FISCAL STUDIES, vol. 27, no. 4, pp. 473–512 (2006) 0143-5671

The Impact of Children on Women's Paid Work*

GILLIAN PAULL†

†*Institute for Fiscal Studies*
(gill_p@ifs.org.uk)

Abstract

This paper investigates how and when differences in work behaviour between men and women develop, focusing on the evolution of the gender gaps over the period of family development. The findings support the theory that gender differences in the formal labour market stem from the presence of children in the home and that childbirth and children entering school are critical times in women's employment. Births mark a dramatic decline in participation in work for women, while school entry is a time of considerable turnover in participation. The length of absence from work following a subsequent birth is closely related to whether the mother was in work between births, while maternity pay and leave entitlements appear to influence the precise timing of the return to work. In addition, a return to work following birth is often only temporary. The gradual decline in women's relative wages following the first birth appears to stem from the accumulation of several shorter periods of unusually low wage growth for women around the times of birth and school entry. There is also a sharp

*This paper draws on material from the Department for Work and Pensions Research Report no. 308 (Brewer and Paull, 2006), which was commissioned by the Department for Work and Pensions (DWP) under the project 'Newborns and New Schools: Critical Times for Women's Employment'. The authors wish to thank Heather Joshi and participants at an IFS seminar and at a DWP presentation for useful comments. The British Household Panel Survey (BHPS) data were made available through the ESRC Data Archive. They were originally collected by the ESRC Research Centre on Micro-social Change at the University of Essex (now incorporated within the Institute for Social and Economic Research). Neither the original collectors of the data nor the Archive bear any responsibility for the analyses or interpretations presented here.

JEL classification numbers: J16, J22, J31.

movement into part-time work for women following childbirth and a transition towards non-permanent positions and non-supervisory roles at both critical points.

I. Introduction

Government legislation and cultural changes have led to marked changes in the role of women in the labour market over recent decades. Yet substantial gender differences in formal employment persist: women are less likely to be in paid work than men, earn a lower wage on average and tend to work shorter hours. There are many competing theories that seek to explain these differences, but the explanation explored here is that gender differences in the formal labour market stem from the division of parental duties between mothers and fathers in the home, with mothers being primarily responsible for the care of children. This paper investigates how and when differences in work behaviour between men and women develop, focusing on the evolution of the gender gaps over the period of family development.

The analysis highlights two potentially crucial periods in family development: when a new baby arrives and when a child starts school. Newborns clearly affect women's employment opportunities and choices: the need to provide care for the child and the additional domestic responsibilities raise the financial and opportunity costs of working and, more controversially, may reduce the woman's actual or perceived productivity as a formal worker. The effect of a child starting school has received less attention as an important turning point, in spite of the fact that both academic research and government policy have consistently made the distinction by considering mothers with pre-school children as a separate entity from those with only school children. While school entry at age 4 or 5 presents a substantial sudden change in circumstances through the provision of what is effectively free (and compulsory) childcare, which may enhance employment opportunities for mothers, it also comes with additional parental demands associated with school life and the complexities of organising care around normal school hours. There is a presumption underlying policy discussion that mothers' employment opportunities are suddenly improved once their youngest child starts school, but there is little concrete evidence that employment outcomes change substantially at this point.

Much of the previous research on women's formal employment in the labour market has been conducted in the context of their position relative to men. Historically, the focus has been on understanding why female workers

command lower hourly wages on average than their male counterparts,[1] but attention has turned more recently towards examining gender differences in participation in paid work and on the impact of children on work choices, both for reasons related to gender equality and because of concerns about how these decisions affect family well-being.[2] The effects of motherhood on women's employment and wages in Britain have been documented in Joshi, Paci and Waldfogel (1999), Joshi (2002) and Paull and Taylor (2002).[3] The findings of these studies indicate that the 'family gap' – that is, the differences in work behaviour between women without children and mothers – may be more important than the gender gap alone, vindicating research emphasis on analysing the role of family formation in understanding the gender differences. The effect of childbirth on women's employment and wages has been the subject of several publications, partly motivated by interest in the effectiveness of maternity rights legislation. Studies considering women's work participation following childbirth in Britain include Joshi and Hinde (1993), McRae (1993 and 1996), Macran, Joshi and Dex (1996), Dex, Joshi and Macran (1996), Joshi, Macran and Dex (1996), Callender et al. (1997), Dex et al. (1998), Waldfogel, Higuchi and Abe (1998), Burgess et al. (2002) and Hudson, Lissenburgh and Sahin-Dikmen (2004), while the impacts of childbirth and subsequent absences from work on wages have been analysed by Joshi (1990), Waldfogel (1995 and 1998b) and Joshi, Paci and Waldfogel (1999).[4] These studies have shown that more recent cohorts of mothers in Britain are returning more quickly to employment following childbirth, are more likely to return between births and are more likely to be in employment subsequent to childbirth than older generations. The evidence also shows that some types of mothers tend to return sooner than others – younger mothers; the more educated; those with higher wages, in higher-level occupations or working in the public sector; those with longer employer tenure; those with lower unearned income; and those with more children – although there are conflicting findings across studies on the impact of the presence of a partner. Those qualifying for maternity leave also tend to return more quickly, even allowing for possible differences in observed characteristics and unobserved differences in labour market attachment. The same types of

[1]A summary of this work can be found in Anderson et al. (2001) or Joshi and Paci (1998, pp. 32–4) for Britain and in Blau (1998, section III) for the United States. International comparisons of the gender wage gap are provided in Blau and Kahn (1996 and 2000) and Grimshaw and Rubery (2001).

[2]A summary of the earlier literature on children and female labour supply focusing on the US can be found in Browning (1992).

[3]Waldfogel (1997a and 1998a) and Anderson, Binder and Krause (2002) provide a similar analysis for the US, and an international comparison for seven industrialised countries is provided in Harkness and Waldfogel (1999).

[4]Comparative work for the US and Japan has been published in Waldfogel, Higuchi and Abe (1998), Barrow (1999) and Waldfogel (1997b and 1998b).

factors are also related to the propensity to return to full-time rather than part-time work and to remain in employment once returned. Shorter interruptions in employment following childbirth and using maternity leave are also associated with a smaller wage penalty for having children.

This paper makes several advances over previous research in this area. First, as far as we are aware, changes in mothers' employment around the time of school entry have not previously been examined. Second, the analysis considers how employment conditions, as well as simple work participation, develop at the critical points. Third, the analysis uses two types of control groups to calibrate whether the changes observed at childbirth and school entry are normal labour market dynamics or whether they are critical points in the evolution of the gender gaps. The first control group consists of women at other times in family formation and development. The second consists of men at the same critical points, the use of whom controls for possible trends in wages and other employment characteristics that coincide with the arrival of children. Finally, the analysis uses data from an ongoing annual panel survey, which has the advantages of updating work that used older data sources, of controlling for the selection issues present in aggregate cross-sectional statistics and of removing the need to rely on information recalled over long periods.

The remainder of the paper is organised as follows. Section II describes the sample and compares gender differences in work participation and employment characteristics across three broad groups – those without children, those with children and those whose children have grown up or left home. It also presents the dynamics in work behaviour just prior to and following the birth of the first child. Section III considers whether the critical times of birth and school entry are distinct from other periods for women, while Sections IV and V analyse in more detail the work behaviour of women following childbirth and around the time of school entry. The final section summarises the findings.

