females Compared to Males	-0.46	-0.43	-0.36	-0.06
Workers with a Disability Compared to Able-Bodied Workers	-0.06	-0.07	-0.08	+0.01
Workers Born Outside Australia (English Speaking) Compared to Workers Born in Australia	-0.15	-0.12	-0.11	-0.01
Workers Born Outside Australia (Non-English Speaking) Compared to Workers Born in Australia	-0.17	-0.10	-0.18	+0.08

† A negative (positive) residual is consistent with bias against (in favor of).

Table 5: Incremental Impact of Gender on the Promotion Effects of Acquiring Formal Qualifications

	Gaining a PhD	Gaining a Masters	Gaining a Bachelor	PhD at Entry	Masters at Entry	Bachelor at Entry
Expected Number of *Additional* Promotions – Males	+0.19	+0.33	+0.31	+0.34	+0.15	+0.16
Expected Number of *Additional* Promotions – Females	+0.46	+0.38	+0.38	+0.27	+0.18	+0.17
Incremental bias against women††	+0.27	+0.05	+0.07	-0.07	+0.03	+0.01

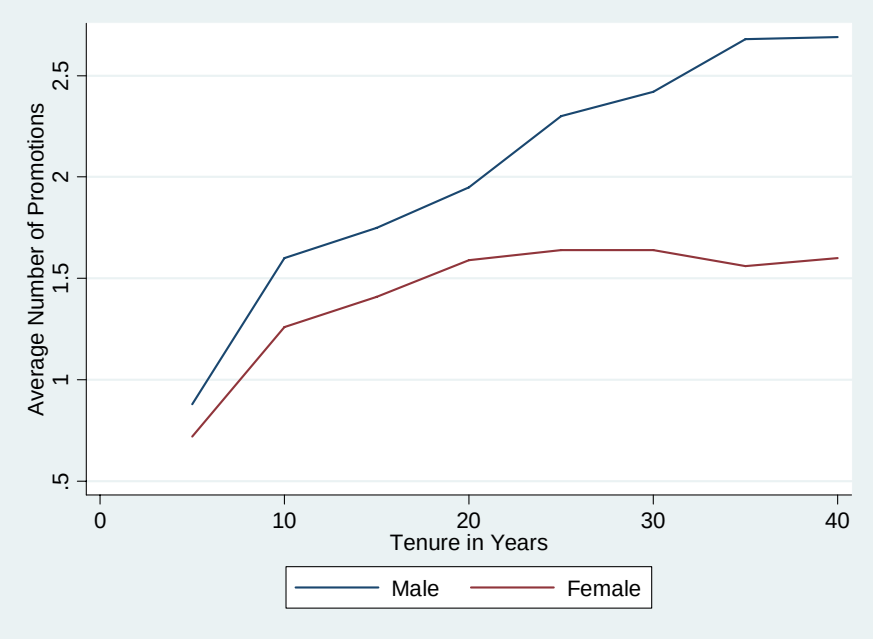
†† A positive (negative) sign indicates that the marginal effect of a qualification is higher (lower) for females than it is for males.

Table 6: Incremental Impact of Gender on the Promotion Effects of Selected Internal Labor Market and Individual Characteristics

	Study Assistance	Married	Full-Time	Ongoing	Executive	Higher Duties	Tenure (10 to 15)	Tenure (10 to 20)
Expected Number of *Additional* Promotions – Males	+0.18	+0.12	+0.38	-0.18	-0.57	+0.03	+0.37	+0.67
Expected Number of *Additional* Promotions - Females	+0.16	+0.08	+0.26	+0.09	-0.53	+0.03	+0.27	+0.43
Incremental bias against women†	-0.02	-0.03	-0.12	+0.27	-0.04	0	-0.10	-0.24

† A positive (negative) sign indicates that the marginal effect of a qualification is higher (lower) for females than it is for males.

