Women, computing and the 'ideal worker': A comparison of professional occupations

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ABSTRACT

In this paper we use recent census data supplemented with case study evidence to investigate the extent to which professional computing occupations in Australia are constructed around the notion of an 'ideal' worker. Census data are used to compare computer professionals with other selected professional occupational groups, illustrating different models of accommodating (or not accommodating) workers who do not fit the ideal model. The computer professionals group is shown to be distinctive in combining low but consistent levels of female representation across age groups, average rates of parenthood and minimal provisions for working-time flexibility. One strategy employed by women in this environment is selection of relatively routine technical roles over more time intensive consultancy based work.

Introduction

The under-representation of women in skilled computing work has received considerable descriptive and analytical attention, with explanations typically focusing on the enduring masculinity of science and technology, the way this is perpetuated in recreational and educational experiences of children and young adults, the culture and content of tertiary courses in computer science and information technology, and perceptions of computing work as isolating rather than socially engaging (see, among many, Greenhill et al 1996; Henwood 2000; Mahoney and Toen 1990; Wilson 2003; Wright 1996; and for broader analyses of women and technology, Cockburn 1985; Wajcman 1991). At the organisational level, masculine workplace cultures, lack of informal networks and role models for women, gender-biased notions of skill, sexual harassment and a limited capacity to balance work and family are among factors seen as impacting negatively both on the likelihood that women will choose to enter information technology (IT) jobs and their career prospects once they are working in the field (for example, Ahuja 2002; Panteli et al 1999; Webster 2004). Thus, alongside fundamental barriers associated with intimate links between masculinity and technology, a wide range of more generic factors are drawn on, particularly in relation to retention and advancement. This raises questions over the extent to which work organisation and culture in IT is idiosyncratic. While writers such as Lang (2003) have noted that long hours, male dominated environments and lack of female role models have also characterised law and medicine (areas into which women nevertheless made significant inroads), there is as yet little comparative analysis of employment patterns in IT and other professional work that can shed light on the extent and nature of IT 'difference'. In this paper we take a first step in this direction with an examination of the extent to which professional computing differs from other selected types of professional employment in terms of the capacity to accommodate those who do not fit an 'ideal' worker model.

The notion of an ideal worker (essentially a worker with the [male] characteristic of freedom from domestic responsibilities) has long been implicit in feminist studies of employment, particularly when the focus has been on highly paid managerial and professional jobs. As Cockburn observed some twenty years ago, 'women who want to compete with men for good jobs are obliged to present themselves on the labour market *as men*, domestic persona and cares carefully tucked out of sight' (1985: 250, emphasis in original). At one extreme, such pressures may manifest themselves in the choice to remain childless, as illustrated in Wajcman's study of women in top managerial positions (Wajcman 1999: 143). More broadly, prevalent 'ideal worker norms' underpin the 'glass ceilings and maternal walls' that impede women's entry to, and progression within, highly paid professional and managerial positions (Williams 2000: 20, 68-69) – often regardless of their actual family status, as all women (not just wives and mothers) are affected by the 'construction of "free" workers as men' (Wajcman 1999: 143). The labour market does, of course, accommodate 'non-ideal' workers, although typically segregating them either in 'mommy tracks' within occupations or in those areas of the labour market with the most working time flexibility.

While much professional work has traditionally been based on the assumption of an unencumbered worker supported by the unpaid work of a wife (see Crompton 1986), recent increases in the proportion of women in areas such as medicine and law raise questions over the extent to which 'ideal worker' norms have been modified in these areas. Our concern in this paper is to compare professional computing work with professions in which female representation has traditionally been high or has recently increased, and thus to assess the prevalence of ideal worker norms and the capacity to accommodate non-ideal workers in this area of employment.