II. Impact of children on women's work

The analysis uses data from the first 13 waves of the British Household Panel Survey (BHPS), covering the years 1991 to 2003. The BHPS is an annual survey of approximately 10,000 adults from a nationally representative sample of over 5,000 households. At each wave, all adults living in the household complete a full questionnaire, and all individuals are re-interviewed in successive waves, together with any new adults living in the household. The vast majority of interviews are conducted during the autumn of each year, collecting information on current paid work and employment characteristics, together with the dates of spells of work and

employer changes over the previous year. The sample used is limited to individuals aged 18 to 54 and all statistics and regression models use BHPS weights to control for panel attrition.

This section uses information on current work behaviour at the time of interview. The data are analysed as repeated cross-sections but the longitudinal aspect of the panel is used to divide respondents into three broad categories of 'no children', 'with children' and 'children left' and to present employment statistics by years *prior* to the birth of the first child. The 'with children' category contains individuals with 'own' children under the age of 17 living in the household at the time of interview, including own natural, adopted, step and foster children. The first and third categories are defined with the help of the fertility histories collected in wave B and the information on past and future births contained in previous and subsequent interviews in the panel. The 'no children' group contains individuals who are known not to have had any children as well as individuals without a complete fertility history but who currently do not have any children and are under age 33. This group contains both those who have not yet had children and those who may never have children. The 'children left' group includes those whose children are all aged 17 or older (whether still in the household or not) or are under the age of 17 but not living in the household.

Table 1 presents some background sample and demographic information for the data. A substantial proportion of individuals in the 'no children' group (16.2 per cent of men and 20.5 per cent of women) are observed to have children subsequently, while the majority of the group (56.2 per cent of men and 52.5 per cent of women) are under age 33 with no children yet and may well have children in the future. Only a minority of the group are likely to remain childless (the 16 per cent of men and women aged 40 and over). Interestingly, women with no children are slightly better qualified than the men in the group and are more likely to have a partner. The sample of women with children tend to be slightly younger than men with children and to have lower levels of education. A much greater proportion of mothers than of fathers are single (19.4 per cent compared with 2.0 per cent). For those in the 'children left' group, women tend to be slightly older than men, possibly because this group includes separated parents with children living with the other parent who tend to be younger fathers. Women have lower levels of education than men in this group, but are more likely to have a partner.

Prior to the arrival of children, men and women are equally likely to be in formal paid work (Table 2).[5] The presence of children is related to a

[5]The terms 'work' and 'employment' are used in this paper to refer to formal paid work, with the usual caveat that this does not imply that those not in 'work' or 'employment' are not working or gainfully employed in home and family responsibilities. The term 'employment' has also been loosely applied to

substantial change in the propensity to work for both genders, but in opposing directions. Some 82 per cent of men are reported to be working prior to the arrival of children and 88 per cent work when children are present, but the percentage of women working prior to children (83 per cent) declines dramatically to 62 per cent for those with children. The gap between the genders narrows for those who no longer have children in the household (84 per cent of men and 73 per cent of women work) but does not disappear entirely.

The previously established fact[6] that gender differences in the hourly wage tend to be associated with motherhood is confirmed in Table 2. The average wage for women is 92 per cent of the average for men prior to children, but falls to 66 per cent for women and men with children and only

TABLE 1

Sample sizes and demographic characteristics by broad group

	No children		With children		Children left	
	Men	*Women*	*Men*	*Women*	*Men*	*Women*
No. of observations						
No. of interviews	15,491	14,147	14,621	19,560	6,640	7,905
No. of individuals	3,587	3,314	2,465	2,865	1,427	1,535
Mean age	29.3	29.0	38.3	36.0	45.8	48.5
(standard deviation)	(9.3)	(9.4)	(7.2)	(7.4)	(8.2)	(4.6)
Age and children						
<33, before/with/after	13.5	18.5	22.3	32.9	10.5	1.0
<33, no children yet	56.2	52.5	—	—	—	—
34–39, before/with/after	2.4	1.9	33.4	34.4	7.5	2.4
34–39, no children yet	11.7	11.3	—	—	—	—
40+, before/with/after	0.3	0.1	44.3	32.7	82.0	96.5
40+, no children yet	15.8	15.7	—	—	—	—
% with education						
None	10.2	5.0	15.4	16.8	22.6	33.7
NVQ1 / <GCSE	6.5	6.7	8.4	12.0	6.9	9.2
NVQ2 / GCSE	19.8	21.4	18.3	26.2	18.1	21.1
NVQ3 / A level	21.0	21.8	12.7	9.8	11.8	6.3
NVQ4–5 / higher	41.8	44.7	44.3	34.3	40.3	28.8
Other	0.8	0.5	0.9	0.9	0.3	1.0
% with partner	33.0	42.8	98.0	80.6	73.8	79.8

Notes: Means and proportions are weighted using BHPS weights. Variable definitions are provided in the appendix.
Source: Individuals aged 18–54 from waves 1–13 (1991–2003) of the BHPS.

mean both employment with an employer and self-employment, other than where it is clear that a distinction is being made between the two.

[6]See Joshi, Paci and Waldfogel (1999), Joshi (2002) and Paull and Taylor (2002).

TABLE 2

Work characteristics by broad group

	No children		With children		Children left	
	Men	*Women*	*Men*	*Women*	*Men*	*Women*
% in work	82.0	82.8	87.7	62.2	84.4	73.3
Average hourly gross wage	£8.30	£7.67	£10.98	£7.26	£9.92	£7.09
(standard deviation)	(4.95)	(4.31)	(6.13)	(4.44)	(5.21)	(4.04)
Gender wage ratio	92.4		66.1		71.5	
Gender wage ratio for full-time workers	95.1		73.7		78.7	
Mean employer tenure (months)	50.5	47.7	87.7	49.4	113.1	99.9
(standard deviation)	(64.7)	(60.3)	(86.5)	(56.7)	(111.9)	(87.9)
% in sector:						
private	81.8	67.7	78.1	57.0	80.1	56.2
public	14.6	27.7	18.9	37.3	17.4	37.4
other	3.6	4.7	3.0	5.7	2.5	6.4
% self-employed	11.7	5.2	18.5	8.4	20.0	9.0
Mean weekly hours	43.0	38.4	47.2	27.2	47.0	32.4
(standard deviation)	(12.0)	(11.0)	(12.1)	(13.7)	(12.1)	(13.4)
% full-time	92.6	87.0	97.5	44.4	97.4	62.9
% in permanent position	88.6	89.5	94.5	90.5	95.1	94.4
% in supervisory position	33.2	34.8	50.1	27.1	45.2	32.8
% working at home	3.8	1.8	7.1	6.2	8.2	5.5
% working:						
during day	70.5	73.7	68.5	58.2	68.5	62.1
mornings or afternoons	2.8	2.7	1.4	14.4	2.1	13.8
some evenings/nights	5.3	3.9	4.1	10.5	3.4	5.0
at various times	14.9	12.5	17.5	9.6	16.7	12.2
other	6.5	7.2	8.6	7.4	9.3	6.9
No. of observations	15,450	14,125	14,529	19,307	6,569	7,885
No. of wage observations	10,675	10,470	10,050	10,700	4,035	5,001

Notes: Means and proportions are weighted using BHPS weights. Variable definitions are provided in the appendix. The gender wage ratio is the average female wage as a percentage of the average male wage.
Source: Individuals aged 18–54 from waves 1–13 (1991–2003) of the BHPS.

slightly recovers to 72 per cent for women and men whose children have grown up or left home. Only a small fraction of the gap can be attributed to women working part-time: for full-time workers, the gender wage ratio is 95 per cent for those before children, 74 per cent for those with children and 79 per cent for the group after children.[7] Indeed, wage regressions with controls for a wide range of demographic variables and work characteristics (Model 4 in Table 3) show a wider gap between male and female workers prior to children than a regression not controlling for these factors (Model 1),

[7]The analysis below presents findings on the gender wage gap for all workers, but constraining the analysis to only full-time workers generated similar patterns.

suggesting that these women should be earning more relative to men, given their characteristics. For those with children, differences in demographic and work characteristics explain less than one-quarter of the gap, while about one-third of the gap is explained for the 'children left' group. While there is an unexplained gender wage gap (bottom row of Table 3) of 10 per cent for male and female workers prior to children, the unexplained gaps of 33 per cent for those with children and 24 per cent for those whose children have grown up or left home are considerably larger.

