

Women's Work Transitions Around Childbearing

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Abstract

There is little known about the extent to which Australian women leave work on commencement of childbearing or return to work afterwards. Of particular interest is whether or not women return to full-time or part-time work. This paper uses work histories collected in Waves 1 and 2 of the Negotiating the Life Course (NLC) Surveys to analyse these transitions for women who had at least one child since 1970. The analysis focuses first on the transition that occurs when the first child is born, using multinomial logistic regression. It then focuses on the return to work —looking at whether it occurs and if so, on the timing and whether it is to full-time or part-time work, using discrete time event history analysis. The multivariate analyses consider, amongst other things, whether there have been changes over time, and the effect of education, marital status and pre-birth job characteristics.

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Introduction

Statistics on employment amongst mothers consistently show that age of youngest child is an important determinant of the probability of being employed. The relationship between childbearing and employment is well-known, and has been demonstrated to be true in a range of studies using Australian data (for example, Brusentsev 2002; for example, Gray *et al.* 2003; Wooden and VandenHeuvel 1997). This in fact recognises transitions out of and into work following childbirth — some women continue to work through their childbearing years while others take a break from paid work. Of those that take a break, some return to work faster than others. Over time, an increase in maternal employment is related to changes in these patterns of employment transitions around childbearing. An increase in the proportion of mothers with young children working may reflect that more women are working continuously through childbearing — perhaps taking only a short period of maternity leave — or it may indicate women still take a break for childbearing, but they return to work faster than they did in previous decades. In fact, increasing maternal employment is likely to reflect a mix of these changes.

As shown by Beggs and Chapman (1988) and Breusch and Gray (2004) there are significant lifetime earning losses experienced by those women who take a break from employment. Arun, Arun, and Borooah (2004) also showed, using Australian data on career breaks, that women who have taken a child-related career break have lower income than otherwise similar women, holding other human capital variables constant. This is consistent with studies of the family wage gap in the international literature (for example, Budig and England 2001; Joshi, Paci and Waldfogel 1999; for example, Waldfogel 1998). Women benefit financially if they are able to maintain job continuity, minimising their loss of human capital and minimising the impact of children on lifetime earnings. As has been found in the literature reviewed below, access to parental leave arrangements and affordable child care can help mothers maintain attachment to the workforce.

This work focuses on the transitions that occur on the birth of a child, and for those who left work after a birth (or were not working before the birth), the transitions to work after childbearing. The aim is to further the understanding of how women's transitions around childbearing have changed in Australia (focusing on the period

between 1970 and 2000). It also considers what factors are associated with a higher attachment to work as evidenced by a greater tendency to stay at work on commencement of childbearing, or a faster return to work if a break from work is taken.

The paper firstly reviews the relevant international literature, then summarises Australian findings. This is followed by a description of the data used. The next section focuses on transitions around the first birth, and includes the methodology, results and discussion as they apply to that analysis. The following section covers these areas looking at the transitions to work after childbearing, looking at the timing of return to work after childbearing. A concluding section draws together these results.

1 Literature review

A number of country-specific and comparative studies have covered women's employment transitions around childbearing. The comparative studies, in particular, focus on differences in policy regimes, showing the importance of family and labour policies in explaining cross-country variation in employment patterns around childbearing.

1.1 Parental leave

There is considerable evidence from the international literature that the timing of women's return to work after childbearing differs according to the availability of parental leave. Women with access to maternity leave have a higher likelihood of returning to work at the end of that period of leave compared to women with no leave entitlement (see, for example, Hofferth 1996; McGovern *et al.* 2000; see, for example, Pylkkanen and Smith 2003; Waldfogel, Higuchi and Abe 1999). That is, the existence of this period of leave is beneficial to long term job continuity (Dex *et al.* 1998). In Britain, Waldfogel showed the availability of leave was linked to improved wages on return to employment after childbearing (Waldfogel 1998).

Generally, women return more slowly where there is a longer period of leave in which they retain a guaranteed return to their job (Rønsen and Sundström 2002). Further, there is some evidence that the longer the period of leave, the lower the rate of return at the end of the period. This was found to be true in Germany, in an analysis of the

effects of lengthening the job protection period (Ondrich *et al.* 1999). As these and other authors have noted, this could lead to a weakening of women's employment opportunities, as it might lead to a loss of skills and therefore reduced earnings on return (Gutierrez-Domènech 2004; Rønsen and Sundström 2002).

Waldfoegel *et al.*'s study compared the effects of maternity or child care leave coverage on the return to work in Britain, the United States and Japan (Waldfoegel *et al.* 1999). In Britain, where maternity leave eligibility was determined by pre-birth job tenure, the effect of maternity leave coverage *did not* significantly affect the return to work once pre-birth job tenure was controlled. This was not the case in Japan or the United States — having access to maternity or child care leave increased retention even after controlling for job tenure. The authors note that the British result is difficult to interpret because of the strong relationship between job tenure and maternity leave coverage. This is particularly relevant to Australia, where there is no universal system of paid maternity leave, and during the 1980s and 1990s access to unpaid maternity leave was dependant on pre-birth job status (whether permanent or casual) and tenure (see below).

1.2 Financial assistance

If the decision to return to work is arrived at after comparing the cost of staying at home to the cost of working, another important factor is the amount of financial assistance families receive in the absence of employment. This financial assistance may be in the form of paid maternity leave. While paid to remain at home, parents are likely to remain at home for the duration of that entitlement. Another form of assistance may come through government payments to low-income or single-income families. Rønsen and Sundström's (2002) analysis of Finland, Norway and Sweden included a finding that the availability of the home-care allowance, paid to not-working mothers in Finland, was associated with a slower return to work. They also noted that other research on Norway found that the more recent introduction of a similar payment had also resulted in lower employment amongst those eligible (Rønsen and Sundström 2002). Where government assistance is withdrawn once earnings increase — as is the case in Australia — the financial incentive to work can be limited, particularly in low-income families (Beer 1998; Pech 1991; Saunders 1995; Sullivan 2001). This may have some impact on women's decisions to return to work.

1.3 Human capital

Human capital influences — measured as labour market experience or education level — are found to be an important determinant of transitions out of work on childbearing and on the return to work. Usually, women with greater levels of human capital are less likely to exit from work on childbearing (Wenk and Garrett 1992), and to return to work faster (Cramer 1979; Dex *et al.* 1998; Hofferth 1996; Macran, Joshi and Dex 1996; McLaughlin 1982; Polachek and Sieber 1993; Pylkkanen and Smith 2003; Shapiro and Mott 1979; Shapiro and Mott 1994). This is consistent with the argument that these women might seek to minimise job breaks to reduce the opportunity cost of childbearing, and to minimise the deterioration of skills.

The effect of human capital is not always clear, however. Gustafsson *et al.* (2004) found higher education was associated with lower exits from employment and faster returns for West German and British women, but they found less support for this in Sweden. The same result was found by Gutierrez-Domènech (2004), who studied a number of European countries¹, including Sweden, and found that Sweden was the only country for which education was found not to have an effect on employment transitions. Earlier studies by Bernhardt on Swedish data had found education to be relevant to whether a woman was working after a birth (Bernhardt 1986; 1993). The effect of human capital may be smaller where women of all education levels have equal access to leave arrangements and child care, which facilitate the return to work, as is the case in Sweden (Gustafsson *et al.* 1996; Gutierrez-Domènech 2004).

1.4 Child care

Particularly relevant to the return to work is the availability of affordable, quality substitute child care. In countries where care is not universally available, the higher paid (usually the higher educated) can more likely afford paid child care, as can women with more highly paid husbands. Macran *et al.* (1996) and Desai and Waite (1991) argued that older mothers are probably in a better financial position than young women because of greater acquired work experience, so are better able to afford child care. However, the ability to access such care does not necessarily depend on human capital or wages, as the availability of informal care can mediate this requirement. Also, even those with higher financial resources may have difficulty finding suitable care where there are widespread shortages in such care.

1.5 Work prior to birth

Having worked before childbearing is a strong predictor of the incidence and timing of return to work after childbearing (Hofferth 1996; Joesch 1994). Women who worked up to the birth have a faster return to work. This is likely to be related to a number of factors. The most important are that these women are more likely to have access to maternity leave, and that the human capital acquired through employment is likely to be higher for these women. Joesch (1994) suggests that the effect of work status before the birth captures both the opportunity cost effect as well as a preference effect — that those working during pregnancy had a stronger preference for work. Both Joesch (1994) and Hofferth (1996) find that working during pregnancy is such a strong predictor of the return to work timing, that many other covariates become insignificant once this variable is included.

In Australia, the characteristics of the job before childbearing are expected to have an association with the likelihood of return. In part, this would be because maternity leave is not available to everyone, but varies from job to job depending on the employment conditions. Also, for some occupations it might be preferable to return to work faster, to maintain job-specific skills and to ensure continuity of a career. For low-skilled jobs this may be less of an issue, although women in low-skilled jobs may have husbands in low-paying jobs that may necessitate a faster return to work to meet financial obligations.

1.6 Part-time work

For women returning to work, in Australia and in many other industrialised countries, part-time work helps to maintain a balance between work and family commitments. For some, a preference to work part-time may be so strong that taking up a full-time job on return to work is inconceivable, or perhaps not even possible if the availability and/or cost of non-parental child care are prohibitive to working longer hours. The availability of part-time work is of course an issue, as not all women can work part-time, even if they want to. Part-time work has become much more readily available in Australia, and the availability of part-time work was more likely to have been a constraint on employment in the 1970s compared to the 1980s or 1990s. Cross-country comparisons find that the availability of part-time work is an important factor in explaining differences across countries. This was found by Gutierrez-Domènech (2004), who suggested that fewer women in Italy and Spain might choose non-

employment if there were more opportunities to combine child care with part-time work.

In analysing returns to work it is particularly relevant to consider whether there are different factors associated with a return to part-time work over a return to full-time work. Hofferth's (1996) analysis of the return to work in the United States found that having access to part-time work was associated with a faster return to work. Her study also analysed the covariates associated with returning to part-time work and full-time work separately. She found that having a higher other family income suppressed the return to full-time work, and having higher own wage increased return to part-time work. As Hofferth says, "This makes sense. Mothers who do not need the money as much do not need to return full-time; they may decide to return part-time." (Hofferth 1996:398). A similar result was found for women in Germany by Ondrich, Spiess, Yang, and Wagner (1999).

1.7 Marital status

Married women are found to be more likely than single women to exit employment on childbearing (Drobnic, Blossfeld and Rohwer 1999), and to have a slower return to employment (McGovern *et al.* 2000; Miller 1993). This finding is linked to the financial aspect — that married women have financial support from their husband, while single women do not have this option. Of course, the degree of financial support provided by husbands varies considerably across families. For this reason, studies generally show that women with lower-income husbands are likely to resume work faster (Hofferth 1996; Joesch 1994; McGovern *et al.* 2000). Financial need cannot be looked at in isolation, however, as to return to work requires access to affordable child care, and is likely to be associated with other costs of working as well as loss in government assistance, as discussed.