Several contrasting possibilities are suggested in the literature on IT employment. On the one hand, IT firms are frequently depicted as organisations free of traditionally gendered culture and practice (see Panteli et al 1999), and the technology itself brings potential to organise work in more flexible ways. On the other hand, research suggests long working hours, lack of part-time work and a need to constantly update skills. Project work for clients typically involves tight deadlines, on-site work and on-call availability (Webster 2004), with the pressure to work long hours depicted by Henwood (1993) as imbued in a culture of *'Boys' Own* heroism'. The relatively deregulated and individualist environment in much of the IT sector can exacerbate these difficulties, with professional development largely the responsibility of the individual, and widespread contracting out and freelance work limiting the scope for regulation of employment conditions (see Webster 2004). Such factors are seen as underpinning a 'leavers' problem – not only are women reluctant to enter IT work, they leave it at a greater rate than men (see Bentley 2003)

While 'IT' incorporates a wide range of occupational groups, each likely to have developed different expectations about ideal workers, our focus in this paper is on professional computing work. We recognise that the term 'professional' is not unproblematic (in comparison with professions such as law and medicine, for example, there is no specified professional education, membership of a professional body, or set of professional sanctions to distinguish these employees – see Beekhuyzen et al 2003: 78), however there is a clear set of occupational divisions in the Australian Standard Classification of Occupations (ASCO) that enable us to distinguish high skill computing from technical support and more routine jobs within the IT spectrum. In the following section of the paper we compare these 'computer professionals' with professional occupations in which female representation has recently increased (legal professionals and general medical practitioners), another relatively new area of professional employment (human resource professionals) and with the female dominated 'professional support' occupation of nursing. Although it would be possible to make comparisons across a much wider range of occupations, we are primarily interested in comparing computer professionals with professional occupations that have better accommodated women. In seeking indicators of the prevalence of ideal worker norms, we examine: the relative propensity of women to stay in these occupational groups over childbearing years; the prevalence of parenthood; the presence of working time pressures and flexibilities; and evidence of penalties such as increasing vertical segregation and pay inequality with age.

Data

We draw on unpublished data from the Australian Bureau of Statistics (ABS) 2001 Census of Population and Housing to compare the representation of women in selected occupational classifications. The advantage of the census data is the statistically reliable picture it provides of the Australian population, although a limitation is the lack of a finely detailed categorisation of IT jobs in the Australian Standard Classification of Occupations (ASCO). Also, although comparisons can be made over time between successive censuses, changes in ASCO in 1996 limit our capacity for comparison over time. Moreover, because the data are cross-sectional rather than longitudinal, direct information on transitions over the life course cannot be obtained, although breakdowns by age group do allow us to draw some inferences. We focus primarily on the 4-digit occupational category 'Computer Professionals', with separate information on 6-digit groups within this category (Systems Managers, Systems Designers, Software Designers and Programmers) to elaborate the situation where appropriate. Comparisons are made with Legal Professionals, Generalist Medical Practitioners (GPs), Human Resource (HR) Professionals and Registered Nurses. We also draw on case studies of professional computing work to elaborate the statistical data. This material is based on interviews with managers and employees in eight organisational case studies conducted in 2003-4.

Analysis

The census data confirm the low representation of women in professional computing jobs, and their segregation into the lower paying and more routine areas of the IT sector. In 2001, women made up 23 percent of computer professionals, 31 percent of support technicians and 85 percent of data entry operators (in descending order of average income). There is little evidence of change between 1996 and 2001 in these figures, with the exception of a 12 percentage point decline in the female share of support technicians (noted also by Byrne and Staehr 2003). Women's representation in the other professional groups addressed in our analysis was significantly higher than the 23 percent recorded for computer professionals: 46 percent for GPs; 50 percent for legal professionals; 61 percent for HR professionals; and 92 percent for registered nurses (again in descending order of average income). Our specific focus in this paper is not so much on these aggregate comparisons, but rather on indicators of retention and advancement. As noted above, in the absence of longitudinal data we use breakdowns by age groups to provide an indication of change over childbearing years.

FEMALE SHARE BY AGE GROUP: A comparison of women's representation by age group in the selected occupational categories is presented in Figure 1. The occupations are listed in the legend on the right-hand side of the figure in ascending order of average income (again showing the inverse association between female share and average income, with the exception that the computer professionals group is a clear outlier). Apart from emphasising the low female share in computing professional jobs, Figure 1 shows relative stability across age groups in this occupational category, particularly in comparison with legal and HR professionals. These groups exhibit a marked decline in female share over the age groups – a pattern consistent with recently increasing entry of women to these professions, but also consistent with low retention rates of women in occupations poorly equipped to accommodate non-ideal workers, and suggesting a much more dramatic 'leavers' problem in these occupations than in computing. In contrast, among GPs, apart from a slight dip among late 20s and early 30s age groups, female share remains relatively constant until declining amongst those over 40. For registered nurses, the lowest paid group represented in the figure, the high female share tends to increase marginally with age, consistent with widespread availability of provisions to support non-ideal workers (although providing no indication of what penalties might be attached to such arrangements).