TABLE 3

Log wage regressions by broad group

Dependent variable: log wage	Regression sample		
	No children	*With children*	*Children left*
Model 1 regressors: female, year			
Coefficient on *female* dummy variable	–0.067***	–0.432***	–0.345***
(standard error)	(0.007)	(0.007)	(0.010)
R-squared	0.017	0.174	0.130
Number of observations	21,246	20,754	9,031
Model 2 regressors: female, year, family background variables			
Coefficient on *female* dummy variable	–0.089***	–0.370***	–0.329***
(standard error)	(0.006)	(0.009)	(0.011)
R-squared	0.347	0.348	0.273
Number of observations	18,127	17,580	7,382
Model 3 regressors: female, year, family background variables, experience			
Coefficient on *female* dummy variable	–0.081***	–0.368***	–0.238***
(standard error)	(0.007)	(0.011)	(0.015)
R-squared	0.357	0.368	0.262
Number of observations	12,558	12,016	5,635
Model 4 regressors: female, year, family background variables, experience, work characteristics			
Coefficient on *female* dummy variable	–0.097***	–0.334***	–0.238***
(standard error)	(0.008)	(0.013)	(0.016)
R-squared	0.430	0.469	0.403
Number of observations	10,664	10,649	5,024

Notes: Regressions are weighted using BHPS weights. Coefficients are significantly different from zero at the 1 per cent level (***). Year variables are dummy variables for the wave. Family background variables include the number of children, age of youngest child, a quadratic in age, education, ethnicity, health problem, partner, whether partner working, partner's work hours and partner's earnings. Experience is a quadratic in months. Work characteristics include weekly hours, permanency of position, self-employed, supervisory position, sector, firm size, place of work, and tenure as a quadratic in months. Full variable definitions are provided in the appendix.
Source: Individuals aged 18–54 from waves 1–13 (1991–2003) of the BHPS.

It is sometimes argued that mothers earn lower wages than their equivalent male counterparts because they have different preferences over other work characteristics, such as flexibility in hours or convenience of location, which they choose rather than higher wages. On the other hand, it could also be argued that lower relative wages for mothers reflect a generally weaker position in work, whereby lower productivity (or perceived productivity) manifests itself not only in a lower wage but also in other less desirable work features. Table 2 therefore also compares a range of work characteristics across the three broad groups defined by the presence of children.

Employer tenure is very similar for men and women prior to children, but men's average tenure is considerably higher for the group with children and somewhat higher for those after children. This is not surprising, given that the absence from work of women following the arrival of children may terminate a particular employer–employee relationship. Women are always less likely to work in the private sector than men and are more likely to be employed in the public sector, although the differences in sector are slightly greater for those with children and the group 'children left'. The gender differences in the percentage in self-employment are fairly consistent across the three groups: women are always less likely to be self-employed than men. Even before children, women work fewer hours and are less likely to be in full-time work, but there are substantial drops in hours and in the proportion working full-time for women with children which do not entirely recover in the group after children. The percentages in a permanent position are very similar for men and women prior to children, but men with children are slightly more likely to be found in a permanent position than women with children. This difference is not so marked once the children have grown up or left home. The likelihood of a supervisory role is equal for men and women prior to children, but there is a large gender gap for those with children which persists into the 'after children' group. Although men are slightly more likely to work at home than women, the gender gap is fairly constant across all groups. Finally, gender differences in the time of day worked are markedly different between the groups. While men and women have similar patterns prior to children, women with children are much more likely to be working 'mornings or afternoons' or 'some evenings or nights' than men with children and are less likely to be working 'during the day' or at 'various times'. Overall, the evidence shows that differences between mothers and fathers exist in a wide range of work characteristics which are not always present prior to the arrival of children. Hence, the 'family gap' in work extends beyond simple participation and the hourly wage.

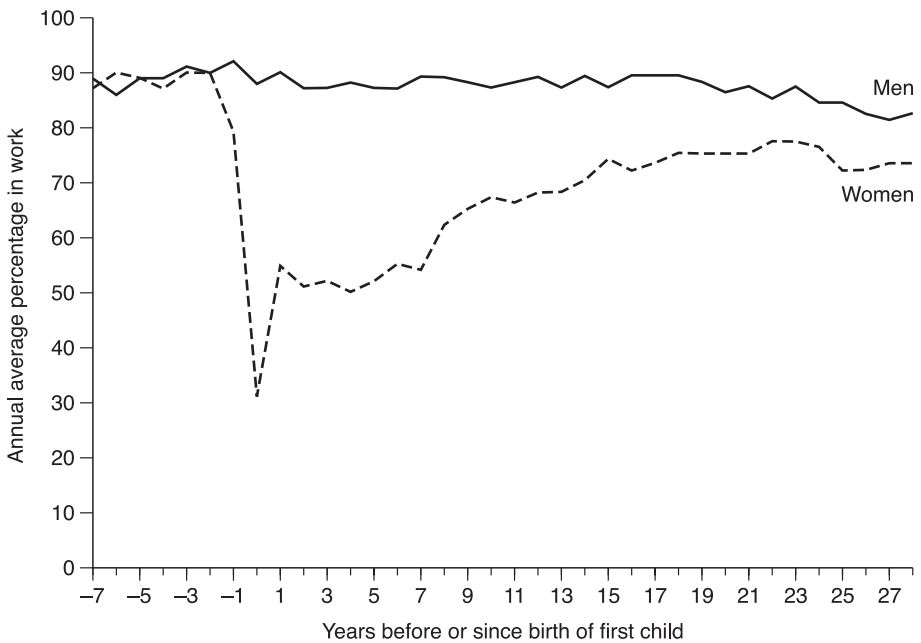
Greater detail is added to this picture in Figures 1 to 3, which present the work rates, gender wage ratio and proportion of workers in full-time work

by years before and since the birth of the first child. These graphs exploit the longitudinal nature of the data as the statistics for the years leading up to the first birth are calculated using information about future fertility from subsequent interviews. Year –1 is defined as the year prior to birth, year 0 as the year following birth, year 1 when the child is 1 year old, and so on. The work rates are calculated as the average proportion of men or women in work during the year and women on maternity leave are counted as *not* being in work.