Drobnic found that in the United States and in West Germany, single parents return to work full-time, rather than part-time. She attributed this to the interaction with the potential loss of government assistance if working part-time — part-time employment did not bring sufficient financial compensation for the loss of this assistance to bring single parents out of poverty. These parents then had the options of no work, with government assistance, or full-time work (Drobnic 2000).

1.8 Age at first birth

Age at birth may also have an effect on the rate of return to work, although there is a strong association between this variable and measures of human capital, which probably accounts for the apparently small or negligent effects of age found in most multivariate analyses (for example, Pylkkanen and Smith 2003).

2 The Australian situation

There is little work on the workforce transitions of mothers in Australia. The most notable exceptions are the study on maternity leave by Glezer (1988) and analyses of workforce transitions by Young (1978; 1989; 1990).

Young (1978) reported that by 1971 there were already increasing proportions of women working continuously while their children were young and by this time, women were more likely to be working after marriage and before having children. Of all women interviewed about employment at different life cycle stages, 48 per cent had worked after marriage and before childbearing, 19 per cent worked while they had pre-school aged children and 37 per cent had worked while at least one child was school-aged. At each stage, education was strongly associated with employment, with higher education being linked to a higher rate of employment. Young found that higher education was associated with a working sequence in which women worked before the first birth, withdrew when their children were pre-school aged, and resumed work when their children were school-aged.

Glezer studied the use of maternity leave and the return to work of a sample of women who had a birth in 1984. She found that of all first-birth mothers, 39 per cent returned to work in the 18 months following this birth. For those first-birth mothers who had been working while they were pregnant (73 per cent of the women), the rate was higher, at 55 per cent (Glezer 1988:69,72). Many of these women returned to work part-time. Glezer's results showed that whether or not a woman returned to work after her first birth was an important determinant of whether she returned to work after later births. If a mother was working while pregnant with her second or third child, for example, she was more likely to return to work after that birth than was a mother who was not working during the pregnancy. For first and other births, there were other factors associated with a greater likelihood of returning to work. These were having a low-income husband, a high-status occupation, high earning

potential, higher work commitment (as measured by having worked up until just before the birth and having worked longer for their employer), and a view that child care was not detrimental to young children (Glezer 1988:77).

As was demonstrated from the international literature, family and labour market policies can affect the timing of return to work after childbearing. It is relevant, therefore to consider the Australian situation, and how it has changed since 1970.

As discussed above, access to leave after childbearing has been found to affect the timing of return. In Australia there is no universal system of paid maternity leave, although one year's unpaid maternity leave has been available to all permanent employees since 1979. Since 2001, casual workers who have worked for 12 months with their employer are also entitled to one year's unpaid maternity leave. Paid maternity leave is only available in those jobs where it is provided as a condition of employment, and this has been the case throughout this period.

Although Australia's formal child care program has expanded significantly since the 1970s, a high proportion of parents still rely on informal care while they work. In fact, the use of formal child care in Australia ranks very low compared to other OECD countries, with 15 per cent of children aged under three using formal care, and 60 per cent of children aged three to five using formal care in 2000 (OECD 2001:144). Child care affordability remains an issue, as does the availability of places, particularly for young children.

Part-time work has grown very strongly amongst women during the 1980s and 1990s in Australia (Borland, Gregory and Sheehan 2001). Working mothers in Australia have increasingly taken up part-time work on return to employment after childbearing. Studies consistently report this is a preference amongst the majority of mothers with young children (Glezer and Wolcott 1997). Of employed women, partnered mothers have a higher rate of part-time work, but single parents have also increasingly worked part-time since the beginning of the 1980s (Renda 2003). In 2000, 54 per cent of employed women aged 25 to 54 in Australia with one child, and 63 per cent with two or more children worked part-time. This compared to OECD averages of 29 per cent and 37 per cent respectively (OECD 2002:78). In Australia, the choice to work part-time is likely to be influenced by the ability to earn reasonable incomes from part-time work. The hourly wage rate of part-time workers is not

affected by a large part-time work penalty as is found in other countries (Rodgers 2004).

The tax-benefit system in Australia is very complex, having become increasingly so over the years. Payments are withdrawn as earnings increase, so for some families this provides a strong disincentive for the primary carer to work in the case of two-parent families, or low-income single parents (Beer 1998; Pech 1991; Saunders 1995; Sullivan 2001). As such, directing government subsidies to child care has a stronger positive influence on female labour supply than does directing this expenditure to income-tested child or family payments (AIFS 1989; Apps and Rees 2002; Jaumotte 2003).

3 The data

This study uses the retrospective work history collected for respondents in Waves 1 and 2 (1996-97 and 2000) of the Negotiating the Life Course (NLC) Survey, where persons were asked for their work status in every year between when they turned fifteen and the survey date. Alignment of these data to the comprehensive fertility and relationship histories collected in this survey enabled an examination of how work changed in the years following childbearing.

Data were extracted for all female respondents who have had one or more child — a total sample of 890 women aged between 18 and 54 in Wave 1. Work status was collected as worked full-time, part-time or did not work for every year since they turned fifteen. A detailed examination of these data is presented in the appendix, which looks at how the data compare to employment data from other sources. As a result of this analysis, further work was limited to data relating to 1970 onwards, as the sample size was particularly small and likely to be unrepresentative before this time. This left a sample of 799 women.

The greatest difficulty in using these data to analyse workforce transitions was in the collection of data in annual blocks. In these data, short breaks from work were not recorded, and for those working about half a year, it was left to the respondent to decide whether to record this as mostly working or mostly not working. This has obvious implications for an analysis of breaks from work following childbearing — some breaks are not shown in the data at all. The appendix contains a more thorough

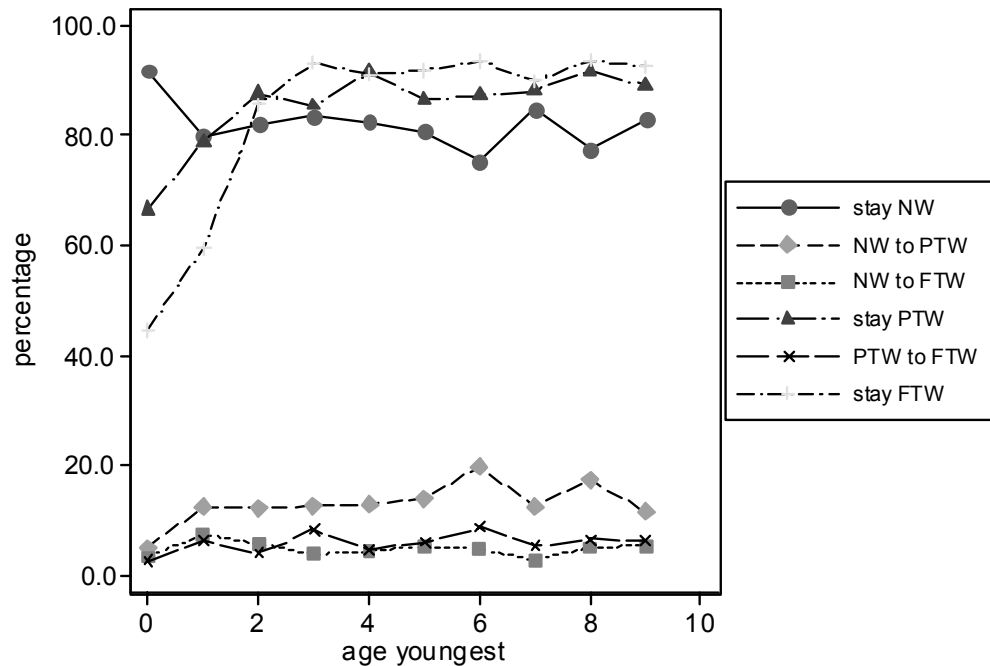
examination of this issue. While the data are useful for looking at broad patterns of exits from and returns to employment, they cannot help in an analysis of maternity leave. Not only are short breaks hidden in the data, but also there is no information on whether a year away from work was taken using formal maternity leave, or taken as a break from a job using a less formal arrangement, or whether it involved resigning from one job and starting another. Also, no information is available on whether a break from work was paid or unpaid.²

With these constraints on the analysis, the expected results are unclear. Those that did leave work on commencement of childbearing included those who had access paid maternity leave as well as those who left work with no financial assistance from their past employer and no guarantee to return.

The change in an individual's work status from one year to the next was used to measure workforce transitions. Where there was no change in status, this was recorded as a form of transition (for example, 'stay working full-time') to enable a complete picture to be built up over all person-years. All transitions were captured from the year of the first birth — the first transition captured is that from before the year of first birth, to the year of the first birth. Every transition was recorded up until the year for which complete fertility, relationship and work history is available — usually 1996 if they responded to Wave 1 only, otherwise 1999.

Figure 1 shows the main transitions that occur on and after childbearing, up to 9 years after a birth³. These data have been calculated from all births, so women having more than one child are represented more than once. A transition is measured as occurring or not occurring for all those persons in the origin state, that is, those at risk of making that transition. Of those not working when they had a youngest child aged one year old, for example, in the year that the youngest child turned two, 82 per cent stayed not working, 12 per cent moved to part-time work and 5 per cent moved to full-time work. From these data it is clear that the most common 'transitions' are those representing staying in one state or another. An overview of all transitions is presented in more detail in the Appendix Table A- 1.

Figure 1 Selected transitions following childbearing, all births since 1970



NW=not working, PTW=part-time work, FTW=full-time work
source: NLC 1996/97 and 2000

To analyse the effect of covariates on these data, the individual-level data were converted to person-year data, with one record for each person for every year from when they had their first birth to the survey date. That record contains indicators of work status and transitions in that year, as well as other time-varying characteristics, such as information on ages and numbers of children, and the relationship status at the end of the year. Also attached to each record are fixed covariates including age at first birth, country of birth, occupation and sector (or whether ever worked) before the first birth.

It was expected that information about the job held before childbearing (if there was one) would be useful as an indicator of eligibility to maternity leave (as was found for Britain by Waldfogel *et al.* 1999). For example, women in the public sector may have been more likely to have had access to paid maternity leave. They may have been more likely to be permanent employees⁴, entitling them to one year's unpaid maternity leave. Women in higher status jobs may also have had better access to paid maternity leave, and be more likely to be permanent employees and therefore to have had access to unpaid maternity leave⁵.

Information on financial need for employment, perhaps as indicated by partner's income level, at the time of each birth or subsequent years, were not available from this survey. Attempts were made to use the occupation or education of the partner at the survey date as an indicator, but these results were rarely significant, so for the sake of parsimony this information was not used.

More information about the data items is found in the appendix.

4 Transitions around the first birth

4.1 Methodology

The first section of this analysis focuses on transitions around the first birth, looking at work status before and after the first birth. Because the focus is on whether the mother worked continuously, whether she did not work at all around the birth, or whether she left work after childbearing, the full-time/part-time split has been collapsed.