FIGURE 1

*Female share by age group, selected occupations, Australia 2001*
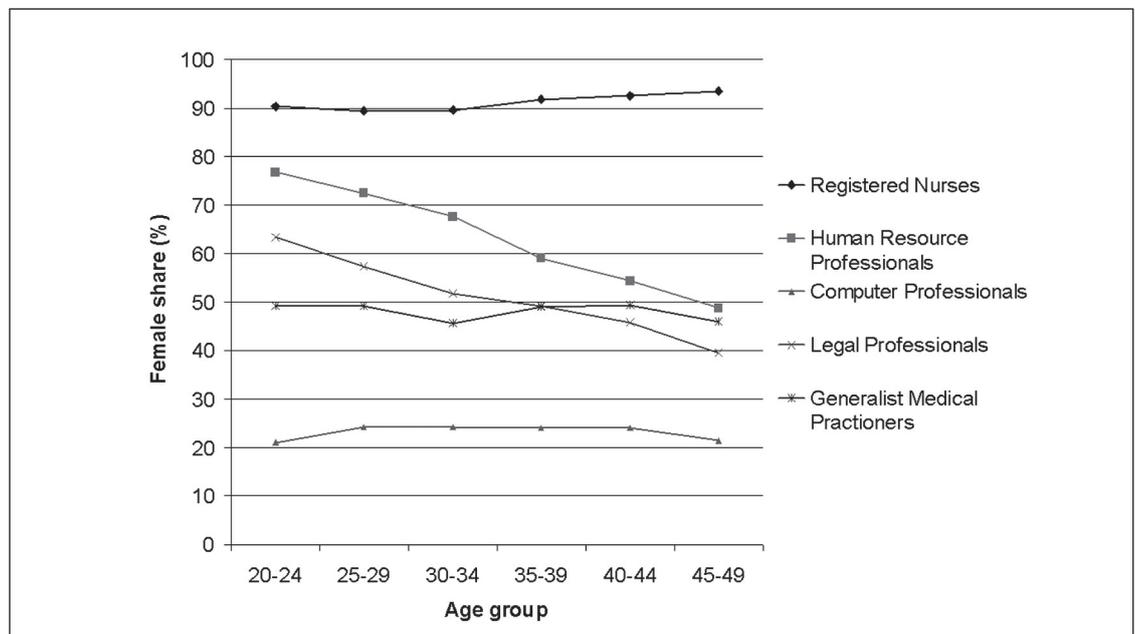
Notes 'Computer professionals' combines systems managers, systems designers, software designers, application and analyst programmers, system programmers, computer systems auditors and other computing professionals nec.

Source ABS Census of Population and Housing, 2001, unpublished data.

Finer detail on computing professionals is presented in Figure 2, which shows patterns for four 6-digit level groups within this category (Systems Managers, Programmers [combining Applications and Analyst Programmers with Systems Programmers], Software Designers and Systems Designers). Again these are listed in ascending order of average income and illustrate an inverse relationship between female share and average income. Thus, although women's representation is comparatively high among Systems Managers, this is the lowest paid occupational group within the computer professionals category, underlining its relatively low status. In combination with Donato's (1990) observation that women in IT management tend to be managing other women working in areas such as data entry, these figures signal the need for caution in interpreting data on women in management in the IT field.

Turning to the issue of consistency in female share across age groups, there is little suggestion of a decline over childbearing age groups in any of the groups except the Systems Managers, and for Programmers there is an increased female share among those in their 30s and 40s. This would be consistent with a tendency for male programmers in these age groups to be moving into managerial or advanced technical positions, and/or with women transferring into programming jobs from other areas. There is, however, a marked decline in female share amongst older workers for Programmers, and a similar, although smaller, decline for Systems and Software Designers. This phenomenon would be consistent with lower entry levels of women into these types of jobs in the past, but the data do not allow us to test this interpretation.