Men and women are almost identical in their rates of work until the year before the arrival of the first-born (Figure 1). The arrival of the first-born has no impact on the participation rate for men and the proportion of men in work remains virtually constant for almost 20 years following the first birth. In contrast, the average annual participation rate for women drops below 80 per cent in the year prior to arrival (year –1), reflecting a decline in work during the months running up to the birth. In the year following the birth of the first-born (year 0), the work rate for women plummets to just over 30 per cent, reflecting both that virtually all women do not work during the three

FIGURE 1

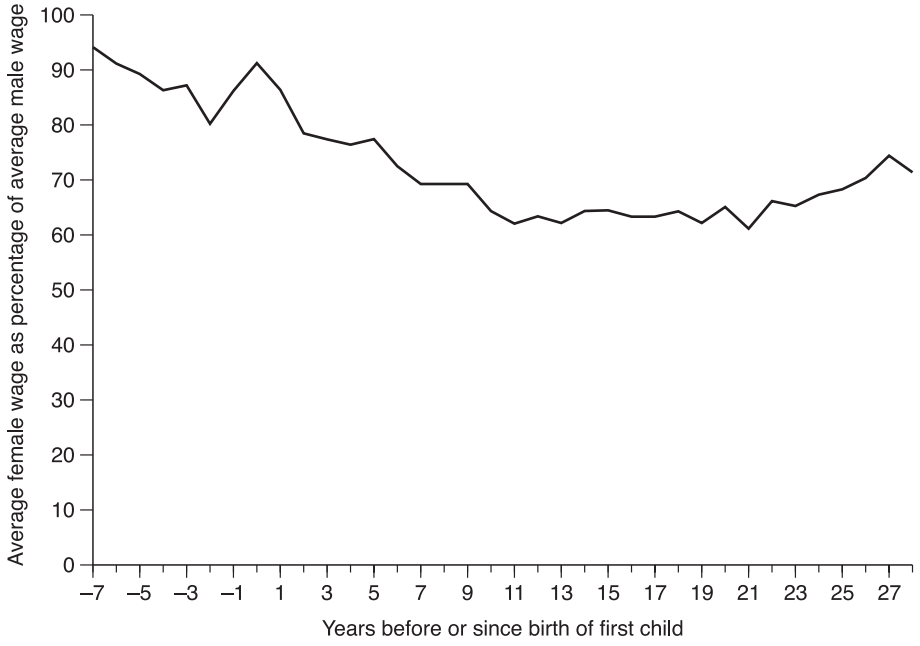
Work rates by years before and since birth of first child



Note: Proportions are weighted using BHPS weights.
Source: Individuals aged 18–54 from waves 1–13 (1991–2003) of the BHPS. Sample contained 50,456 observations with an average cell size of 701 observations used to calculate each proportion and a range in cell size from 143 (men in year –7) to 940 (women in year 12).

FIGURE 2

Gender wage ratio by years before and since birth of first child



Note: Wage ratios are calculated using weighted data.
Source: Individuals aged 18–54 from waves 1–13 (1991–2003) of the BHPS. Sample contained 32,245 observations with an average cell size of 896 observations used to calculate each ratio and a range in cell size from 255 (men and women in year –7) to 1,122 (men and women in year 12).

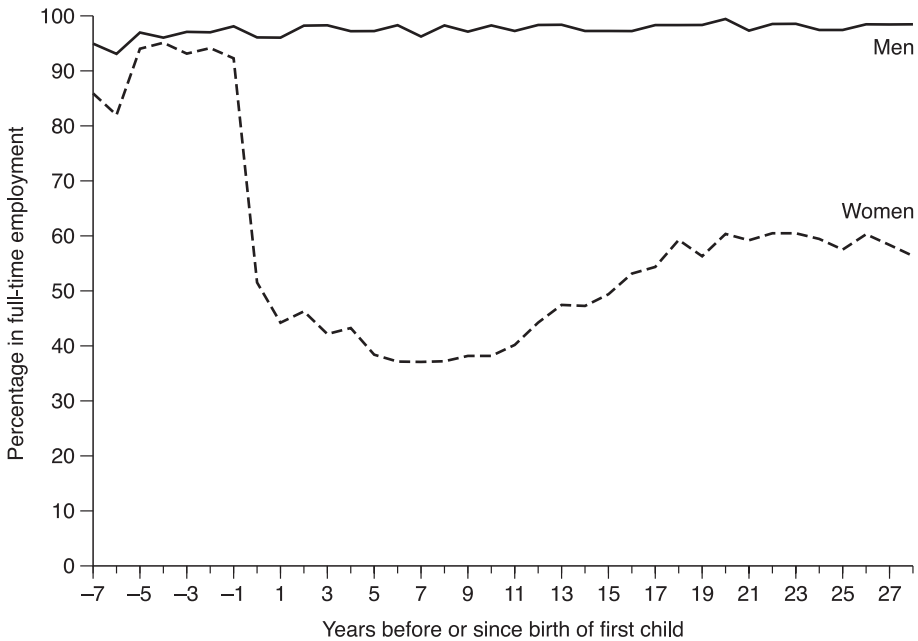
months following birth and that a substantial proportion do not work at all during the year. The work rate jumps up to around 55 per cent in the following year and remains around that level for the following six years. It climbs steadily, but remains below that for men even at almost 30 years after the first birth. This picture suggests that there are no anticipatory effects of children on work participation, but the arrival of the first child marks a distinct decline in women's propensity to work which does not begin to recover until the child (and possibly a second sibling) is of school age.

Women command lower wages than men even in the decade prior to the arrival of children (Figure 2). The birth of the first child marks the start of a gradual decline in the position of women relative to men which lasts for approximately 10 years; women's relative wage then stagnates for another 10 years before showing a small recovery.

The pattern for the proportion of workers in full-time employment (Figure 3) is closer to that for work participation than to that for wages. There are no obvious anticipatory effects in the sense that female workers

FIGURE 3

Percentage of workers employed full-time by years before and since birth of first child



Note: Proportions are weighted using BHPS weights.
Source: Individuals aged 18–54 from waves 1–13 (1991–2003) of the BHPS. Sample contained 38,340 observations with an average cell size of 533 observations used to calculate each proportion and a range in cell size from 127 (men in year –7) to 701 (men in year 12).

do not begin to shift towards shorter hours in the years immediately leading up to birth, although women have a very slightly lower propensity to work full-time than men even prior to the birth. The substantial drop in the proportion of women working full-time at the birth of the first child is followed by a long period of stagnation in the full-time employment rate: indeed, the rate does not even begin to rise until over 10 years after the first birth. Even almost 30 years after the birth, only 60 per cent of female workers are in full-time employment compared with almost 100 per cent of men. It is interesting to note that while work participation rates for women do eventually more or less recover from the impact of birth and children (Figure 1), the gender wage gap does not return to pre-children levels within the same period (Figure 2) and the hours of work for women make very little recovery (Figure 3).

III. Are newborns and new schools critical times?

Having considered differences between the broad groups of those with and without children, this section focuses more narrowly on specific critical times during family formation by dividing the 'with children' group into seven categories. In particular, the analysis tests whether the birth of a child or a child's entry into compulsory schooling at age 4 or 5 marks a distinct change in women's work behaviour. It also attempts to address the issue of possible biases from the selection of particular types of individuals into parenthood and into work participation by using the panel aspect of the data to consider changes in work participation and work characteristics for given individuals either as they move into parenthood or as they remain in work as parents.

The sample used in this section consists of pairs of interviews for the same individual that are two years apart. The pairs of interviews are defined in terms of nine categories: no children, first newborn, subsequent newborn, pre-school, school entry and pre-school sibling, school entry and no pre-school sibling, primary school, secondary school and after children. The initial interview of the two-year gap for mothers with newborns is that immediately prior to the birth and the latter interview is the second interview after birth. As not many mothers are back in work at the time of the first interview after birth, using a two-year rather than a one-year gap increases the size and representativeness of the sample. First newborns are those where the parent has no older child under age 17 living in the household and subsequent newborns are those where there is such an older child.