To see the effect of childbearing, I take into account work status in the year before childbearing. I look for any moves out of work in the birth year or the following year, as, depending on when in the year the birth was, the effect of a birth may not be evident until the following year. The following table shows that it is important to consider transitions in the year after the birth as well as the year of the birth — while the majority of what appear to be birth-related transitions (that is, movement out of work) occur in the birth year, the number of transitions is boosted a great deal by the inclusion of the following year⁶.

Table 1 Transitions at first birth, all first births occurring from 1970

From year before first birth	Transitions in birth year		Transitions in or one year after birth year	
	Count	Percent	Count	Percent
Not working before and after birth	136	17.0	136	17.0
Not working before, working after	25	3.1	25	3.1
Working before, not working after	314	39.3	397	49.7
Working before and after birth	324	40.6	241	30.2
Total	799	100.0	799	100.0

Source: 1996/97 and 2000 NLC.

As Table 1 shows, the three main transitions were to stay not working, to continue to work or to leave work. In analysing these data, the other transition, starting work after the birth, was excluded (that is, persons that experienced this transition were excluded) because of the relatively small numbers. The transition was treated as a three-way choice and modelled using multinomial logistic regression⁷, where P_{iSW} is the probability of person i staying at work after the birth, P_{iNW} is the probability of not working before and after the birth and P_{iLW} is the probability of leaving work after the birth. The multinomial logistic regression solves for values of coefficients, β_j , in the following equations, where j is not working before and after the birth (NW), leave work after the birth (LW) or stay at work after the birth (SW). The x_i values are values in a vector of explanatory variables for person i .

$$\log \frac{P_{iSW}}{P_{iNW}} = \alpha_{SW} + \beta'_{SW} x_i$$

$$\log \frac{P_{iLW}}{P_{iNW}} = \alpha_{LW} + \beta'_{LW} x_i$$

and,

$$\log \frac{P_{iSW}}{P_{iLW}} = \log \frac{P_{iSW}}{P_{iNW}} - \log \frac{P_{iLW}}{P_{iNW}}$$

4.2 Results

The majority of women (80%) were working up to their first birth. Of these, most left work for at least a year on the birth of their first child (50% of all women went from working to not working) while a considerable number did not leave work for a year or more (30% worked before and after the first child was born). Of those who were not

working before the birth, most remained not working after (17% of women were not working before the birth and after the birth; 3% were not working before the birth but were working after) (Table 2).

A summary of how the work status before and on/after the first birth varies according to selected characteristics is given in Table 2. This table also presents these data in terms of the main transitions occurring before and on/after the birth.

Looking across time periods, just over three-quarters of those commencing childbearing in the 1970s and 1980s were working in the year before the birth. This proportion was higher in the 1990s at 86 per cent. Comparing the 1970s and 1980s, of those that were working before the birth, many more stayed working in the 1980s. In the 1990s, the proportion staying working was higher again, although the proportion leaving work remained high.

Those with a higher education were more likely to be working before the first birth and those with post-secondary education — vocational or degrees — were more likely to be working after the birth. Much of the difference by education was in the proportion not working before and after the birth, with less educated women more likely to be in this category. The proportion who stayed at work was much lower amongst these lower educated women.

Younger mothers were less likely to be working before and after the birth, with a very high representation in the 'stay not working category' (24% of mothers aged 15 to 19 and 21% of mothers aged 20 to 24 were in this category). Of those working before the first birth, the older mothers are more likely to stay at work.

Table 2 Work status before and at/after first birth by selected characteristics

	% Work before	% Work after	Stay not working	Work to no work	Stay work	No work to work	Sample count
	<i>Percentage (%)</i>						
Period							
1970-79	77.1	25.1	19.8	55.1	22.0	3.1	227
1980-89	76.3	34.5	19.7	45.9	30.5	4.0	325
1990-99	87.1	39.3	10.9	49.8	37.3	2.0	247
Pre-birth education							
Bachelor or higher	89.5	38.1	7.6	54.3	35.2	2.9	105
Other post-secondary	86.0	39.4	12.2	48.4	37.6	1.8	221
Complete secondary	78.6	35.3	17.1	47.6	31.0	4.3	187
Incomplete secondary	72.6	25.9	23.7	50.4	22.3	3.7	274
Age at first birth							
15 to 19	70.4	23.5	23.5	53.1	17.3	6.2	81
20 to 24	73.6	33.6	21.1	45.3	28.3	5.3	265
25 to 29	85.4	32.1	13.6	54.3	31.1	1.1	280
30 or older	85.0	39.3	13.3	47.4	37.6	1.7	173
Relationship status at end of birth year							
Not Partnered	74.6	46.0	20.6	33.3	41.3	4.8	63
Married	81.2	32.2	15.9	51.9	29.3	2.9	653
Cohabiting	73.5	32.5	22.9	44.6	28.9	3.6	83
Country of birth							
Australian / English speaking	81.1	33.0	27.4	35.5	29.0	8.1	62
Non-English Speaking	64.5	37.1	20.6	33.3	41.3	4.8	63
Child born next year							
No	80.1	34.5	16.9	48.6	31.5	3.0	724
Yes	77.3	21.3	18.7	60.0	17.3	4.0	75
Pre-birth sector/occupation							
Has not worked	0.0	20.0	80.0	0.0	0.0	20.0	20
Manager, professional or para-prof., public sector	87.2	33.8	9.8	56.4	30.8	3.0	133
Manager, professional or para-prof., private sector	88.2	44.7	11.8	43.4	44.7	0.0	76
Other work, public sector	87.1	35.3	10.6	54.1	32.9	2.4	85
Other work, private sector	79.5	31.1	17.5	51.4	28.1	3.0	434
Worked, but occupation & sector unknown	70.6	35.3	25.5	39.2	31.4	3.9	51
Total	79.9	33.3	17.0	49.7	30.2	3.1	799

Source: 1996/97 and 2000 NLC.

Most mothers were married when they had their first child. The not partnered and cohabiting women were less likely than married women to be working before the birth (many not partnered/cohabiting women were younger, so this result is related to the age effect mentioned above). After the birth, not partnered women were more

likely to be working, but the cohabiting women had the same percentage working as the married women. While many of the not partnered women were not working before and after the birth, of those that did work before the birth, more remained working, compared to married and cohabiting women who were more likely to leave work for at least a year.

Changes in work status at the first birth may have been made in view of future plans for more children. For some, the next child may have even be planned or expected in the following year. As expected, of those that had a child in the year immediately after the first child a higher proportion were not working that year, while the proportion working before the first birth was very similar.

Women who had worked in higher status jobs (managers, professionals or para-professionals) at some time before their first birth had a high proportion working in the year before that birth (87% public sector, 88% private sector). Those in non-managerial/professional jobs in the public sector also were more likely to be working in the year before the birth (87%), compared to those in non-managerial/professional jobs in the private sector (80%). The work pattern after the birth also differed according to the sector and occupation of the pre-birth job. Private sector managers/professionals were more likely to stay at work after their first birth (45% stayed working compared to 31% of managers/professionals in the public sector). This may have been related to leave provisions for the public sector workers, which enabled women to take paid leave as well as unpaid leave after the birth of a child. However, these patterns were not the same for women employed in jobs of lower status. For women in the private sector in non-managerial/professional jobs, 28 per cent stayed working, and the equivalent figure in the public sector was 33 per cent.

As with any bivariate analysis, the relationships between the variables make it difficult to isolate the effect of one variable over another, especially considering these data span a thirty-year period, and over this time there have been vast changes in education and fertility patterns. To explore the relationships more fully, a multinomial logistic regression was estimated on those women who made one of three main transitions around the birth of the first child (as explained earlier, those who did not work before the birth but did after were excluded). Persons with not stated education or who had never worked were excluded from this analysis, resulting in a sample size of 758.

Table 3 shows the results of this model. In this table ‘leave work’ refers to those who worked before the birth but not after, ‘stay at work’ is those that worked before and after and ‘not work’ is those who did not work before or after. The first two columns of coefficients compare those who did work before the birth with those who did not work before and after the birth. The final column compares staying at work to leaving work, for those who worked before the first birth. As this column shows, many of the explanatory variables did not have a significant effect on the difference between staying and leaving work. Those that did contribute significantly to the model were primarily concerned with explaining the difference between those who were not working before or after the birth and those who worked before — whether or not they stayed working after the birth. In most cases the results confirm those of the descriptive statistics, although some results were not significant.

Mothers who had their first birth in the 1970s and 1980s were less likely to be working before their birth than those who had their first birth in the 1990s. There was, however, no significant change in the probability of staying at work versus leaving work.

Lower education was associated with a likelihood of not working before the birth, but did not significantly distinguish between those who stayed at work after the birth and those who left work, holding other variables constant.

Age of first birth did not have the expected effect, however, this was because of the inclusion of a variable that captured the number of years having worked full-time before the first birth (and a squared-term to capture non-linearities). This variable was highly significant in distinguishing between those who were not working before and after the birth from those who worked before the birth (whether or not they worked after the birth). Women with more full-time experience were more likely to be working before the first birth. Full-time experience was not significant in distinguishing between those who stayed at work and those who left work.

Table 3 Regression results: Work status before/after first birth

	Compare: Leave work		Stay at work		Stay work	
	To: Not working both		Not working both		Leave work	
	Coefficient	S.E.	Coefficient	S.E.	Coefficient	S.E.
Period of first birth						
1970-79	Ref.					
1980-89	-0.010	(0.262)	0.387	(0.292)	0.397	(0.224)
1990-99	0.859*	(0.348)	1.187**	(0.373)	0.328	(0.251)
Pre-birth education						
Bachelor or higher	Ref.					
Voc./diploma/undergrad	-0.597	(0.500)	-0.368	(0.518)	0.228	(0.312)
Complete secondary	-0.745	(0.450)	-0.637	(0.468)	0.108	(0.283)
Incomplete secondary	-1.442**	(0.491)	-1.597**	(0.519)	-0.155	(0.335)
Age of first birth						
15 to 19	3.581***	(0.687)	3.166***	(0.764)	-0.415	(0.569)
20 to 24	1.850***	(0.499)	2.192***	(0.538)	0.342	(0.378)
25 to 29	1.056**	(0.388)	1.145**	(0.412)	0.089	(0.279)
30 and over	Ref.					
Relationship status						
Not Partnered	-0.695	(0.438)	0.117	(0.434)	0.812*	(0.324)
Married	Ref.					
Cohabiting	-0.282	(0.370)	-0.068	(0.397)	0.214	(0.295)
Born in NESB country	-0.567	(0.402)	-0.269	(0.424)	0.298	(0.344)
Child born next year	0.193	(0.359)	-0.478	(0.435)	-0.671*	(0.337)
Pre-birth occupation and sector						
Manager/profession, public	0.632	(0.415)	0.647	(0.440)	0.016	(0.284)
Manager/profession, private	0.147	(0.454)	0.760	(0.462)	0.613*	(0.307)
Other work, public sector	0.488	(0.413)	0.672	(0.440)	0.184	(0.278)
Other work, private sector	Ref.					
Unknown	-0.501	(0.449)	0.098	(0.473)	0.600	(0.401)
Total years FT	0.382***	(0.087)	0.350***	(0.091)	-0.032	(0.069)
Full-time years-squared	-0.011*	(0.005)	-0.007	(0.005)	0.004	(0.003)
Constant	-1.234	(0.739)	-2.399**	(0.803)	-1.165*	(0.591)
McFaddens R-square	0.077		-2LL model-696.163			
Chi-square	116		IIA tests (Hausman and Hsaio-Small indicate outcome categories are independent of other alternatives).			
N	758					

Legend: * p<0.05; ** p<0.01; *** p<0.001.