Figure 1: Tenure and Average Number of Promotions



Appendix A: Definitions and descriptive statistics

Variable	Description	Base (for dummies)	Mean (Standard Deviation)	Variable	Description	Base (for dummies)	Mean (Standard Deviation)
			Dependent variable				
Promotions	The Number of Promotions since joining the Public Sector	na	1.20 (1.38)				
			Human Capital and Experience				
PhD Gained	Gained a Doctoral Degree since joining VPS	Did not gain any formal qualifications since joining VPS	0.01 (0.10)	**Masters Gained**	Gained a Masters Degree since joining VPS	Did not gain any formal qualifications since joining VPS	0.05 (0.21)
Grad Diploma Gained	Gained a Graduate Diploma since joining VPS	Did not gain any formal qualifications since joining VPS	0.09 (0.29)	**Bachelor Gained**	Gained a Bachelor Degree since joining VPS	Did not gain any formal qualifications since joining VPS	0.05 (0.23)
Adv Diploma Gained	Gained an Advanced Diploma since joining VPS	Did not gain any formal qualifications since joining VPS	0.05 (0.22)	**Certificate Gained**	Gained a Certificate since joining VPS	Did not gain any formal qualifications since joining VPS	0.05 (0.23)
PhD Entry	Had a Doctoral Degree at time of joining VPS	Did not gain any formal qualifications since joining VPS	0.01 (0.11)	**Masters Entry**	Had a Masters Degree at time of joining VPS	Did not gain any formal qualifications since joining VPS	0.03 (0.18)
Grad Diploma Entry	Had a Graduate Diploma at time of joining VPS	Did not gain any formal qualifications since joining VPS	0.09 (0.29)	**Bachelor Entry**	Had a Bachelor Degree at time of joining VPS	Did not gain any formal qualifications since joining VPS	0.27 (0.44)
Adv Diploma Entry	Had an Advanced Diploma at time of joining VPS	Did not gain any formal qualifications since joining VPS	0.09 (0.29)	**Certificate Entry**	Had a Certificate at time of joining VPS	Did not gain any formal qualifications since joining VPS	0.14 (0.35)
Study	Respondent currently undertaking formal education	Not undertaking formal education	0.17 (0.38)	**Tenure**	Number of Years employed in the Public Sector	na	12.42 (9.98)
Study Assist Financial	Respondent received financial assistance for study and training	Respondent did not receive financial assistance for study and training	0.09 (0.29)				
			Individual Characteristics				
Genfemale	Respondent is a female	Respondent is a male	0.37 (0.48)	**Disability**	Respondent has a disability	Respondent does not have a disability	0.05 (0.22)
Born Outside Australia – English	Respondent is born outside Australia from an English	Respondent was born in Australia	0.08 (0.27)	**Born Outside Australia – non-English**	Respondent is born outside Australia from a non-English	Respondent was born in Australia	0.10 (0.29)

	speaking country				speaking country		
Children	Number of Children	na	1.48 (1.39)	**Married**	Currently married	Not married	0.67 (0.47)
Age Entry	Age at time of entry into VPS	na	30.55 (9.50)	**Time off Family**	Total time away from work for family reasons	na	1.11 (3.04)
			Internal Labour Markets				
VPSMID	First VPS job was a mid-level job	Entry level job	0.24 (0.42)	**VPSHIGH**	First VPS job was a high-level job	Entry level job	0.04 (0.21)
VPSEXEC	First VPS job was an executive level job	Entry level job	0.01 (0.10)	**SIDEWAYSJOB**	How many times have you moved to a new job at your current level within the VPS	Na	1.16 (1.94)
Full-Time	Respondent works full-time	Respondent works part-time	0.75 (0.44)	**Ongoing**	Respondent has an ongoing or permanent position	Respondent does not have an ongoing or permanent position	0.83 (0.37)
Higher Duties	Number of times acted in a job at a higher level for a period of more than one month	na	1.92 (4.24)				
			Sector				
Water	Respondent employed in Water sub-group	Respondent employed in Victorian Public Service	0.03 (0.17)	**Schools**	Respondent employed in Schools sub-group	Respondent employed in Victorian Public Service	0.03 (0.16)
Health	Respondent employed in Health sub-group	Respondent employed in Victorian Public Service	0.19 (0.39)	**Uni**	Respondent employed in Uni/TAFE sub-group	Respondent employed in Victorian Public Service	0.15 (0.35)
Other	Respondent employed in Other sub-group	Respondent employed in Victorian Public Service	0.10 (0.30)				

Appendix B: Ordered Probit Regression Coefficients (Robust Covariances)