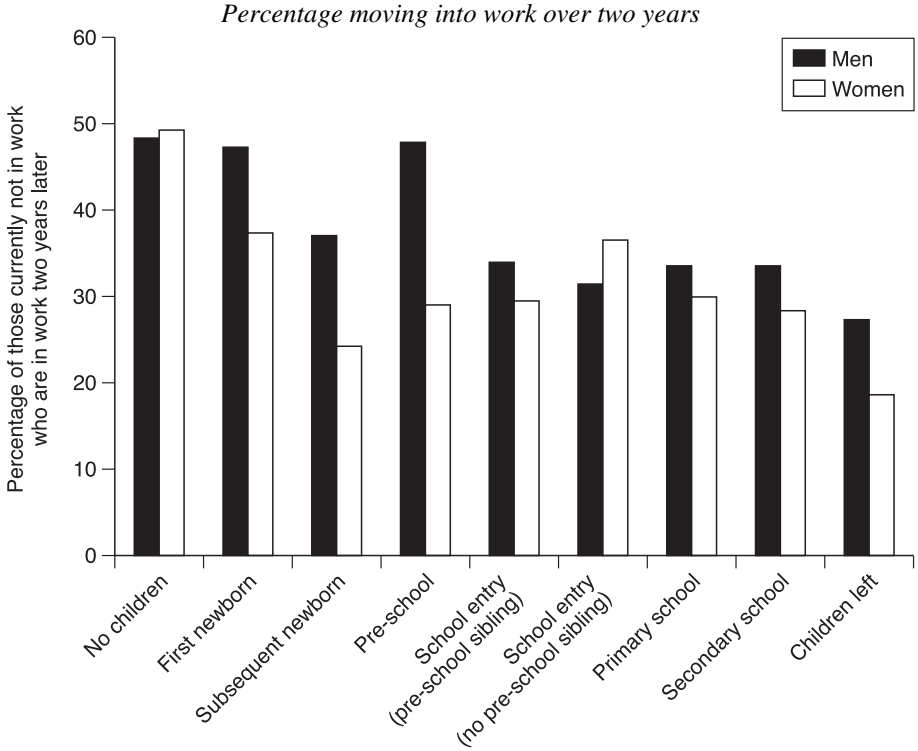
For mothers with children entering school, the initial interview is in the autumn when the child is aged 3 on 1 September and the latter interview is in the autumn when the child is aged 5 on 1 September. Although age at school entry is not uniform across the country (children start school in the September that they are aged 4 in some areas, while other areas delay entry until the start of the school term in which the child becomes 5), a child aged 5 in the September of the autumn of interview must have started school at some point in the prior year. Using a two-year gap for school entry ensures that the child is definitely not in school at the initial interview and is definitely in school at the latter interview, while the school status may be uncertain at the intervening interview. The 'school entry' category is divided into two subgroups: first, children entering school with a sibling less than five years younger, implying that there will continue to be pre-school children in the household after the school entry; and second, those with no younger sibling less than five years younger, implying that there will be no pre-school children in the household after school entry or that this is the

'last child' entering school. In the case where there is a newborn and a school entry in the same period, the newborn takes precedence in terms of the group categorisation.

The 'no children' and the 'children left' categories are defined in the same way as in the three broad categories described above and are mutually exclusive from all other groups. For the other three 'with children' groups, parents are categorised by the age of their youngest child on the grounds that the age of the youngest child has the greatest influence on work behaviour. However, the interview following a birth is always classified as 'newborn' and the interview following school entry is always classified as 'school entry' as long as there is no newborn at the same or previous interview. Pairs of interviews were only included for the comparison groups if the individual was in the same category at both interviews and at the intervening interview.

FIGURE 4

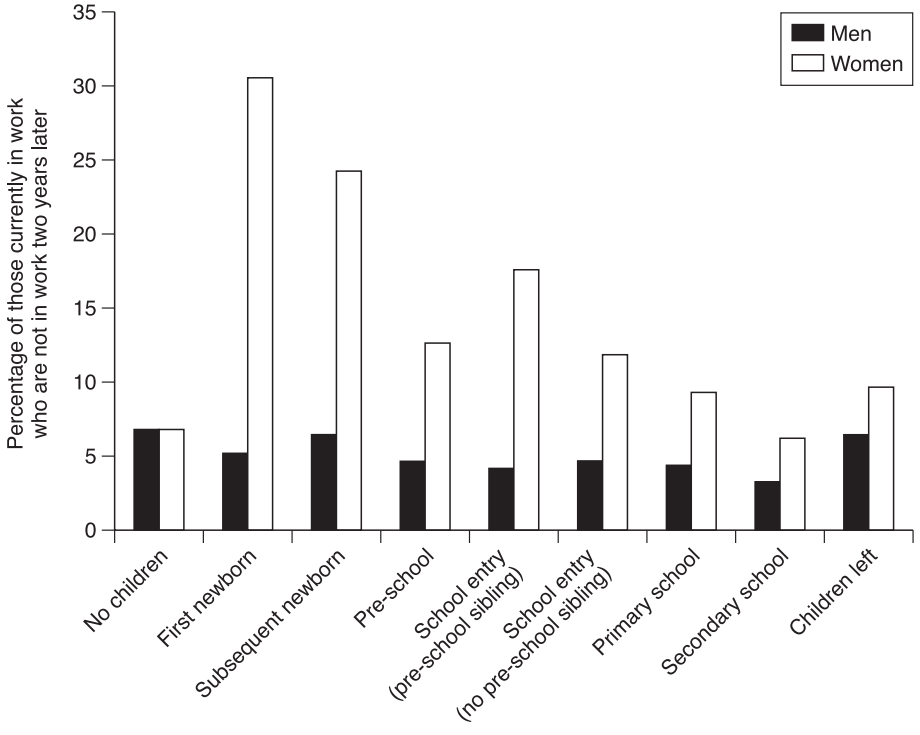
Percentage moving into work over two years



Note: Proportions are weighted using BHPS weights.
Source: Individuals aged 18–54 from waves 1–13 (1991–2003) of the BHPS. Sample contained 8,193 observations with an average cell size of 455 observations used to calculate each proportion and a range in cell size from 44 (men with first newborn) to 1,516 (men with no children).

FIGURE 5

Percentage moving out of work over two years



Note: Proportions are weighted using BHPS weights.
Source: Individuals aged 18–54 from waves 1–13 (1991–2003) of the BHPS. Sample contained 32,654 observations with an average cell size of 1,814 observations used to calculate each proportion and a range in cell size from 192 (women with school entry (pre-school sibling)) to 7,421 (men with no children).