There were few variables that differentiated between those who stayed at work and those who left work. Not partnered women were more likely than married women to stay at work after the first birth, consistent with the argument that single women experienced a greater financial need to remain at work, not having the financial support of a partner to rely on. Also, those who had worked in the private sector as managers/professionals were more likely to stay at work than were non-managers/professionals in the private sector. This may be because these women had a stronger commitment to work, had a greater need to maintain continuity in their job/career, or because they faced a higher opportunity cost of not working. Not surprisingly, those women who had another child in the year following the first birth, were more likely to have left work after the first birth compared to those women who did not have a second child in this time.

4.3 Discussion

The lack of significance of some of these data items on the probability of staying at work over leaving work is interesting. This suggests that the practice of leaving work for at least a year after commencement of childbearing is widespread, and has been so throughout this period, and across all family types.

This result is not surprising given that the ‘not working’ women are highly heterogeneous, including those on paid leave, unpaid leave, and also those who resigned from their job. In this ‘not working’ group there are those who, because of their higher education and better status jobs, were able to access paid maternity leave and therefore had no immediate financial need to work in the year after the birth. There are also those women who could not work because they could not find or afford suitable child care. There are others, of course, who left work because of a preference to be at home when their children were young.

The ‘working’ group are also varied, including those who returned to work out of financial necessity but who would have preferred to stay home, and those who returned to work because of a strong identification with their role as worker. Having no variable to capture financial need is unfortunate, as this has been shown to be important in understanding women’s transitions to work and might have been used to differentiate those who have stayed at work out of financial need from those who stayed at work for other reasons.

In the multivariate analysis, education was associated with the likelihood of being in the category of not working before and after the first birth, but did not significantly distinguish between those who stayed at work or left work. This lack of significance is probably in part because of the heterogeneous ‘not working’ and ‘working’ groups, which both include a mix of higher and lower-educated women.

A more comprehensive dataset, including a measure of partner’s income or occupation at the time of the birth, and including data on the nature of the break from work, may provide a clearer understanding of the determinants of staying at work versus leaving work on the birth of the first child. There may be opportunities for such analysis with the HILDA survey when more waves of data have been collected.

5 Transitions to work after childbearing

5.1 Methodology

This section focuses on transitions to work after the first birth, for those persons who were not working on or after that birth. This analysis differs from earlier analysis, in that not only is the occurrence of the event (a return to work) of interest, but also the timing of that event. At each year we know whether or not the mother has returned to work, and whether that return was to full-time or part-time work. The data are set up such that one record represents a person-year, one for each year following the birth of the first child until the mother moves into work or until they are censored. To analyse these data, discrete time event history analysis is appropriate, given that these data are in discrete periods of years (Allison 1984). This approach models whether or not a return to work has occurred on a set of explanatory variables including a time measure, which captures the timing of transition to work. Formally, this analysis is of the hazard of person i returning to work (h_{it}) at time t , conditional on not having done so before time t .

$$h_{it} = \Pr[T_i = t | T_i \geq t, x_{it}]$$

T_i is the uncensored time of event occurrence.

First, the transition was measured as a return to work — the distinction between full-time and part-time was not made. The transition variable was a binary indicator, which was set to zero if the transition did not occur, and one if it did occur. Once a transition was observed, the subsequent records were not used. Those persons who

did not make a transition at all by the time they were censored had a zero value on all records. The analysis was undertaken on those who were at risk of working, given that they were not working in the year of or the year after the first birth. Time dummies were included in the model, and the parameters on these terms were used to determine the hazard of returning to work at different times after the first birth.

Some authors suggest that these data can then be modelled using logistic regression (for example, Allison 1984; Singer and Willett 2003). In this case, the hazard model would look like this, where α_t are the time-dummies and β is the vector of coefficients associated with the explanatory variables, x_{it} for person i .

$$h_{it} = \frac{1}{1 + \exp(-\alpha_t - \beta'x_{it})}$$

This can be estimated with a logistic regression, which was done in this analysis using the Stata procedure *logistic*. Robust standard errors were calculated to allow for the clustering of person-records⁸. This does not affect the parameters.

This, however, does not fully account for the fact that, because the data are in person-year format, it is possible to have many records for one person, which violates the assumption of independence of the records. To ignore this independence assumes there are no individual-specific unobserved characteristics which might be associated with the dependent variable. In fact, other studies of workforce transitions have found unobserved heterogeneity to be significant, and that parameters are biased if the unobserved heterogeneity is not controlled (for example, Dex *et al.* 1998). Most importantly, it can be shown that when heterogeneity is not controlled, the parameters on the time variables are biased downwards. The other parameter estimates can also be affected, as demonstrated by Vermunt (2001).

In the case of workforce transition models, the unobserved heterogeneity may capture the individual-specific propensity to stay at home or to return to work. For the model presented here, this unobserved portion may represent not only the person's own propensity to work or not to work⁹, but the family's need for that individual to work, given that data were not available on other family income that might usually capture the effect of financial need.

To determine whether the unobserved heterogeneity was a problem, a hazard model incorporating a term for the unobserved heterogeneity was specified as follows, where

α_t are the time-dummies and β is the vector of coefficients associated with the explanatory variables, x_{it} for person i . The additional term, ε_i , is an individual-specific error term, which captures the unmeasured heterogeneity.

$$h_{it} = \frac{1}{1 + \exp(-\alpha_t - \beta'x_{it} - \varepsilon_i)}$$

This model can be estimated with a logistic regression with random effects¹⁰ (where the random effect represents the unobserved heterogeneity). To use this approach an assumption had to be made that this random effect is not correlated with the independent variables in the model. Stata's *xtlogit* was used for this analysis.

The results of the logistic regression with robust standard errors were compared to the random effects model. As shown in the results section, the unobserved heterogeneity term was significant, but the coefficients from the two models were quite similar.

To further investigate whether there were different factors influencing the return to full-time or part-time work, these alternatives were estimated as a competing risk model. The same principle applied in analysing the hazard of return to work, but because in this case there were three outcomes possible (stay not working, move to full-time or move to part-time work), a multinomial logistic regression was required. The formula for multinomial logistic regression has been presented earlier. As with the logistic regression, robust standard errors were calculated to allow for the variation within person-level records. While it would have been preferable to also test a model incorporating random effects, this model requires the use of different techniques¹¹. Since the coefficients in the random effects model for the binary return to work decision were not very different from those in the model without the random effects term, it was considered that a multinomial logistic model without the random effects term would be sufficient to identify the main covariates of returning to full-time or part-time work, and to see the differences between these choices.

An important aspect of this analysis was in deciding how to specify the time dummies. In looking at return to work it is more informative to measure time relative to the ages of the children than it is to the number of years until the return to work. This becomes complicated, however, as women can have more children before their return to work, so the age of youngest child would be reset to zero every time a new child was born. This on its own would not capture the full effect of time. Various

alternatives were tested, aiming for a good fit of the model but also aiming to create a model with coefficients that were most easily interpreted. The final model uses age of youngest child, but expands the classification to look separately at those who have only one child from those with two or more children.

5.2 Results

As seen in the previous section in Table 2, about two-thirds of women were not working on or after the first birth. In the sample, there were 533 women who were not working in the year of their first birth, or the year after, who had their first child in or after 1970. As the following table shows, the majority of women did not work in the year of the first birth, and their transitions were evaluated from when the first child was aged one.

Table 4 Women who did not work around the first birth

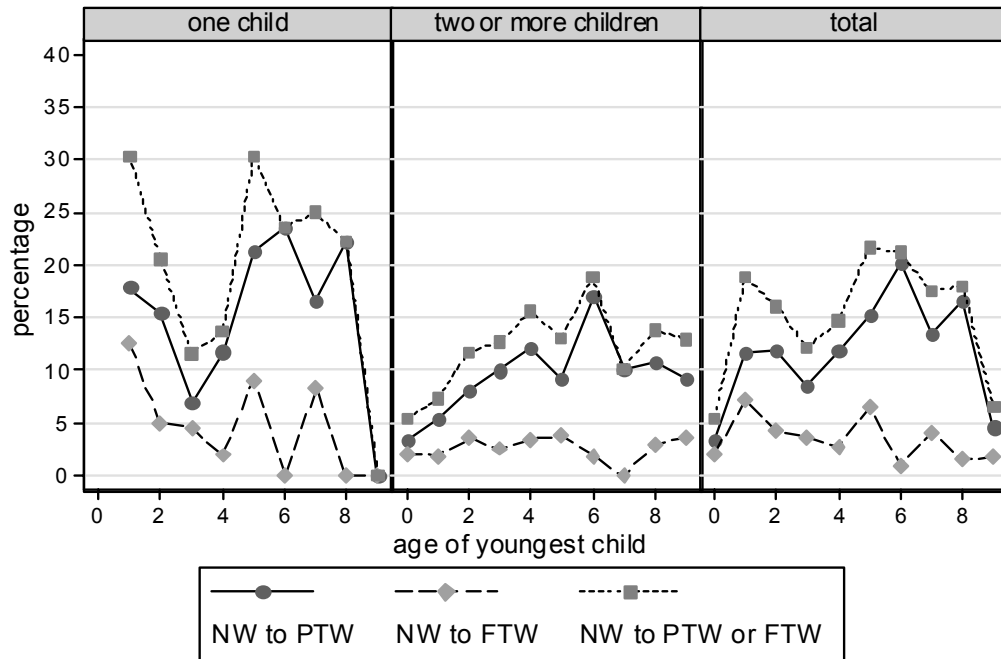
		Sample count
Total mothers having first birth in or after 1970		533
Not working in year first child born	Transitions monitored from the year in which first child is aged one	450
	<i>Of these, some women had a second child when the first child was aged one</i>	59
Working in year first child born, but not working in year after first child born	Transitions monitored from the year in which first child is aged two	83

Source: 1996-97 and 2000 NLC.

This section focuses on these women who did not work on or after the first birth, and follows them year-by-year to ascertain whether or not they returned¹² to work at some stage. In each year, women could make a transition from no work to full-time work or to part-time work, or remain not working. Once they returned to work (or reached the end of the survey period) they were censored. Also, women are only ‘followed’ until the youngest child is aged nine years old.

Figure 2 shows the distribution of transitions by age of youngest child and total number of children. These figures are also given in Table A- 2.