FIGURE 2

Female share by age group, computer professionals sub groups, Australia 2001
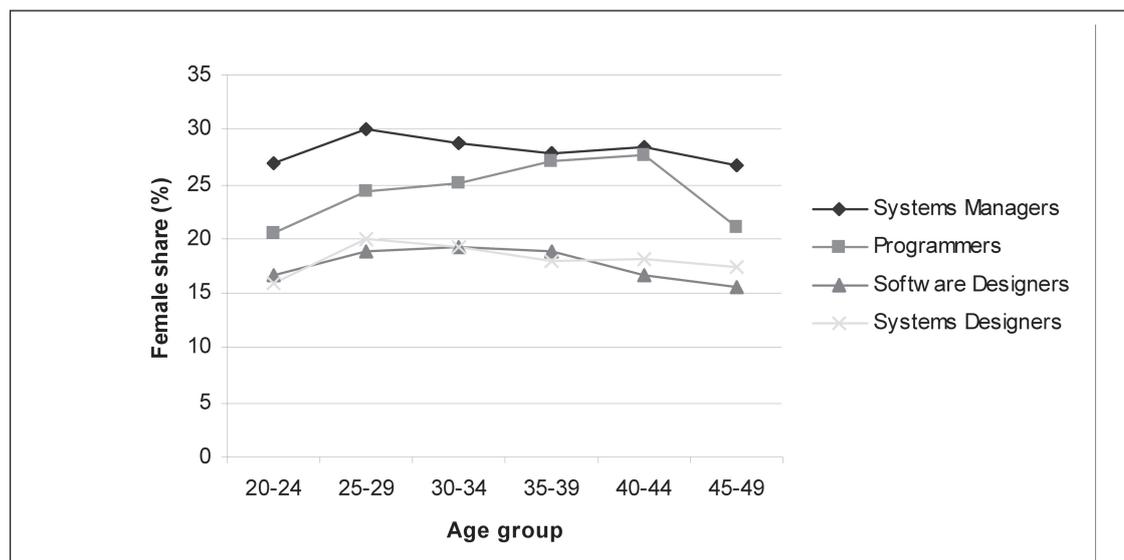
Notes 'Programmers' combines Applications and Analyst Programmers and Systems Programmers.
Source ABS Census of Population and Housing, 2001, unpublished data

Overall, interpretation of these figures is limited not only by the inability to distinguish between the impact of changing entry levels and problems of retention, but also by the inability to identify where changing female share might be due to the movement of men (or women) into other occupational categories. Nevertheless, the data do not provide support for the notion that demand for ideal workers is having a marked impact on computing professionals, unless this is occurring at the entry level (and Weinberger's [2004] analysis suggests the contrary). In the following sub-sections we investigate the extent to which this might be due to lower levels of parenthood among computing professionals or, alternatively, working time arrangements that facilitate work/family balance.

PARENTHOOD:

Lower levels of parenthood among computer professionals might be expected in view of widespread recognition of the problems of skill maintenance during career breaks. This was frequently noted in our case study interviews – as one employee put it: 'the longer a gap appears, the more you've got to explain, and…the less ready people are to accept your explanation'

(female computer professional, medium IT company). Additionally, there is an expectation that this is a relatively young workforce. To investigate these issues we use the census data to compare the proportion of employees with children in the various occupational groups. Figure 3 shows that while women working as nurses or general practitioners are the most likely amongst these groups to have children (and the average age of women in these groups is relative high at 42 and 37 years respectively), parenthood is more prevalent among women working as computer professionals (average age 35 years) than among women in legal and HR professions (average ages 34 and 35 years respectively). Within the computer professionals group, however, it is women working as programmers who are most likely to have children (43 percent, compared with 34 percent of female systems managers and around 35 percent of female software and systems designers).