Variable	Coefficient	z-Statistic	Prob.	Coefficient	z-Statistic	Prob.
Female	-0.354	-2.87	0.00	-0.356	-2.74	0.01
Water	-0.301	-3.12	0.00	-0.261	-2.71	0.01
Health	-0.188	-5.77	0.00	-0.176	-5.39	0.00
Schools	-0.066	-0.93	0.35	-0.095	-1.29	0.20
Other	-0.025	-0.50	0.62	-0.019	-0.37	0.71
Uni	-0.106	-2.76	0.01	-0.097	-2.45	0.01
Female*Water	-0.068	-0.59	0.55	-0.052	-0.45	0.65
Female*Health	-0.045	-0.69	0.49	-0.014	-0.21	0.83
Female*Schools	-0.014	-0.12	0.91	-0.012	-0.10	0.92
Female*Other	0.091	1.43	0.15	0.062	0.97	0.33
Female*Uni	0.089	1.52	0.13	0.065	1.08	0.28
Disability	0.110	0.46	0.64	0.098	0.39	0.70
BornOAEnglish	-0.554	-2.64	0.01	-0.606	-2.74	0.01
BornOAnonEnglish	0.107	0.69	0.49	-0.010	-0.06	0.95
Disability*Water	0.220	0.80	0.42	0.232	0.82	0.41
BornOAEnglish*Water	0.233	0.77	0.44	0.277	0.91	0.36
BornOAnonEnglish*Water	0.096	0.32	0.75	0.008	0.03	0.98
Disability*Health	0.188	1.42	0.16	0.163	1.21	0.22
BornOAEnglish*Health	0.206	2.25	0.02	0.207	2.24	0.03
BornOAnonEnglish*Health	0.095	1.09	0.28	0.052	0.59	0.56
Disability*Uni	0.140	1.13	0.26	0.097	0.77	0.44
BornOAEnglish*Uni	0.015	0.16	0.87	-0.030	-0.31	0.75
BornOAnonEnglish*Uni	0.022	0.25	0.81	-0.036	-0.39	0.69
Disability*Schools	-0.267	-0.79	0.43	-0.354	-1.05	0.29
BornOAEnglish*Schools	-0.250	-0.88	0.38	-0.156	-0.56	0.58
BornOAnonEnglish*Schools	-0.241	-0.61	0.54	-0.219	-0.59	0.55
Disability*Other	0.249	1.80	0.07	0.263	1.91	0.06
BornOAEnglish*Other	-0.083	-0.63	0.53	-0.104	-0.78	0.44
BornOAnonEnglish*Other	-0.223	-1.79	0.07	-0.208	-1.67	0.09
Vpsmid	-0.049	-1.71	0.09	-0.087	-2.96	0.00
Vpshigh	-0.356	-4.73	0.00	-0.420	-5.53	0.00
Vpsexec	-0.865	-3.98	0.00	-0.943	-4.15	0.00
Higherduties	0.043	7.83	0.00	0.044	7.81	0.00
Sidewaysjob	0.041	6.04	0.00	0.040	5.87	0.00
Ftpt	0.359	12.33	0.00	0.358	12.18	0.00
Ongoing	0.123	3.26	0.00	0.123	3.24	0.00
Vpsmid*Female	0.146	3.15	0.00	0.141	2.97	0.00
Vpshigh*Female	0.244	2.35	0.02	0.246	2.31	0.02
Vpsexec*Female	-0.196	-0.77	0.44	-0.179	-0.68	0.49
Higherduties*Female	0.012	1.84	0.07	0.010	1.53	0.13
Sidewaysjob*Female	0.008	0.73	0.47	0.007	0.61	0.54
Ftpt*Female	-0.115	-1.69	0.09	-0.110	-1.60	0.11
Ongoing*Female	0.351	5.79	0.00	0.335	5.47	0.00
Vpsmid*Disability	0.058	0.56	0.58	0.028	0.26	0.80
Vpshigh*Disability	0.315	1.11	0.27	0.254	0.88	0.38
Vpsexec*Disability	-0.338	-0.48	0.63	-0.257	-0.34	0.73
Higherduties*Disability	-0.016	-2.08	0.04	-0.017	-2.22	0.03
Sidewaysjob*Disability	0.051	2.26	0.02	0.050	2.18	0.03
Ftpt*Disability	-0.072	-0.66	0.51	-0.079	-0.72	0.47
Ongoing*Disability	-0.179	-1.38	0.17	-0.151	-1.15	0.25
Vpsmid*BornOAEnglish	-0.002	-0.03	0.98	0.002	0.03	0.98