Figure 2 Women not working in the year of or year after their first birth, transitions to work by number of children born and age of youngest child



NW=not working, PTW=part-time work, FTW=full-time work
 source: NLC 1996/97 and 2000

The transitions to work were very different for first-time mothers with very young children than for mothers who had not returned before having their other children. There was a relatively high risk of returning to work amongst one-child mothers when their child was aged one. Overall, 30 per cent of these women went to work at this time (18% to part-time work and 13% to full-time work). Similarly the risk was high when the child was aged two — 21 per cent of those who had not yet returned went to work at this time (16% to part-time work and 5% to full-time work). After this, the risk dropped off while the child is aged three or four. It then increased again, but for these transitions the sample sizes were small, since so many women had gone on to have a second child by the time their first child was aged five (see the sample counts in Table A- 2).

Once a second (or later) child was born, if the mother had not yet returned to work, the risk of returning was lower. For example, for a mother who had just had her second child and had not yet returned to work, in the year her youngest child turns one she had a risk of entering work of just 7 per cent (5% return to part-time, 2% full-time). The risk gradually increased as the youngest child got older, with the risk of returning to part-time work always higher than the risk of returning to full-time work.

In fact, it was the risk of entering part-time work that increased as the child ages — the risk of entering full-time work remained low.

To study these transitions further, the data were modelled using discrete time event history analysis, as described in the methodology section. The initial analysis combined the full-time and part-time categories to explore the return to work. The dependent variable was the transition variable, indicating that a return to work had or had not occurred.

The explanatory variables included the age of youngest child, although to capture the effects shown above, the age of youngest child was further classified according to whether the child was the first child or a later child. This was done just for age of youngest child less than five, as after this the sample size became very small in one-child families. Other personal and family variables were also included¹³.

Two models were estimated on the binary dependent variable: one logistic regression with a random effects term and the other without. The results from these models are presented in Table 5. The random effects term was significant. Based on the literature it was predicted that a model without random effects would have parameters on the age of youngest child terms that were biased downwards. As this table shows, the parameter estimates are usually lower in the model that did not incorporate random effects, although they are actually higher for the terms corresponding to first-child mothers with youngest child aged one or two. This means the predicted risk of returning to work would be higher for these mothers using a model without random effects, but lower for mothers with more and/or older children — especially when considering children of school-age where the differences are particularly higher. Despite this, the overall patterns were similar for the two models, and where accurately measuring orders of magnitude was not the main aim, a model without random effects should be sufficient to capture the influence of the important variables.

The age/number of child variables were the strongest predictors of the hazard of returning to work. The coefficients on these variables confirmed the descriptive results shown in Table 2. The risk of returning to work was high for one-child mothers with a child aged one or two. For mothers of two or more children the risk was lower when their youngest children were this age or when they were newborn (the reference category). There was a gradual increase in the risk as the youngest child

Table 5 Return to work after childbearing, all women whose first birth was in or after 1970 and who left work for at least one year at their first birth

	Without random effects		With random effects	
	Coefficient	Robust S.E.	Coefficient	S.E.
First child , Youngest aged 1	1.989***	(0.232)	1.838***	(0.266)
Youngest aged 2	1.473***	(0.277)	1.359***	(0.302)
Youngest aged 3	0.987*	(0.397)	0.967*	(0.434)
Youngest aged 4	1.178*	(0.473)	1.269*	(0.511)
Later child, Youngest aged 0	Ref.			
Youngest aged 1	0.330	(0.280)	0.419	(0.294)
Youngest aged 2	0.816**	(0.273)	0.994**	(0.305)
Youngest aged 3	0.952**	(0.291)	1.231***	(0.342)
Youngest aged 4	1.219***	(0.300)	1.639***	(0.387)
Any child, Youngest aged 5	1.402***	(0.304)	1.870***	(0.401)
Youngest aged 6	1.588***	(0.313)	2.179***	(0.450)
Youngest aged 7	1.070**	(0.386)	1.736***	(0.527)
Youngest aged 8	1.357***	(0.395)	2.113***	(0.558)
Youngest aged 9	1.087*	(0.467)	1.897**	(0.623)
Bachelor degree or higher	Ref.			
Other post-school qualifications	-0.105	(0.213)	-0.121	(0.282)
Complete secondary	-0.308	(0.219)	-0.435	(0.306)
Incomplete secondary	-0.621**	(0.220)	-0.795*	(0.317)
Didn't work in year before birth	-0.925***	(0.147)	-1.215***	(0.242)
Never had a job	0.358	(0.339)	0.443	(0.526)
Manager/professional public sector	0.511*	(0.199)	0.707**	(0.273)
Manager/professional private sector	0.542**	(0.204)	0.640*	(0.324)
Other job, public sector	0.044	(0.192)	0.049	(0.268)
Other job, private sector	Ref.			
Worked, occupation unknown	0.548**	(0.207)	0.700*	(0.344)
Born in NESB country	-0.217	(0.286)	-0.232	(0.328)
Single	0.034	(0.175)	0.090	(0.221)
Cohabiting	0.150	(0.242)	0.165	(0.308)
Married	Ref.			
1970-79	Ref.			
1980-89	0.269	(0.182)	0.306	(0.207)
1990-99	0.424*	(0.191)	0.536*	(0.236)
Constant	-2.711***	(0.321)	-2.668***	(0.401)
Rho			0.235**	(0.113)
Mcfadden's R-square	0.106		Not applic.	
Chi-square	209		157	
Model log-likelihood	-1042		-1040	
Sample size (persons)	524		524	
Sample size (observations)	2848		2848	

Legend: * p<0.05; ** p<0.01; *** p<0.001

got older, with relatively high risks of returning to work when the youngest (or only) child was school-aged. Education had some effect on the risk of returning to work, as those with the lowest levels of education had the smallest risk of returning. Those with a bachelor degree or higher had the highest risk of returning, although the difference between this and other levels of education was non-significant, except for the comparison with the lowest level of education.

One of the strong predictors of returning to work was whether or not the woman worked in the year before she had her first birth. Those women who were not working at this time had a significantly lower risk of entering work while they had a youngest child aged under ten.

Of those who had worked at some time before their birth, the occupation of the job held before the birth was associated with the risk of returning. Compared to those who had worked in non-managerial/professional private sector jobs, women who had worked as managers, professionals or para-professionals had a high risk of returning to work, whether they had worked in the public sector or the private sector. Amongst those working in non-managerial/professional jobs there was also no significant difference in the hazard of returning when comparing the public and private sector.

There was another group of women who had a high risk of returning to work. These were women who had worked at some time (according to their work history), but who had said they had no occupation when asked about their main jobs. It may be that these women did not consider their work as an occupation — perhaps it was sporadic work, or low status work that they saw as something temporary and not worth identifying as a ‘main job’. That these women had a high risk of returning to work might suggest the timing of their return to work was not because the job was a good one that they wanted to return to, but because they needed to return to work relatively quickly out of financial necessity.

Relationship status and country of birth did not have a significant impact on the hazard of returning to work.

Table 6 Return to work after childbearing, all women whose first birth was in or after 1970 and who left work for at least one year at their first birth, return to full-time or part-time work

Compare To	Part-time		Full-time		Part-time	
	Not working		Not working		Full-time	
	Robust		Robust		Robust	
	Coefficient	S.E.	Coefficient	S.E.	Coefficient	S.E.
First child , Youngest aged 1	1.915***	(0.289)	2.098***	(0.359)	-0.183	(0.447)
Youngest aged 2	1.664***	(0.332)	1.030*	(0.463)	0.635	(0.547)
Youngest aged 3	0.957	(0.496)	1.019	(0.612)	-0.062	(0.763)
Youngest aged 4	1.526**	(0.524)	0.154	(1.090)	1.372	(1.172)
Later child, Youngest aged 0	Ref.					
Youngest aged 1	0.508	(0.339)	-0.052	(0.483)	0.560	(0.579)
Youngest aged 2	0.911**	(0.335)	0.641	(0.447)	0.270	(0.546)
Youngest aged 3	1.186***	(0.346)	0.369	(0.529)	0.817	(0.616)
Youngest aged 4	1.451***	(0.358)	0.670	(0.532)	0.781	(0.624)
Any child, Youngest aged 5	1.528***	(0.366)	1.155*	(0.499)	0.373	(0.597)
Youngest aged 6	1.978***	(0.362)	0.078	(0.787)	1.900*	(0.854)
Youngest aged 7	1.436***	(0.434)	-0.311	(1.070)	1.746	(1.149)
Youngest aged 8	1.612***	(0.450)	0.685	(0.803)	0.927	(0.894)
Youngest aged 9	1.210*	(0.548)	0.852	(0.805)	0.358	(0.939)
Bachelor degree or higher	Ref.					
Other post-school quals	0.093	(0.237)	-0.579	(0.334)	0.671	(0.361)
Complete secondary	-0.219	(0.252)	-0.489	(0.342)	0.270	(0.390)
Incomplete secondary	-0.575*	(0.256)	-0.690*	(0.337)	0.116	(0.389)
Didn't work in year before birth	-0.979***	(0.174)	-0.785**	(0.253)	-0.195	(0.300)
Never had a job	-0.016	(0.433)	0.805	(0.564)	-0.821	(0.748)
Manager/prof., public sector	0.396	(0.221)	0.769*	(0.312)	-0.373	(0.340)
Manager/prof., private sector	0.790***	(0.217)	-0.646	(0.621)	1.436*	(0.652)
Other job, public sector	-0.197	(0.229)	0.507	(0.297)	-0.704*	(0.356)
Other job, private sector	Ref.					
Worked, occupation	0.580*	(0.242)	0.466	(0.390)	0.114	(0.455)
Born in NESB country	-0.364	(0.350)	0.096	(0.391)	-0.460	(0.481)
Single	-0.015	(0.197)	0.149	(0.313)	-0.163	(0.351)
Cohabiting	0.097	(0.316)	0.241	(0.357)	-0.144	(0.476)
Married	Ref.					
1970-79	Ref.					
1980-89	0.397	(0.223)	0.040	(0.274)	0.357	(0.335)
1990-99	0.603**	(0.232)	0.088	(0.294)	0.514	(0.354)
Constant	-3.353***	(0.387)	-3.421***	(0.487)	0.068	(0.581)
Mcfadden's R-square		0.105				
Chi-square		256				
Model log-likelihood		-1264				
Sample size (observations)		2848				

Legend: * p<0.05; ** p<0.01; *** p<0.001

There was evidence of an increase in the hazard of returning to work over the period, with the hazard of returning significantly higher in the 1990s compared to the 1970s. The hazard of returning in the 1980s was higher than the 1970s also, but was not significant. (Similarly the difference between the coefficient for the 1990s was not significantly higher than for the 1980s.)