FIGURE 3

Percentage of employees with children, selected occupations Australia 2001
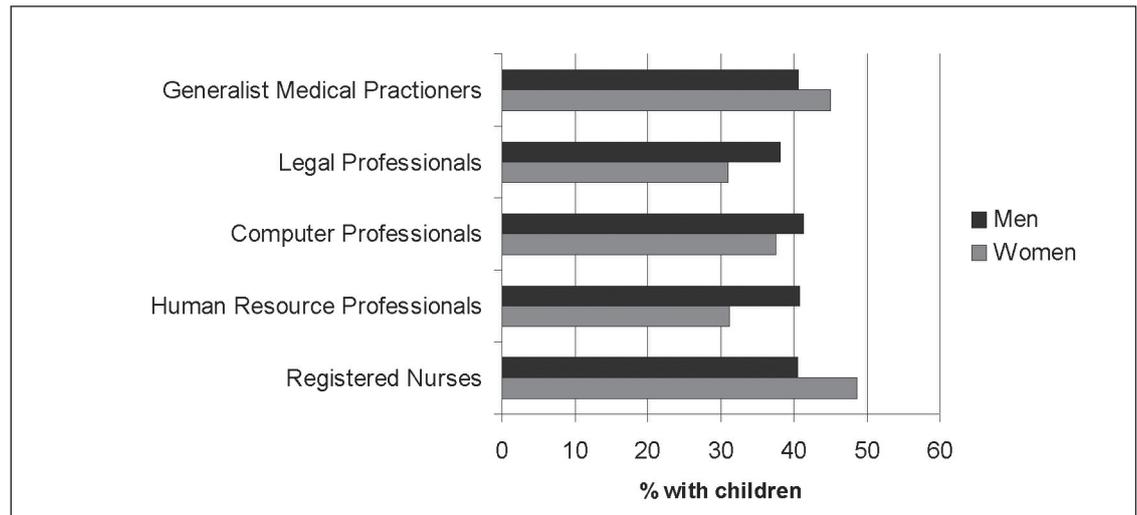
Notes   Children 15 years or under.
Source   ABS Census of Population and Housing, 2001, unpublished data

Again, lack of longitudinal data and detailed information on reasons for choices about parenthood place some limits on what can be ascertained from the figures being used in this paper. Nevertheless, the data thus far have provided little evidence that women who enter computer professions are choosing not to have children in order to fit with an 'ideal worker' model, or that they are leaving the profession in significant numbers during childbearing age groups. Alternative possibilities are that the long hours culture associated with project work is not typical, or avoidable, within these occupations; and/or that other flexibilities are available, for example part-time work or working from home. Although we are unable to address the latter with the census data, the next sub-section compares the selected occupations on aspects of working time.

WORKING TIME: Columns 1 and 2 in Table 1 show that among the selected occupations, average weekly hours for women is lowest among registered nurses (31 hours per week) and highest among legal professionals (41 hours per week). The figure for computing professionals (38 hours per week) conceals some variation within this group (around 39 hours per week for women in systems and software designer roles, and 37 hours per week for programmers). Amongst computer professionals, women's average weekly hours are around three hours per week lower than men's – similar to the situation for legal and HR professionals, but a narrower difference than is evident for nurses and GPs.

> The contrast between occupations is more marked for the proportion working very long hours (more than 49 per week) shown in columns 3 and 4 of Table 1. Both male and female computer professionals are less likely to work these very long hours than employees in HR and legal professions, or in general medical practice, where the strongest contrast between males and females is evident.

	Average hours/wk		%working 49+hrs/wk	
	F	**M**	**F**	**M**
Registered nurses	31	37	6	10
Human resource professionals	38	41	17	28
Computer professionals	38	41	11	18
Legal professionals	41	44	35	48
General practitioners	36	43	28	49

Source   ABS Census of Population and Housing, 2001, unpublished data.

At the other end of the working hours scale, however, there is little evidence that part-time work is readily available for computer professionals. As Figure 4 shows, part-time work is widely used by registered nurses, particularly among those in their mid-30s; with a similar pattern (at a lower level) among GPs. Computer professionals stand out as the least likely to access part-time work, with little variation across age groups.
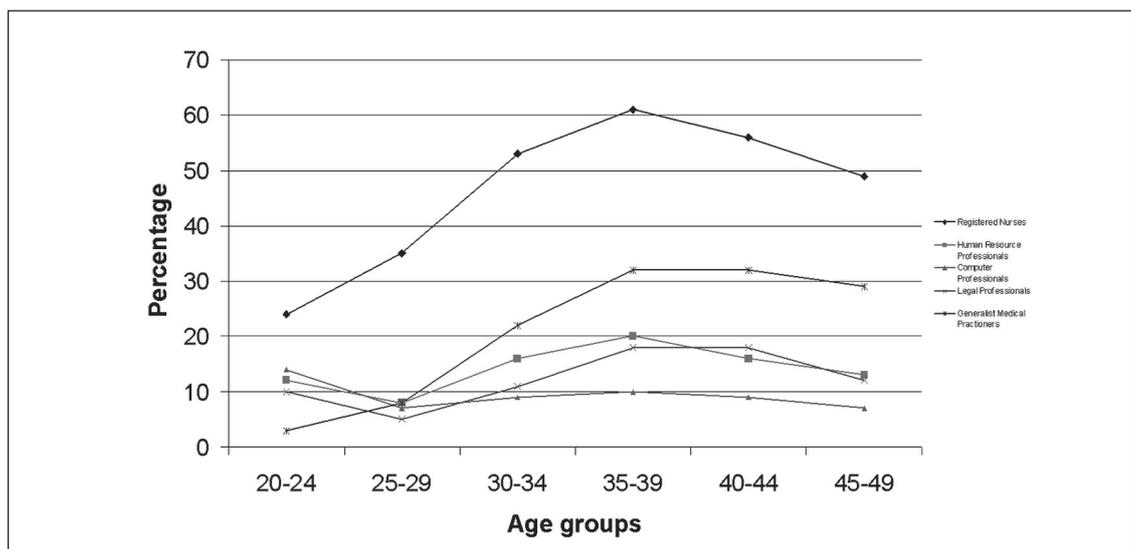
Notes   1. Less than 35 hours per week.
Source   ABS Census of Population and Housing, 2001, unpublished data