Figure 4 charts the propensity of those not currently in work to be in work two interviews later for men and women across the nine groups of family formation and development. Figure 5 presents the corresponding picture for the proportion of those currently in work who are not in employment two interviews later. Figure 4 shows that newborns mark a sudden drop in the propensity to move into work for women, particularly for subsequent births where the mother already has one child. The proportion moving into work around the time of school entry is consistent with the levels for mothers with pre-school and primary-school children, although there is a slightly higher rate of return for school entries with no pre-school sibling: 36 per cent of mothers initially not working move into work when this 'last child' enters school, compared with a little under 30 per cent for

TABLE 4

Logit models for moving between work and non-work over two years

	Probability of working two years later if currently not working		Probability of not working two years later if currently working	
	Coeff.	*Standard error*	*Coeff.*	*Standard error*
Groups (comparing women):				
(1) no children	1.110***	0.126	–1.487***	0.140
(2) with first newborn child	0.620***	0.218	0.313*	0.172
(3) with subsequent newborn child	omitted	omitted	omitted	omitted
(4) with pre-school child	0.242	0.153	–0.800***	0.180
(5) with school-entry child (and pre-school child)	0.266	0.170	–0.409*	0.237
(6) with school-entry child (and no pre-school child)	0.583***	0.156	–0.880***	0.196
(7) with primary-school child	0.285**	0.142	–1.148***	0.159
(8) with secondary-school child	0.206	0.148	–1.575***	0.162
(9) children left	–0.339***	0.134	–1.104***	0.142
Interacting group with men:				
(1) no children × men	1.075***	0.123	–1.489***	0.139
(2) with first newborn child × men	1.025***	0.349	–1.753***	0.252
(3) with subsequent newborn child × men	0.607**	0.252	–1.530***	0.216
(4) with pre-school child × men	1.051***	0.260	–1.882***	0.223
(5) with school-entry child (and pre-school child) × men	0.472*	0.286	–1.986***	0.308
(6) with school-entry child (and no pre-school child) × men	0.355	0.275	–1.879***	0.239
(7) with primary-school child × men	0.453**	0.198	–1.939***	0.188
(8) with secondary-school child × men	0.454**	0.188	–2.268***	0.194
(9) children left × men	0.150	0.147	–1.542***	0.148
Constant	–1.141***	0.112	–1.134***	0.131
Significant differences within women:				
First newborn	groups 1 3 4 8 9		all women groups	
Subsequent newborn	groups 1 2 6 7 9		all women groups	
School entry (and pre-school child)	groups 1 6 9		all women groups	
School entry (no pre-school child)	groups 1 3 4 5 7 8 9		groups 1 2 3 5 8	
Significant differences with men	groups 3 4 9		groups 2 3 4 5 6 7 8 9	
Pseudo R-squared	0.044		0.027	
Number of observations	8,151		32,575	

Notes: Regressions are weighted using BHPS weights. Coefficients are significantly different from zero at the 1 per cent level (***), 5 per cent level (**) and 10 per cent level (*).
Source: Individuals aged 18–54 from waves 1–13 (1991–2003) of the BHPS.

mothers with pre-school and only primary-school children. In comparison with men at the same stage of their lives, mothers with newborns and those with pre-school children are particularly unlikely to be moving into work.

Newborns, particularly first births, mark a distinct spike in the propensity for women to move out of work (Figure 5). Interestingly, school entry for a child with younger pre-school siblings also marks a point of an unusually high degree of movement out of work for mothers, possibly due to additional parental demands associated with school life and the complexities of organising care around normal school hours. As the propensity for men to leave employment shows little variation across the groups, newborns and school entry with a pre-school sibling stand out as a particularly unusual time for women relative to men.

Table 4 presents the results from probability models testing whether the differences observed across groups in Figures 4 and 5 are statistically significant. The birth of a child marks a significant decline in the propensity to move into work for women, although mothers with a subsequent newborn or pre-school children are significantly less likely to move into work than those with a first newborn or than men at the same points in family formation. Mothers with a child entering school and no younger pre-school children are significantly more likely to move into work than mothers with pre-school children (with or without school entry) and mothers with older children, confirming that this is an unusual point for the transition back to work, although it is not significantly different from the likelihood for men. The second regression in Table 4 confirms that the differences in the propensity to leave work between mothers with newborns and mothers with school-entry children are all significant, except that the likelihood of moving out of work for mothers with school entry and no younger pre-school siblings is not significantly different from that for mothers in the 'pre-school children' group. For all groups except the 'no children' category, women are significantly more likely than men to move out of work.

Figure 6 presents the average growth in wages across two interviews for the nine groups. For times outside of births and school entries, the bars follow a steady downward trend for women. Contrary to this pattern, wage growth at the time of the first newborn is similar to that for mothers with pre-school children, while that for subsequent births is slightly lower than that for those with pre-school children. Wage growth for women when the last child enters school is also much lower than might be expected from the overall pattern, although the wage growth is unusually high if there is a younger pre-school sibling present at the time of school entry. Most importantly, wage growth for women is notably lower than that for men during both types of newborn and both types of school-entry periods. This contrasts with the more even growth for men and women in the 'no children'

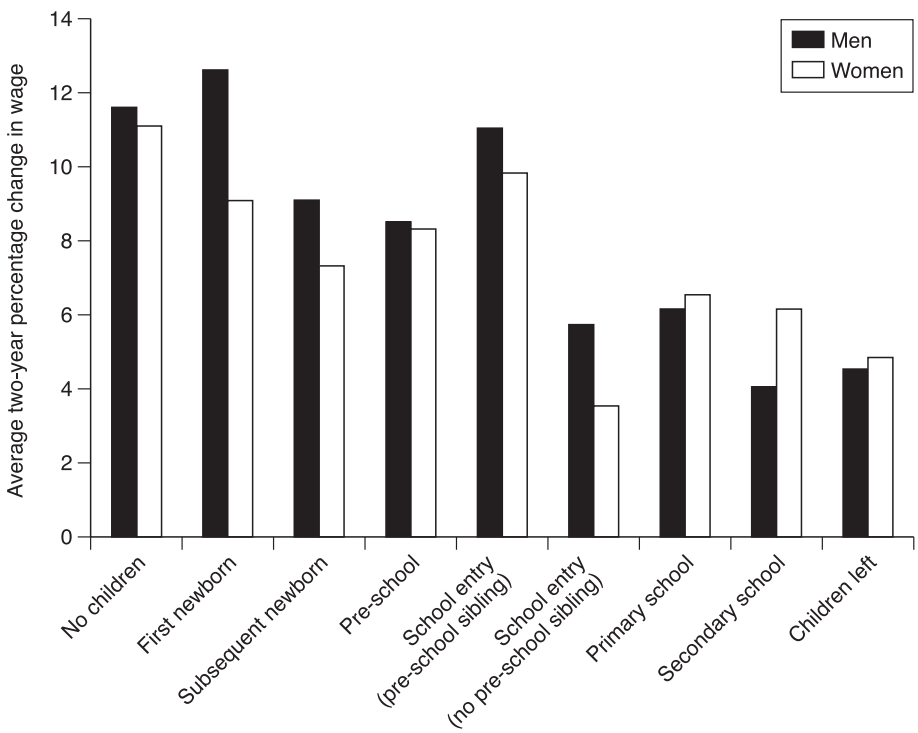
and 'pre-school children' groups and the higher rate of growth for women once the youngest child is in primary school or older. One possible explanation for the lower wage growth for women during the newborn period could be the loss of performance-related pay while on maternity leave, but it could also reflect a change in actual or perceived productivity with the arrival of the child.

The significance of the differences in wage growth between groups is tested using wage growth regressions for the two-year changes. The results are presented in Table 5. Four different specifications are estimated, examining whether the differences can be explained by differences in observed family background and work characteristics.

Wage growth for women at the time of birth and when a child enters school with younger pre-school siblings is not consistently statistically different from that at other times across the specifications. School entry with

FIGURE 6

Average two-year percentage change in wage



Note: Average changes are weighted using BHPS weights.
Source: Individuals aged 18–54 from waves 1–13 (1991–2003) of the BHPS. Sample contained 23,752 observations with an average cell size of 1,320 observations used to calculate each proportion and a range in cell size from 122 (women with school entry (pre-school sibling)) to 5,514 (women with no children).