Of interest also, was whether women were returning to work full-time or part-time after their break from work. Table 6 presents the results of the model in which the return to work was treated as a choice between going into full-time work, part-time work, or remaining not working. This was run as a multinomial logistic regression, with standard errors adjusted to allow for the non-independence of person-records. A random-effects equivalent has not been presented (see endnote 11). These results show that much of the measured variation was in the return to part-time work, which varied across age of youngest child and other characteristics.

The hazard of returning to full-time work was significant when there was only one child and the child was aged one or two — there was a particularly large return to full-time work when the child was aged one. The hazard of returning to part-time work was also high at these times, such that there was no significant difference in the hazard of returning to full-time or part-time work. Similarly, the hazard of returning to work when the youngest or only child was aged five was significantly higher (compared to those who had a second or later child born that year) for full-time and part-time work, so the odds of returning to full-time work was not significantly different from the odds of returning to part-time work. The hazard of returning to part-time work was particularly high when the youngest or only child was aged six years, while the hazard of returning to full-time work at this time was relatively low, meaning there was a significant difference between the hazard of returning to full-time and part-time work at this time.

These results show that the effect of education was significant in explaining the return to full-time or part-time work when comparing those with incomplete secondary education to those with bachelor degrees or higher. Similarly, not working before the first birth affected the return to full-time and part-time work. In both cases these variables did not distinguish between those who returned full-time as opposed to those who returned to part-time work.

The pre-birth job had different effects on the return to full-time or part-time work. First looking at those who worked as managers/professionals or para-professionals, those who had worked in the public sector were more likely to return to work full-time (compared to non-managerial private sector workers) while those who had worked in the private sector were more likely to return to part-time work. The choice between full-time and part-time work was not significant for the public sector manager/professional/para-professionals, but it was for those who had worked in the private sector. Also, those who had worked in non-managerial/professional public sector jobs were more likely to return to full-time work than to part-time work.

Again, relationship status and country of birth were not significant. It was expected that single mothers would be more likely to return to full-time work, given they faced greater financial pressure to do so. There was very weak evidence of this — the coefficients were small and standard errors too high to pick up a significant relationship.

Looking at the period effects, the increased hazard of returning to work appears to be associated with the increased hazard of returning to part-time work. There was very little increase in full-time work over this period, while a significant increase in part-time work was detected. Nevertheless, the comparison of full-time to part-time work did not result in a significant effect — that is, by the 1990s the hazard of returning to part-time work instead of full-time work was not significantly higher than it was in the 1970s. The coefficients indicate there was some increase, but evidently the standard errors were too high to achieve significance.

5.3 Discussion

This section presented an analysis of the transitions to work for those women who took a break from work around commencement of childbearing. This analysis was firstly done on the transition to work, using logistic regression, with and without random effects. Further analysis broke this down to look for differences in returns to full-time work as opposed to part-time work using multinomial logistic regression.

The logistic regression results with and without random effects told the same story, even if the orders of magnitude of the effects varied between models.

Clearly, the age of the youngest child in conjunction with whether or not this is the first child, is an important predictor of transitions to work. This is no surprise. It is

interesting to observe that much of the return to work occurs in the year or two after the first child is born, showing that many women do not take an extensive break for childbearing. No doubt some of these women would go on to have another break if they were to have more children. This analysis has not sought to analyse subsequent transitions once a return to work has occurred.

The effect of education was consistent with expectations. Women with higher education are most likely to return to work faster. This may be to minimise financial losses; it may be that they are more able to afford substitute child care; or they may wish to return to a job relatively early to maintain continuity with their skills and/or career. The same arguments might apply to explain the higher hazard of returning to work amongst women who had worked in a higher status job prior to their first birth.

Also consistent with the international literature was the effect of not having worked before the first birth, with these women having a lower hazard of returning. As stated earlier, this effect may be in part a preference effect — that those who were not working before the birth probably had a lower preference to be working. The opportunity cost effect also suggests that if these women were not working before the birth, then they are not forgoing income to stay at home with their child/ren, so financially they are no worse off to stay at home.

Changes over time in the hazard of returning to work were also evident in these data, with women more likely to return to work sooner in the 1990s.

Part-time work is often used by mothers on returning to work after childbearing, as was seen in Figure 2. The analysis showed up some differences in the determinants of returning to full-time work over part-time work, but on the whole there was very little that was significant. A larger dataset would no doubt find more associations.

There were some differences by pre-birth occupation. Private sector managers, professionals or para-professionals were more likely to return to work part-time than were women employed in other occupations or in the same occupation group in the public sector. This result was not expected. A closer look at these data revealed that a high proportion of those who had worked in the private sector in these higher status jobs had been working part-time even before the first birth. The same applied for those who worked in other private sector jobs and especially those whose occupation was unknown. This is summarised in Table 7.

This may explain some of the increased tendency for persons in higher status occupations in the private sector to be more likely to be in part-time work, however, a re-specification of the model including a term to capture full-time / part-time status before the first birth did not result in different effects — even after controlling for part-time status before the first birth the occupation effects stand as they have been shown here.

Table 7 Women who took a break from work on the birth of their first child, pre-birth occupation and sector by whether worked in the year before the first birth and full-time part-time status if they did

Pre-birth occupation and sector ^(a)	Worked the year before the birth			Not working year before the birth	Total
	Full-time	Part-time	Total		
	<i>Percentage(%)</i>				
Manager, professional or para/professional, public sector	76.4	4.9	80.2	18.8	100.0
Manager, professional or para/professional, private or unknown sector	63.8	11.4	75.2	24.8	100.0
Other occupation, public sector	76.7	6.6	83.3	16.7	100.0
Other occupation, private sector	63.5	10.1	73.6	26.4	100.0
Unknown	29.4	30.1	59.6	40.4	100.0
Total	63.1	10.1	73.2	26.8	100.0

Source: 1996-97 and 2000 NLC.

(a) The occupation/sector worked in most recently up until the year the first child was born. Excludes persons who had never had a job.

While it was expected that single mothers would have a faster rate of return, and a greater tendency to full-time work, neither of these results were found to be significant, although the parameter coefficients were in the expected direction. The lack of effect may be in part due to the inability to classify the partnered women according to their partner's income, which would enable some analysis of those women who might have returned to work out of financial necessity as opposed to others who might have had more freedom to choose when they returned. The partnered women, then, are likely to be quite heterogeneous, and this along with the small sample size could explain the lack of effect.

6 Summary

Of women having their first child between 1970 and 2000, about two-thirds of women were not working after that birth, although of this proportion 15 per cent were also not

working before the birth. The multivariate analysis showed that lower education was associated with higher odds of not working both before and after the first birth. These data also showed that over time there has been an increase in the proportion working before the first birth.

Among those that worked before the birth there was, however, little to distinguish between those who stayed at work and those who left work. As found by Drobnic *et al.* (1999), not partnered women were more likely to stay at work, probably reflecting need for income, given the inability for these women to depend on the income of a partner. Those with a high status occupation in the private sector were also less likely to leave work. Joesch (1994) suggested that both preference effects and human capital effects were being captured by the effect of pre-birth employment. This is relevant to these results, as the effect of pre-birth job could be a reflection of preference, human capital or it could be that these women are under more pressure to resume work after childbearing to maintain their position at work. It may also reflect lack of access to leave arrangements which permit these women to take a long absence from work.

Overall, interpretation of these results was made difficult because of the heterogeneous nature of the not-working women, including those on paid and unpaid maternity leave, as well as those who resigned from work. Women who were found to exit work could have fallen into any one of these types (or more than one where a mix of arrangements were used). These data then, were not able to be used to analyse how the availability of maternity leave or child care affected decisions about whether or not to take a break from work on commencement of childbearing.

Further analysis showed that of those not working after the first birth, many returned when this child was aged one or two. For those that did not return before having more children, there was a gradual return to work as the youngest child grew older. There were some factors associated with a faster return, most notably related to whether the person worked before the first birth (as found by Joesch (1994) and Hofferth (1996)), and the occupation and sector of the pre-birth job. There was also evidence that women were returning to work faster in the 1990s than they were in the 1970s.

As noted above, because we do not know about the nature of the break from work — whether paid leave, unpaid leave or leaving the employer altogether — this analysis of returns to work cannot accurately determine how such arrangements affect the

timing of return to work. It is likely that the pre-birth job characteristics are in some way related to the type of arrangement used, with public sector and higher status jobs likely to be associated with use of paid and unpaid leave. However, not only are these data insufficient in terms of the type of break taken, a more useful analysis would require data on transitions back to work in terms of weeks or months instead of years, since so much of the transition back to work occurs in the first one or two years after the first child is born.

Mothers often use part-time work when their children are young, and this was clear from the higher proportions using part-time work in these data. These data were less useful in distinguishing those who worked part-time from those who worked full-time on return to work, although it appears that women working in certain types of jobs, as identified by the occupation and sector they work in, might be more likely than others to work part-time.

This analysis considers only the first transition to work after the first birth. More detailed analyses of these transitions data could look at later transitions, for example, looking at the extent, to which women move into and out of work as they have other children, or the extent to which they change between full-time and part-time work.

How do these data help explain the increased employment of mothers over the 1980s, and to a lesser extent over the 1990s? In the analysis of exits from work there was not a significant increase in the probability of staying at work, if working before the first birth. However, these data showed that in the 1990s more women worked before the first birth. This alone explains some of the increased employment of mothers, as women working before the first birth were more likely to be working after that birth. Women who worked before the first birth had a higher rate of return to work, compared to those not working in the year before the first birth, if they did take a break around the time of the first birth.

In the analysis of returns to work, there was a significant difference between the rate of return in the 1990s compared to the 1970s. The difference was not significant between the 1970s and 1980s, and between the 1980s and 1990s but despite this the direction of the coefficients suggested there had been some increase in the rate of return between each period.

Also, education has been demonstrated to have an effect on transitions with the strongest differences evident in comparing those with incomplete secondary education to those with bachelor degrees or higher. The education levels of women have increased considerably over the 1980s and 1990s such that young women in the 1990s are far less likely to have incomplete secondary education than young women in the 1970s and 1980s. This also has implications for women's employment as more highly educated women are more likely to work in higher status jobs. This no doubt also contributes to the increased employment of mothers, as higher educated women and women in higher status jobs were more likely to be working in the year before the birth and more likely to return to work faster when they take a break.

Unfortunately these data could not be used to conclusively relate any increased employment to policy changes, in particular the effect of maternity leave or child care. Some of the occupation and sector effects may be related to the availability of maternity leave in these jobs, but without more detailed data, this cannot be substantiated.

¹ Belgium, West Germany, Italy, Spain and Sweden

² Wave 3 of the NLC survey contains more detailed information on leave use after childbearing for some women, but this was not available in time to incorporate it into this analysis.

³ Some transitions have been excluded because they are not to be analysed — part-time work or full-time work to not working and full-time work to part-time work.

⁴ In 1990 5% of females in the public sector were casual employees compared to 12% in the private sector, based on employment in workplaces with 20 or more employees (Romeyn 1992:23).