Our case studies consistently highlighted the difficulties faced by professional computing staff trying to access part-time work. Managers were often strongly resistant to the idea: 'Part-time work and IT just [don't mix]…it is so difficult to get the job done, and…your responsibility is to the company to get the job done' (Female manager, IT section of a large, publicly funded organisation). Employees tended to accept the rarity of part-time work: 'I did go back to part-time work and it was fantastic, but then there was no part-time work! It's like gold dust in IT' (Female computer professional, medium IT company). We also found evidence of long hours work, but this was very role dependent – most evident among consultancy staff who had to respond to client needs and least evident among programmers and research and development staff.

Overall, in light of the census data, computer professionals do not stand among the selected professional occupations as working the longest hours, and the difference between men's and women's average hours is not as marked as in those professions in which very long hours is most prevalent. On the other hand, all our evidence suggests that they have very limited access to part-time work, although we found little evidence to support the idea that the work would not be amenable to such arrangements.

GENDER PAY RATIOS: Thus far the analysis has indicated relative stability in female share across age groups in professional computing work, in spite of lack of any evidence that women in these jobs are deciding against parenthood in order to be seen as ideal workers, or that 'non-ideal' status is accommodated through the availability of the usual forms of working-time flexibility. In this final sub-section we investigate the possibility that computing professionals are distinctive in the extent to which women pay a 'vertical segregation' (and thus a pay equity) price for their 'non-ideal' status – that is, that they choose roles within these occupations that keep them at the lower ends of career ladders and pay scales but perhaps allow some additional flexibility. We examine changes in gender pay equity ratios across age groups to identify whether there is any evidence of 'IT exceptionalism' on this measure.

FIGURE 5

Female/male pay ratios for full-time employees by age group, selected occupations, Australia 2001
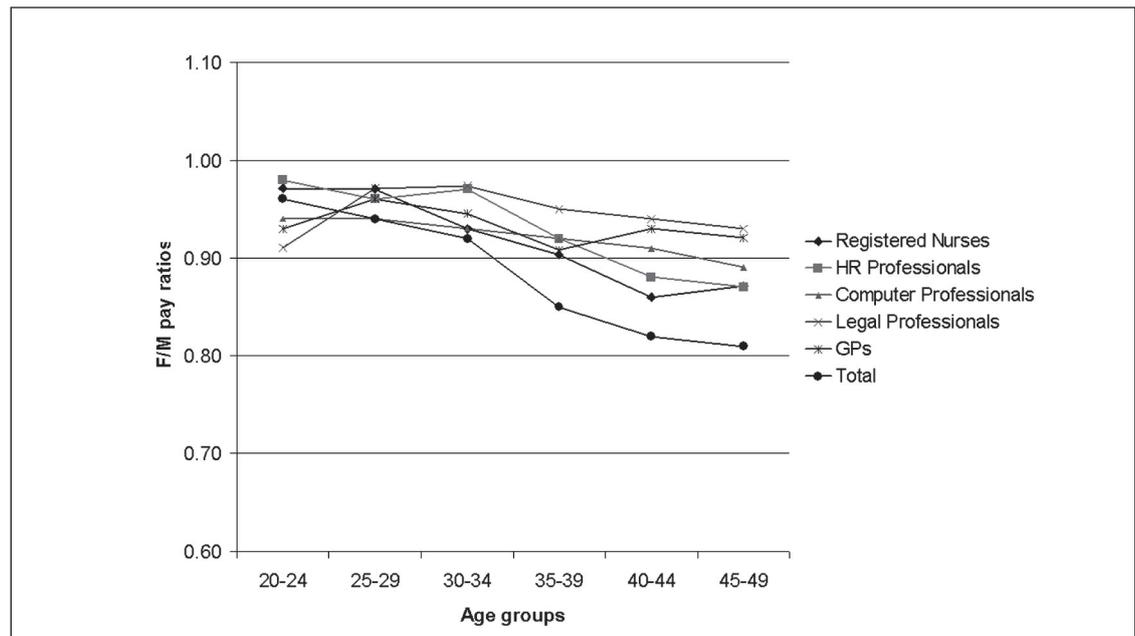
Notes   Based on average weekly income for full-time employees only
Source   ABS Census of Population and Housing, 2001, unpublished data