Vpshigh*BornOAEnglish	0.359	2.29	0.02	0.375	2.32	0.02
Vpsexec*BornOAEnglish	0.284	1.00	0.32	0.259	0.88	0.38
Higherduties*BornOAEnglish	0.003	0.31	0.76	0.002	0.19	0.85
Sidewaysjob*BornOAEnglish	0.022	1.05	0.30	0.020	0.99	0.32
Ftpt*BornOAEnglish	0.162	1.81	0.07	0.149	1.67	0.10
Ongoing*BornOAEnglish	0.036	0.37	0.72	0.048	0.48	0.63
Ageentry	-0.019	-9.98	0.00	-0.017	-8.59	0.00
Married	0.116	4.30	0.00	0.103	3.81	0.00
Timeofffamily	-0.006	-1.30	0.20	-0.005	-1.14	0.25
Nochildren	-0.012	-0.90	0.37	0.002	0.19	0.85
Ageentry*Female	0.003	0.91	0.36	0.002	0.65	0.52
Married*Female	-0.029	-0.62	0.53	-0.025	-0.54	0.59
Timeofffamily*Female	-0.046	-1.63	0.10	-0.045	-1.58	0.11
Nochildren*Female	0.007	0.38	0.70	0.008	0.44	0.66
Ageentry*Disability	0.001	0.12	0.90	-0.002	-0.35	0.73
Married*Disability	0.019	0.20	0.84	0.045	0.46	0.64
Timeofffamily*Disability	0.009	1.09	0.27	0.010	1.12	0.26
Nochildren*Disability	0.045	1.27	0.20	0.044	1.23	0.22
Ageentry*BornOAEnglish	0.009	1.83	0.07	0.009	1.91	0.06
Married*BornOAEnglish	0.064	0.82	0.41	0.064	0.82	0.41
Timeofffamily*BornOAEnglish	0.011	0.88	0.38	0.010	0.82	0.41
Nochildren*BornOAEnglish	-0.046	-1.53	0.13	-0.048	-1.59	0.11
Ageentry*BornOAnonEnglish	-0.006	-1.37	0.17	-0.008	-1.70	0.09
Married*BornOAnonEnglish	0.044	0.57	0.57	0.018	0.23	0.82
Timeofffamily*BornOAnonEnglish	-0.009	-0.60	0.55	-0.005	-0.34	0.73
Nochildren*BornOAnonEnglish	0.003	0.10	0.92	0.002	0.07	0.95
Ephdgained	0.737	5.42	0.00	0.580	4.23	0.00
Emastersgained	0.600	10.40	0.00	0.515	8.70	0.00
Ebachelorgained	0.336	6.10	0.00	0.435	7.67	0.00
Egraddiplomagained	0.481	11.57	0.00	0.437	10.19	0.00
Eadvdiplomagained	0.226	3.79	0.00	0.351	5.71	0.00
Ecertificategained	-0.022	-0.39	0.70	0.075	1.26	0.21
Female*Ephdgained	0.354	-2.11	0.04	0.365	-2.13	0.03
Female*Emastersgained	0.079	-0.91	0.36	0.094	-1.06	0.29
Female*Ebachelorgained	-0.067	0.83	0.41	-0.043	0.51	0.61
Female*Egraddiplomagained	0.151	-2.28	0.02	0.127	-1.88	0.06
Female*Ecertificategained	0.026	-0.31	0.76	0.063	-0.71	0.48
Female*Eadvdiplomagained	0.246	-2.89	0.00	0.260	-2.96	0.00
Study	0.045	1.41	0.16	-0.077	-1.55	0.12
Female*Study	0.052	-1.02	0.31	0.043	-0.54	0.59
Disability*Ephdgained	0.311	0.83	0.40	0.298	0.77	0.44
Disability*Emastersgained	0.053	0.25	0.80	0.008	0.04	0.97
Disability*Ebachelorgained	0.117	0.68	0.50	0.118	0.65	0.51
Disability*Egraddiplomagained	0.409	2.71	0.01	0.388	2.51	0.01
Disability*Ecertificategained	0.115	0.68	0.50	0.138	0.78	0.44
Disability*Eadvdiplomagained	-0.262	-1.48	0.14	-0.249	-1.39	0.17
BornOAEnglish*Ephdgained	-0.232	-1.09	0.28	-0.192	-0.89	0.38
BornOAEnglish*Emastersgained	0.107	0.74	0.46	0.137	0.93	0.35
BornOAEnglish*Ebachelorgained	-0.335	-2.12	0.03	-0.333	-2.07	0.04
BornOAEngl*Egraddiplomagained	-0.177	-1.49	0.14	-0.197	-1.63	0.10
BornOAEnglish*Ecertificategained	0.029	0.13	0.90	0.031	0.13	0.89
BornOAEngl*Eadvdiplomagained	0.120	0.74	0.46	0.107	0.65	0.52
BornOAnonEnglish*Ephdgained	-0.036	-0.14	0.89	0.102	0.37	0.71
BornOAnonEngl*Emastersgained	-0.328	-2.55	0.01	-0.260	-1.98	0.05