TABLE 5

Wage growth regressions

Dependent variable: percentage change in wage over two years	Coefficient (standard error)			
	Model 1	*Model 2*	*Model 3*	*Model 4*
Groups (comparing women):				
(1) no children	3.718*	1.688	–1.028	–7.861***
	(1.938)	(2.182)	(2.832)	(2.923)
(2) with first newborn child	1.792	0.861	–0.609	–7.646**
	(2.552)	(2.798)	(3.524)	(3.654)
(3) with subsequent newborn child	omitted	omitted	omitted	omitted
(4) with pre-school child	0.882	1.934	–2.053	–4.248
	(2.270)	(2.519)	(3.303)	(3.372)
(5) with school-entry child (and pre-school child)	2.900	2.668	–0.975	–0.486
	(3.110)	(3.394)	(4.442)	(4.729)
(6) with school-entry child (and no pre-school child)	–3.940*	–3.703	–7.403**	–9.472***
	(2.385)	(2.646)	(3.381)	(3.465)
(7) with primary-school child	–0.951	2.701	–1.160	–2.641
	(2.059)	(2.310)	(2.958)	(3.027)
(8) with secondary-school child	–1.177	4.397*	1.383	–1.554
	(2.018)	(2.280)	(2.926)	(2.998)
(9) children left	–2.538	3.106	0.143	–4.751
	(1.966)	(2.271)	(2.928)	(3.012)
Interacting group with men:				
(1) no children × men	4.147**	1.956	–0.847	–8.706***
	(1.936)	(2.182)	(2.832)	(2.932)
(2) with first newborn child × men	5.433**	4.986*	1.938	–5.613
	(2.387)	(2.606)	(3.373)	(3.512)
(3) with subsequent newborn child × men	1.701	2.280	–0.340	–9.441***
	(2.320)	(2.553)	(3.263)	(3.365)
(4) with pre-school child × men	1.118	2.141	–2.734	–11.609***
	(2.225)	(2.459)	(3.155)	(3.258)
(5) with school-entry child (and pre-school child) × men	3.882	5.369*	5.158	–3.535
	(2.552)	(2.793)	(3.502)	(3.630)
(6) with school-entry child (and no pre-school child) × men	–1.723	0.404	–2.036	–10.971***
	(2.307)	(2.546)	(3.245)	(3.361)
(7) with primary-school child × men	–1.474	1.834	–0.322	–9.527***
	(2.084)	(2.338)	(3.001)	(3.101)
(8) with secondary-school child × men	–3.430*	1.291	–1.236	–9.674***
	(2.060)	(2.323)	(2.982)	(3.086)
(9) children left × men	–2.789	1.431	–1.468	–10.997***
	(1.982)	(2.261)	(2.912)	(3.020)
Year dummy variables	included	included	included	included
Family background variables	—	included	included	included
Experience variables	—	—	included	included
Work characteristics variables	—	—	—	included

Continues on next page

TABLE 5 continued

	Model 1	*Model 2*	*Model 3*	*Model 4*
Adjusted R-squared	0.019	0.040	0.044	0.084
Number of observations	23,694	20,472	15,551	13,745
Significant differences within women:	*Groups:*	*Groups:*	*Groups:*	*Groups:*
First newborn	6 9	6 8	6	3 7 8
Subsequent newborn	1 6	8	6	1 2 6
School entry (+ pre-school child)	6 9	6	—	1 6
School entry (no pre-school child)	1–5 7 8	1 2 4 5 7–9	1–4 7–9	3–5 7–9
Significant differences with men	8	2 6 8 9	6 8	3 4 7–9

Notes: Regressions are weighted using BHPS weights. Coefficients are significantly different from zero at the 1 per cent level (***), 5 per cent level (**) and 10 per cent level (*). Year variables are dummy variables for the wave. Family background variables include the number of children, age of youngest child, a quadratic in age, education, ethnicity, health problem, partner, whether partner working, partner's work hours and partner's earnings. Experience is a quadratic in months. Work characteristics include weekly hours, permanency of position, self-employed, supervisory position, sector, firm size, place of work, and tenure as a quadratic in months. Full variable definitions are provided in the appendix.
Source: Individuals aged 18–54 from waves 1–13 (1991–2003) of the BHPS.

no pre-school children has significantly lower wage growth for mothers than at most other times across most specifications and their wage growth is significantly lower than that for men at the same time for two of the models. Hence, although Figure 6 appears to support the hypothesis that childbirth and school entry are critical times in the development of the gender wage gap, the statistical significance of the differences is not proven. This may be due to an insufficient number of wage change observations in the newborn and school-entry groups rather than the absence of real differences.[8]

Table 6 considers whether changes in other employment characteristics are unusual for women around the time of birth and school entry. Women are significantly more likely to change employer around the time of birth and school entry than at other times. Somewhat surprisingly, women with

Notes to Table 6
[a]The newborn groups are combined as all mothers of first newborns working at home remain working at home.
Notes: Average changes are weighted using BHPS weights. The significance of the differences between groups was estimated using weighted logit models for the discrete changes and using weighted regression models for the continuous variable weekly hours.
Source: Individuals aged 18–54 from waves 1–13 (1991–2003) of the BHPS.

[8]The number of wage growth observations for women was 276 for the first newborns, 214 for the subsequent newborns, 122 for the school entry (with pre-school children) and 361 for the school entry (no pre-school children). The corresponding numbers for men were slightly higher on account of a higher proportion of men being in work: 372, 411, 241 and 401.

TABLE 6, part I

Changes in other work characteristics over two years

	Percentage who change employer		Weekly Hours: *Mean change in weekly hours*		*Percentage of part-time who become full-time*		*Percentage of full-time who become part-time*		*Percentage who change time of day worked*	
	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women
Groups:										
(1) no children	45.5	44.9	0.7	0.9	64.4	53.3	2.0	3.9	19.4	19.1
(2) with first newborn child	49.1	68.1	–0.5	–12.1	42.9	20.0	2.4	52.8	22.6	19.4
(3) with subsequent newborn child	43.3	77.4	–0.0	–3.6	75.0	8.9	1.5	44.7	21.8	10.1
(4) with pre-school child	35.2	49.5	0.1	1.2	75.0	17.1	1.2	12.0	19.1	14.1
(5) with school-entry child (and pre-school child)	33.6	63.4	0.2	0.8	60.0	14.3	0.6	22.2	22.0	13.4
(6) with school-entry child (and no pre-school child)	30.9	56.4	–0.6	2.0	75.0	18.1	1.7	18.4	20.9	21.2
(7) with primary-school child	30.6	44.4	–0.1	2.0	86.7	18.9	1.1	13.7	17.7	21.0
(8) with secondary-school child	27.0	33.4	–0.2	1.9	70.3	24.7	1.1	10.2	19.7	20.7
(9) children left	27.3	26.3	–0.2	0.0	59.2	14.9	1.2	8.0	18.3	15.6
Significant differences within women:										
First newborn	groups 1 3 4 6 7 8 9		all groups		group 1		groups 1 4 5 6 7 8 9		groups 3 5	
Subsequent newborn	all groups		all groups		groups 1 4 6 7 8		groups 1 4 5 6 7 8 9		groups 1 2 4 6 7 8 9	
School entry (+ pre-school child)	groups 1 3 4 6 7 8 9		groups 2 3		groups 1 8		groups 1 2 3 8 9		groups 1 2 6 7 8	
School entry (no pre-school child)	all groups		groups 1 2 3 9		groups 1 3 8 9		groups 1 2 3 4 7 8 9		groups 3 4 5 9	
Significant differences with men	groups 2 3 4 5 6 7 8		groups 2 3 4 6 7 8		groups 1 3–9		all groups		groups 2 3 4 5 7 9	
No. of observations	13,930	14,265	15,101	14,798	532	4,406	14,569	10,392	13,009	14,782