As Figure 5 shows, there is a decline in the gender pay ratio of around 15 percentage points across age groups for all employees, and this is more marked than for any of the professional groups examined in this paper. Among the professional occupations examined here, the biggest declines are for HR professionals and registered nurses (11 and 10 percentage points respectively), with GPs and legal professionals comparatively static, and computer professionals occupying a middle ground with a decline of around five percentage points. Examination of the 6-digit groups that make up the computer professionals category shows that there is almost no change over the age groups for systems and software designers, a decline of around four percentage points for programmers, and a larger decline of around seven percentage points for systems managers.

While the comparisons presented in Figure 5 are based on averages uncontrolled for skill, experience and other variables, they do suggest a range of possibilities associated with the accommodation (or not) of non-ideal workers. Among the two groups that maintain relatively high levels of female representation across the different age groups, and where there is reasonable access to part-time work and parenthood rates are relatively high (nurses and GPs) it appears that penalties for what might be seen as a 'mommy track' are considerably higher for nurses than for GPs. Among the two groups with the most significant declines in female share across age groups (legal and HR professionals), the penalty among those who stay on appears higher among the HR group. These comparisons suggest equity benefits attached to relatively flat career structures at least partly governed by regulated professional fees for GPS and legal professionals.

Computer professionals appear somewhat more likely to encounter increasing vertical segregation/pay inequity with age, although not so much as nurses and HR professionals. An interpretation consistent with our qualitative data is that women choose different roles within computer professional work to enable them to manage family commitments – opting for office based programming work in lieu of more highly paid on-site consulting and professional services work. As one of our respondents explained: 'I'm also a mother…. I have four children, and over the years I've with [this company] I've very carefully picked the roles that I've applied for, to be roles [in which] I can maximise my ability to meet the double life of mother and…full-time working parent' (Female computer professional, large IT company).

Conclusion

The analysis presented in this paper suggests broad groupings of professional occupations in terms of the capacity to accommodate non-ideal workers, ranging from a 'strong ideal worker' model (evident in legal and HR professional work, where female share reduces markedly over age groups, parenthood rates are comparatively low, working hours are long and there is minimal working-time flexibility) to a more accommodative model (evident for nurses and GPs, where female share is more constant across age groups, parenthood rates are relatively high and working-time flexibility is more widely available). In spite of differences within these groupings, particularly in the extent to which pay equity penalties tend to emerge amongst older age groups, they are models of contrasting extremes, neither of which appears to fit the data associated with computer professionals.

Our data illustrate something of a puzzle surrounding computer professionals: on the one hand reiterating the low level of female representation in these occupations, and emphasising the lack of working-time flexibility and problems associated with career breaks that suggest an expectation of ideal workers; but on the other showing (for the relatively small numbers of women who do engage in these jobs) comparative consistency in female share across age groups alongside average parenthood rates. We argue that computer professionals are under considerable pressure to maintain ideal worker profiles, and that the main accommodative strategy employed is role selection within the profession – a strategy that carries a moderate vertical segregation and pay equity penalty over the life course. This argument and the proposition that this is an occupationally distinctive model are necessarily speculative, requiring detailed longitudinal data across different professional groups for rigorous assessment.

Acknowledgements

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