⁵ In Glezer's analysis of maternity leave she found distinct differences in eligibility for maternity leave, which no doubt to some extent reflect differences in the distribution of permanent versus casual jobs. Eligibility was lowest for women who worked in the private sector or who worked in manual occupations. Women working in sales/services jobs and para-professional occupations also had higher proportions ineligible for maternity leave (Glezer 1988).

⁶ Some transitions in the year after the birth may be due to a second birth the next year, but this appears to not be the primary cause of transitions in the year after the birth.

⁷ A simpler solution would have been to restrict the analysis to those who worked before the birth, and to estimate the effects of the covariates on whether or not there was an exit from work. This, however, leads to selectivity problems, and ignores a considerable proportion of women. Using a multinomial logistic regression still enables an analysis of the exit from work amongst those who worked before the birth, but more correctly also compares these possibilities to that of not having worked before.

⁸ Using the 'cluster' option in Stata's logistic procedure. The method is documented in Wooldridge (2002).

⁹ Perhaps in line with Hakim's view that at the extremes there are some women who are work-centred and others who are home-centred, with many in-between who have less fixed preferences (Hakim 2000).

¹⁰ An alternative approach might be to fit a fixed effects model. This, however, requires that the explanatory variables differ over the time periods — those that remain constant (for example, pre-birth occupation and education) would have to be dropped from the model.

¹¹ Multilevel models for outcome variables with more than two categories can be fit using GLLAMM (Rabe-Hesketh, Pickles and Skrondal 2001). A test of this procedure was run using the same

parameters as the non-random effects model, but with a low quadrature value —higher values are necessary to get accurate results but take vastly longer to run. This test run resulted in non-significant random effects terms, produced parameter estimates that were lower than those shown here, but the direction and significance levels of these terms were the same as those resulting from the non-random effects model.

¹² Throughout this analysis the word ‘return’ is used to describe the transition to work. This word implies they have worked before, although this is not true of everyone.

¹³ The model assumes that the effect of the personal and family characteristics on the hazard of returning to work are fixed for any age of youngest child — that is, that the effects are not stronger or weaker when the child is younger or older, and produces an average effect over all years. Interacting the age of youngest child variable with these characteristics would capture whether or not there were changes in the effect of these variables over time. Such interaction terms have not been incorporated into this model, for the sake of parsimony.

Appendix: NLC Data Description

A1 Work History

The work history was completed for each person and contains information on the respondent's work status in each year between when they turned 15 and the survey year. Work status was collected as worked full-time, part-time or did not work. Respondents were also asked whether they studied part-time, full-time or not at all in each year. Where there was a mix of full-time, part-time or no work (or study) in one year, interviewers were instructed to code the activity to the one the respondent spent most time in. In Wave 2, the information collected was the same, but in the dataset provided for analysis, the study information was available only for those years the respondent was not working. The data from both waves have been combined by classifying the work status of each person-year as working full-time, working part-time/casual, not working/no full-time study and not working/full-time study.

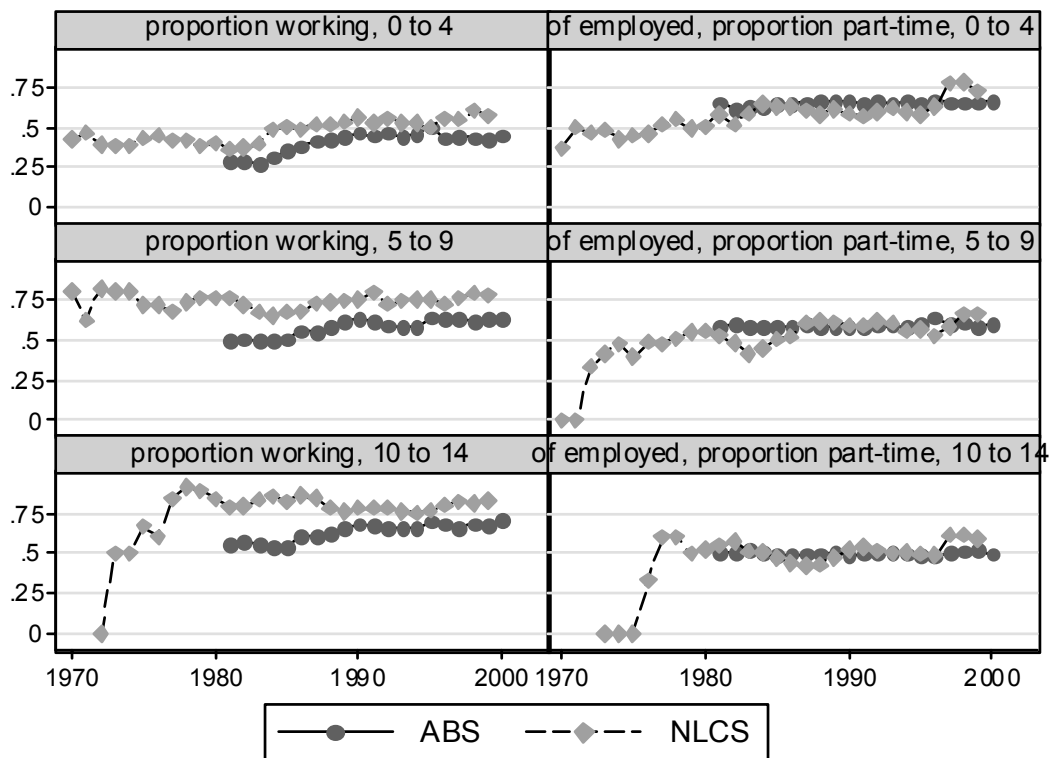
It is important to note that estimates of work and full-time/part-time status are not the same as those produced by the Australian Bureau of Statistics (ABS). ABS estimates of employment relate to persons who work for one hour or more for pay or profit in a reference week, and the division between full-time and part-time work is made strictly based on actual and usual hours worked, with 35 hours or more considered full-time. The NLC data, in comparison, is much more subjective, and because the reference period is one year rather than one week, we can expect the estimates to be quite different.

The NLC data can be compiled by year and the age of youngest child at the end of that year. However, given the restrictions on age of respondents in the NLC (18 to 54 years in 1996-97), going back in time progressively results in smaller samples. There were over 100 respondents contributing to the annual data from 1970 onwards, where the youngest child was aged under 5. Where the youngest child was 5 to 9, numbers fell to less than 100 in the years preceding 1981 (and less than 50 before 1977), and where the youngest child was aged 10 to 14 the numbers were above 100 from 1990, and below 50 before 1982. For some of these earlier years, care should be taken in relying too much on the small sample.

Once aggregated by year, the NLC data were verified by comparing these data to employment statistics produced by the ABS. The following charts compare the

proportion employed, then for employed mothers, the proportion part-time from the two sources of data. To be comprehensive these comparisons should also include women who have not yet started childbearing but this has not been done here¹⁴. The ABS data have been limited to 1980 to 2000, as comparable data for the 1970s were not available.

Figure A- 1 Comparison of Estimates of Employment and Part-Time Employment by Age of Youngest Child, ABS and NLC, 1970 to 2000



source: ABS Labour Force Status and Other Characteristics of Families, various years
 NLC Waves 1 and 2. Refer to text for discussion of the different definitions

As these charts show, the NLC estimates by year are not entirely consistent with the official trend in employment, no doubt affected by smaller sample size as well as the different methodology. The proportion working is always lower in the ABS data, which is not surprising given that a person had to be employed in the survey week to be counted as employed, as opposed to the more general definition used in the NLC. For the mothers of under-5 year old children, the NLC and ABS data are remarkably similar in the trend of proportion working over time. For mothers of 5 to 9 year old children, the proportion working is similar, except for the much higher proportion reported as working in the early 1980s, using the NLC data. Similarly, amongst mothers of 10 to 14 year old children, the proportion working is much higher in the

1980s for the NLC data. No doubt these differences can be attributed at least in part to the smaller sample size mentioned earlier.

The proportion working part-time is comparable from the two data sources, although there are points at which the NLC estimate deviates from the ABS by a considerable amount — especially in the early 1980s and late 1990s. Again, some of these figures are likely to be affected by small sample numbers.

Given these differences, the NLC data cannot be expected to adequately explain changes over time in employment, except perhaps for women with a youngest child aged less than 5. To capture any time effect, the subsequent analysis will include a categorical variable which indicates the period represented by the data — from before 1970, 1970-79, 1980-89 or 1990-99. Because the sample size is relatively small from before 1970, the analysis of transitions in the main section of this report excludes those cases (they are included in the remainder of this data section).

As discussed in 0, these data cannot capture breaks from work which are shorter than one year in duration, and there is likely to be some difficulty in recording absences of around six months duration. A look at the ABS Labour Force Experience (LFE) survey, which collects data from respondents on employment activities over the preceding 12 months, shows the extent to which some NLC respondents may have been unable to show their employment history adequately. The following data are taken from the most recent LFE publication, February 2003¹⁵. The majority of women aged 25 to 44 spent the whole year either in the labour force¹⁶ (55%) or not in the labour force (21%). The remaining 24% spent part of the year in the labour force and part of it out of it, but about half of these could clearly state they worked for *most* of the year, being in the labour force for over 39 weeks out of 52, and at the other end of the scale, many would clearly be able to state they did not work for most of the year, being in the labour force for less than 13 weeks. On the whole it appears that it would have not been too difficult for most women to make the distinction between working and not working. The NLC also asks about full-time /part-time status for each year worked. The LFE Survey shows that of all women who worked at some time during the year, 48 per cent worked full-time all year and 42 per cent worked part-time all year. The remaining 10 per cent had a mix of full- and part-time work. Again, it appears that the majority of women would have been able to classify their work according to mostly full-time or mostly part-time without too much difficulty. These

data may not be typical of women in the years immediately following childbearing, when perhaps breaks from work are more common. The LFE publication does not include data on the labour force experience of women by age of youngest child, so I cannot examine this in more detail.

A2 Workforce Transitions

To analyse the work history data, the data were converted to person-year format, where a new record was created for each person and year for which the work status was known, starting with the year the first child was born. This facilitated the analysis of these data using discrete time event history analysis and also allowed the creation of time-varying covariates.

Individuals' work status in adjacent years was used to measure workforce transitions. In each year, the transition variable measures whether there was a change in work status from the preceding year to the current year. Where there was no change in status, this was recorded as a form of transition (for example, "stay working full-time") to enable a complete picture to be built up over all person-years. All transitions were captured from the year of the first birth — the first transition captured is that from before the year of first birth, to the year of the first birth. Every transition is recorded up until the survey year (1996 if the responded to Wave 1 only, otherwise 1999), so that one person can, and usually does, experience more than one transition.

Because the work history has been collected on the basis of years, rather than months, there are some problems in being able to identify transitions surrounding childbearing. Most importantly, exits from work for a relatively short duration — a few months, for example — are not likely to be picked up at all, if the respondent mostly worked for the rest of the year. Paid maternity leave, when it is available, is usually for around 12 weeks duration, so it is unlikely that these data will show persons taking maternity leave as having had an absence following childbearing unless they also took a longer period of unpaid maternity leave. The 1998 survey of Career Experience, conducted by the ABS, found of those female employees who had taken a break from work when their youngest child was born, 21 per cent were away from work for less than 3 months. Another 20 per cent had a break of 3 to 6 months duration, 32 per cent for 6 to 12 months duration and 27 per cent for one year or more¹⁷. Based on these data, then, it could be expected that a considerable number of breaks from work would not be detected in the NLC data.