BornOAnonEngl*Ebachelorgained	-0.117	-0.88	0.38	-0.069	-0.51	0.61
BornOAnonEngl*Egraddiplomagained	-0.082	-0.67	0.51	-0.040	-0.31	0.76
BornOAnonEnglish*Ecertificategained	-0.199	-0.99	0.32	-0.094	-0.44	0.66
BornOAnonEnglish*Eadvdiplomagained	-0.124	-0.80	0.43	-0.067	-0.41	0.68
Study*Disability	-0.112	-0.99	0.32	-0.027	-0.18	0.86
Study*BornOAEnglish	0.000	0.00	1.00	0.096	0.80	0.43
Study*BornOAnonEnglish	-0.054	-0.63	0.53	-0.104	-0.87	0.39
Tenure	0.121	24.03	0.00	0.127	24.68	0.00
Tenure Squared	-0.003	-16.10	0.00	-0.003	-16.21	0.00
Tenure*Female	0.003	0.49	0.63	0.005	0.68	0.50
Tenure Squared *Female	-0.001	-3.47	0.00	-0.001	-3.51	0.00
Tenure *Disability	-0.039	-2.54	0.01	-0.035	-2.25	0.02
Tenure Squared *Disability	0.001	1.89	0.06	0.001	1.59	0.11
Tenure *BornOAEnglish	0.007	0.57	0.57	0.009	0.67	0.51
Tenure Squared *BornOAEnglish	0.000	-0.55	0.59	0.000	-0.60	0.55
Tenure *BornOAnonEnglish	0.013	1.21	0.23	0.017	1.46	0.14
Tenure Squared *BornOAnonEngl	0.000	-1.14	0.25	0.000	-1.27	0.20
Female*Disability	0.092	-0.92	0.36	0.083	-0.84	0.40
Female *BornOAEnglish	0.013	-0.16	0.87	0.009	-0.11	0.91
Female *BornOAnonEnglish	0.042	-0.61	0.54	0.053	-0.75	0.45
Ephd Entry	-			0.171	0.98	0.33
Emasters Entry	-			0.231	2.80	0.01
Ebachelor Entry	-			0.337	9.82	0.00
Egraddiploma Entry	-			0.099	2.07	0.04
Eadvdiploma Entry	-			0.018	0.37	0.71
Ecertificate Entry	-			-0.108	-2.49	0.01
Female*Ephd Entry	-			-0.035	-0.18	0.86
Female *Emasters Entry	-			0.069	0.60	0.55
Female *Ebachelor Entry	-			0.053	0.97	0.33
Female *Egraddiploma Entry	-			0.034	0.44	0.66
Female *Ecertificate Entry	-			0.131	2.04	0.04
Female *Eadvdiploma Entry	-			0.005	0.07	0.95
Disability*Ephd Entry	-			0.429	1.29	0.20
Disability*Emasters Entry	-			-0.120	-0.33	0.74
Disability*Ebachelor Entry	-			0.142	1.14	0.25
Disability*Egraddiploma Entry	-			0.243	1.50	0.13
Disability*Ecertificate Entry	-			0.099	0.80	0.42
Disability*Eadvdiploma Entry	-			-0.061	-0.33	0.74
BornOAEnglish*Ephd Entry	-			0.146	0.57	0.57
BornOAEnglish*Emasters Entry	-			0.015	0.09	0.93
BornOAEnglish*Ebachelor Entry	-			0.053	0.56	0.57
BornOAEngl*Egraddiploma Entry	-			-0.087	-0.69	0.49
BornOAEnglish*Ecertificate Entry	-			0.032	0.28	0.78
BornOAEngl*Eadvdiploma Entry	-			0.147	1.16	0.24
BornOAnonEnglish*Ephd Entry	-			0.475	2.09	0.04
BornOAnonEngl*Emasters Entry	-			0.219	1.53	0.13
BornOAnonEngl*Ebachelor Entry	-			0.101	1.09	0.28
BornOAnonEnglish*Egraddiploma Entry	-			0.150	1.21	0.23
BornOAnonEnglish*Ecertificate Entry	-			0.357	3.34	0.00
BornOAnonEnglish*Eadvdiploma Entry	-			0.239	1.92	0.05
Studyassistfinancial	-			0.222	3.73	0.00

Studyassistfinancial*Female	-	0.007	0.08	0.94
Studyassistfinancial*Disability	-	-0.105	-0.51	0.61
Studyassistfinancial*BornOAEnglis h	-	-0.111	-0.71	0.48
Studyassistfinancial*BornOAnonEn glish	-	0.107	0.70	0.49