The NLC data should, however, show persons taking a longer break. Because the data are collected in annual blocks, a break from work for about a year may be recorded in the birth year or the next year, perhaps depending on when in the year the birth occurred. If the birth occurred early in the year, the respondent probably mostly did not work in the birth year, but if the birth was towards the end of the year, it may be the year following the birth year in which the respondent mostly did not work. An exit from work around childbearing may, then, occur in the year of the birth or the year after the birth.

Table A- 1 shows the distribution all transitions in the years from the birth years for all persons. The first column shows the proportion of mothers experiencing each transition — multiple transition types are possible so the proportions add to more than 100 per cent. The second column shows the distribution of all person-year transitions across the transition types. These figures add to 100 per cent.

Table A- 1 Distribution of transition types from the birth year to survey year, persons and person-years

	Persons		Person-Year	
	Per cent	Number	Per cent	Number
Stay NW	68	585	29	4416
NW to PTW	53	458	4	628
NW to FTW	23	199	2	248
NW to study	4	38	0	40
PTW to NW	34	296	2	369
Stay PTW	68	587	27	4120
PTW to FTW	28	245	2	290
PTW to study	3	22	0	23
FTW to NW	54	463	4	561
FTW to PTW	30	261	2	302
Stay FTW	57	491	26	3856
FTW to study	2	13	0	13
Study to NW	4	33	0	37
Study to PTW	2	19	0	20
Study to FTW	3	27	0	28
Stay study	4	38	1	84
		864		15 035

NW=not working (and not studying full-time), PTW=part-time/casual work, FTW=full-time work, study=not working but studying full-time.

Over two-thirds of mothers had experienced at least 2 consecutive years of not working since their first birth. The same proportion had experienced at least 2 consecutive years of part-time work. A smaller proportion (57%) had worked full-

time for at least 2 consecutive years. Over half had moved from not working to part-time work and a quarter had moved from not working to full-time work. There were, of course, many making the transition in the other direction — from full-time or part-time work to no work. People also moved between part-time and full-time work, in both directions.

The person-year data differ in that they demonstrate the extent to which staying in a work state is the most common transition type. Other transitions between different work states are bigger in numbers to the person level data, showing that many women have experienced more than one of these transitions since their first child was born. The following table shows the extent to which some of the transitions are experienced more than once by some respondents. No doubt, some of the multiple transitions some women experience are due to movements into and out of paid work as subsequent children are born.

Table A- 2 shows the transition data as it is used in the analysis of returns to work following a break on commencement of childbearing.

A3 Relationship history

The NLC asks a complete set of questions relating to marriages, time living de facto before marriage and other de facto relationships. The month and year of commencement of each marriage and de facto relationship is collected, along with the number of months or years living de facto before marriage. This dates collected can be used to populate an array for each month and year since the respondent turned 18, indicating whether at that time the person was not in a live-in relationship (referred to as single), cohabiting (but not legally married) or married.

Persons were initially coded as being not partnered, cohabiting or married. Cohabiting is used for those living de facto prior to marriage, as well as those who never married but lived de facto with a partner. Married is used for all months between when the marriage began and when it ended (if applicable). Single persons were classified single if they had no live-in partner, and had never been married or cohabiting. Single persons who had been cohabiting or married in previous months or years were coded as previously partnered (although these two groups were often similar enough to combine back into a not partnered category).

Table A- 2 Return to work after childbearing, sample count and percentage in each transition category by number and age of youngest child

Number of children and age of youngest child	Stay not working	Go from no work to part-time or full- time work			Sample count
		Total	To part-time work	To full-time work	
<i>Percentage (%)</i>					
One child					
Youngest aged 1	69.6	30.4	17.9	12.5	392
2	79.5	20.5	15.5	5.0	200
3	88.4	11.6	7.0	4.7	86
4	86.3	13.7	11.8	2.0	51
5	69.7	30.3	21.2	9.1	33
6	76.5	23.5	23.5	0.0	17
7	75.0	25.0	16.7	8.3	12
8	77.8	22.2	22.2	0.0	9
9	100.0	0.0	0.0	0.0	7
Two or more children					
Youngest aged 0	94.6	5.4	3.3	2.1	478
1	92.6	7.4	5.5	1.9	420
2	88.3	11.7	8.1	3.6	307
3	87.3	12.7	10.0	2.6	229
4	84.4	15.6	12.1	3.5	173
5	86.9	13.1	9.2	3.8	130
6	81.1	18.9	17.0	1.9	106
7	89.9	10.1	10.1	0.0	79
8	86.2	13.8	10.8	3.1	65
9	87.0	13.0	9.3	3.7	54
All children					
0	94.6	5.4	3.3	2.1	478
1	81.5	18.5	11.5	7.0	812
2	84.8	15.2	11.0	4.1	507
3	87.6	12.4	9.2	3.2	315
4	84.8	15.2	12.1	3.1	224
5	83.4	16.6	11.7	4.9	163
6	80.5	19.5	17.9	1.6	123
7	87.9	12.1	11.0	1.1	91
8	85.1	14.9	12.2	2.7	74
9	88.5	11.5	8.2	3.3	61

There were other cases in which the relationship history had to be set to missing. Where a respondent was unable or unwilling to provide the year a relationship started or ended, this caused problems in filling in the details of that relationship, and the values had to be set to missing. For example, if we know a respondent married in 1970, and the marriage ended in 1975, but then they stated they married again but provided no details on the timing of that marriage, all months and years from then end of the first marriage were set to missing.

Where information was known about other relationships, before or after the one for which some details were unknown, it was sometimes possible to fill in some of the relationship history, but to set to missing all the months and years between the known relationships. In the example above, if we know the respondent was in a de facto relationship which started in 1990 and continued until the end of the survey, the missing values need only go until that de facto relationship started, as the second marriage must have been some time between 1975 and 1990.

Missing values also had to be used for those respondents who indicated that they had had more than 3 marriages or more than 3 de facto relationships. In each case, the respondent was asked to provide details of the first, second and most recent one, meaning that details of any relationships that occurred in the period between the second and most recent relationships were unknown. This period was set to missing unless other details were known (for example, between the second and most recent de facto they may have been married). This coding meant that some respondents had periods of missing relationship history in the middle of a known relationship history. Some had completely missing relationship histories where insufficient details were provided on any relationship.

To match the monthly relationship data to the annual work transition data, the relationship status at the end of each year was identified. These data are matched, by person and by year, to the employment data to enable an analysis of the effect of relationship status on the employment transitions between the prior and current year.

A4 Birth history

Each respondent was asked to provide details of all their children, including birth year and date. These data were used to fill out an array for each month and year since the respondent turned 15, on how many children they had had at that time¹⁸. The child details were determined using only details relating to their own children. Partner's children were not included and neither were adopted or foster children. In both these cases, it was possible the child did not reside with the respondent for their whole life, and it would be therefore incorrect to count them from their birth date.¹⁹

Data were initially used from the 1996-97 survey, and then updated using the 2000 data for those that responded. There were a number of respondents who provided different information regarding their birth history in the two surveys (complete birth

histories were collected in each survey). Often these differences were minor, say reporting a birth year one year different in the two surveys. Sometimes an additional child was reported in the second survey, as having been born twenty or thirty years ago. As it was impossible to know which data were correct, the first survey results were used, and only updated with new births that had occurred since the first survey.

Missing values were set for those people who did not provide sufficient information to complete the array. Some did not provide birth year information for one or more births, that is, we were told a birth occurred, but the year was unknown. For these persons, the complete birth history was set to missing. In a very few cases, birth year and month was provided, but the parentage was not provided. Again, the birth histories for these respondents were set to missing.

The births data were used to derive the year of first birth, then to derive age of youngest child, age of oldest child and number of children at the end of each year following the year of birth. These data were used as time-varying covariates in analyses of workforce transitions.

A5 Pre-Birth education

This data item was derived using the NLC education questions, to determine what the level of education was before the first birth. This was done to discount any mature-age study that women may have commenced after childbearing.

A6 Pre-birth occupation

NLC asks a series of questions relating to current and previous jobs. These data, including start and end years in each occupation, are compared to the year of the first birth to determine what occupation was held just before the birth. Where persons had worked in second or third occupations after the first (and also different to current) this information was also used to select the occupation they were in the year before the first birth.

Difficulties arose in a couple of ways. First, all persons were asked what their main job was. Some women said they never had a main job (and were not currently employed), but the information given in the work history showed that they had worked full-time. It is possible these women had indeed never had a *main* job, but had worked in a series of different, perhaps casual, jobs. These women were classified as ‘worked, occupation unknown’.

Another problem arose because no information was collected on the year the first job concluded, and for those currently working, the year they started in that occupation. The survey does ask how many years the currently employed have worked with their present employer. This is, however, not necessarily how long they have worked in that occupation. For women that had only ever had one job, when asked the year they started in their first main job, their response was coded as “current job is first job”, and the year they started with their current employer is used — this is probably accurate if they have given this response.

For some women who had had a first job that was different from the current occupation, it was not clear when the occupation change occurred. The time with employer was used, in the absence of other information, but this may mistakenly place some women as being in their first occupation before the birth, when they had actually changed to their current occupation (but not current employer) before the birth.

Occupations were grouped into manager/ professional/ para-professional (the higher status occupations) and other occupations for the analysis.

A7 Pre-birth sector

The same set of questions was used to determine the sector worked in prior to the birth. As above, there were some difficulties in not knowing when the first occupation ended and when the current occupation started. There was further missing information for those who worked in a second or third occupation — for these jobs only the occupation was collected, and so sector was unknown. Those who worked but had unknown sector were reported as such.

In some of the analysis in 0 occupation and sector were combined. In addition, as the self-employed numbers were too small, causing problems with empty cells, they were combined with private sector non-managerial/professional.

¹⁴ A more comprehensive analysis should include all women and all men, but this is outside the scope of the current analysis.

¹⁵ The figures quoted are based on calculations using Table 5 and Table 8 of ABS 6206.0 Labour Force Experience, February 2003.

¹⁶ The labour force includes those working and those looking for work. Based on figures for all women, only a small proportion would be expected to be looking for work and not working.

¹⁷ From Table 13 of Career Experience (6254.0). Those asked had a child aged less than 6 and had taken a break when youngest child was born. These calculations exclude those who were still on a break from work at the time of the survey.

¹⁸ For those who commenced childbearing before age 18, the first entry in the array is how many children they had had up to age 18.

¹⁹ Because step-and foster children have been excluded, they are in effect being treated as if they weren't there. This is not the best solution, and in later work I should go back to do more work to make sure these cases are treated better.

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