TABLE 6, part II

	Permanency				Supervisory Role				Place of Work			
	% of permanent who move to temporary		*% of temporary who move to permanent*		*% of supervisory who move to non-supervisory*		*% of non-supervisory who move to supervisory*		*% of those working at home who move to elsewhere*		*% of those working elsewhere who move to home*	
	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women
Groups:												
(1) no children	3.8	3.7	67.3	68.9	24.5	25.2	20.5	21.1	43.7	51.3	2.1	0.9
(2) with first newborn child	2.7	8.5	74.2	41.7	18.4	41.1	26.3	16.1	68.8	0.0	2.6	4.1
(3) with subsequent newborn child	3.0	6.8	77.8	54.2	17.3	30.3	21.3	13.3	25.0	18.8	3.2	3.9
(4) with pre-school child	2.3	2.8	63.6	71.2	18.9	24.8	16.5	15.7	46.2	41.2	2.7	2.3
(5) with school-entry child (and pre-school child)	3.0	7.1	66.7	63.6	12.7	26.5	17.6	13.8	30.4	36.8	3.8	2.1
(6) with school-entry child (and no pre-school child)	2.5	7.1	65.5	67.4	14.9	27.1	19.3	12.4	36.1	47.2	3.2	2.2
(7) with primary-school child	1.9	4.0	57.7	74.8	17.2	23.7	19.6	13.0	30.1	27.9	3.5	2.0
(8) with secondary-school child	2.7	2.9	69.0	63.1	15.9	26.9	21.7	14.3	27.4	24.3	2.8	1.3
(9) children left	2.4	2.3	71.2	61.1	19.2	23.0	15.4	12.6	31.5	28.9	2.9	2.1
Significant differences within women:												
First newborn	groups 1 4 7 8 9		group 7		all groups		—		n/a [a]		groups 1 7 8 9	
Subsequent newborn	groups 1 4 7 8 9		—		group 2		—		groups 1 4 6 [a]		groups 1 6 7 8 9	
School entry (+ pre-school child)	groups 1 4 7 8 9		—		group 2		—		—		—	
School entry (no pre-school child)	groups 1 4 7 8 9		—		group 2		group 1		groups 2/3 7–9 [a]		groups 1 3 8	
Significant differences with men	groups 2 3 5 6 7		group 7		groups 2 3 5–9		groups 1–3 7–9		group 2/3 [a]		groups 1 2 7 8 9	
No. of observations	14,236	13,743	1,023	1,206	5,310	4,496	7,330	9,151	808	546	14,473	14,411

subsequent newborns are significantly more likely to change employer than those with a first newborn, and women with remaining pre-school children are more likely to make such a move when a child enters school than those with their last child entering school. Women are more likely to change employer than men at virtually every stage, although the differences between men and women are quantitatively greater at the two critical times. For newborns, this is not surprising as many women do not have maternity entitlements that could facilitate them returning to the same employer following a birth, and the period of absence from work following birth, regardless of entitlements, can be substantial. The greater propensity to change employer over school entry is more surprising and may reflect mothers making changes in their work characteristics by switching employer.

Similar analysis for the propensity to change industry or occupation, to change sector of work or to switch between employment and self-employment did not indicate that newborns and school entry are critical times for women for these characteristics. Hence, there is no evidence that they are critical times for changes in work characteristics that define the segment of the labour market.

The story is very different, though, for those characteristics that define the nature of their work and working conditions. There are dramatic changes in women's work hours with the arrival of a newborn: average weekly hours fall by 12.1 over the time of a first birth and by 3.6 following a subsequent birth, while they increase by between 1 and 2 hours during almost all other stages of family development. The decrease in hours is significantly greater for women with newborns than for men at the same critical time. Interestingly, school entry does not mark a time of unusual change in work hours for women: the increases of 0.8 hours over the two years for those with younger pre-school children and 2.0 hours for those with a last child entering school are not significantly different from the changes for mothers with pre-school or school children. This latter increase is significantly different from the decrease in work hours that men experience over school entry for the last child, but this is consistent with the pattern for the school-children groups. Women with subsequent newborns are significantly less likely to move from working part-time to full-time than other groups of women: only 9 per cent of those initially working part-time make the change over the two years compared with between 14 and 25 per cent for other groups of women with children. Mothers with children entering school are not significantly more likely to move from part-time to full-time work than mothers with pre-school or only primary-school children. However, both mothers of newborns and mothers with children entering school stand out as significantly more likely to move from full-time to part-time work than other

groups of women: some 53 per cent of mothers with first newborns, 45 per cent of mothers with subsequent newborns and roughly 20 per cent of mothers with a child entering school initially working full-time are in part-time work two years later, compared with between 10 and 14 per cent for the other groups of mothers. Whether a movement towards shorter hours and part-time work is good or bad for women is not clear. On the one hand, it may reflect a desire on the part of women to work less to allow more time for child responsibilities. On the other hand, part-time work often pays less well and is argued to have a lower status than full-time work. For those with children entering school, the movement towards part-time work could reflect a lack of options for childcare outside of school hours or increased need for maternal care from the demands of school life.

Somewhat surprisingly, women with subsequent newborns or with a school-entry child (and pre-school child) are significantly less likely to change the time of day that they work than other groups of women, although women with a school-entry child (and no pre-school child) are more likely to adjust the time of day worked than other groups. However, all four groups of women at the critical times of birth and school entry are significantly more likely to move from a permanent to a non-permanent position than other groups of women and men at the same critical points (Table 6, part II). Some 9 per cent of mothers with first newborns, 7 per cent of mothers with subsequent newborns and 7 per cent of mothers with children entering school initially working in a permanent position will move into non-permanent work, compared with 4 per cent or less for all other groups of women. These proportions are significantly higher than those for men over the periods of birth and school entry. Mothers with newborns are also less likely than other mothers and men at the same time to move from non-permanent to permanent work, although the differences are not statistically significant, possibly due to the smaller sample of parents initially in non-permanent work. It is hard to argue that this general movement towards temporary work for mothers of newborns and children entering school is something that might be desired in itself by these mothers and it is more likely to reflect a loss of labour market position (possibly through having to change employer) or a compensating change for other more desirable work characteristics. Mothers of first newborns are particularly likely to move from a supervisory position to a non-supervisory position: some 41 per cent of those initially in a supervisory position make the transition compared with between 23 and 30 per cent for all other groups of women and with 18 per cent of men at the same point in family development. Women with children entering school are also significantly more likely to move to a non-supervisory position than men at the same point, although this pattern continues throughout the years of having school children. Going in the other

direction, birth marks a period when women are significantly less likely to be promoted to a supervisory position than men: only 16 per cent of mothers with first newborns and 13 per cent with subsequent newborns will make the move, compared with 26 per cent and 21 per cent of men respectively. Moving to a non-supervisory role may reflect a desire on the part of mothers with newborns to reduce the responsibilities of formal employment when they return to work, but it may also be interpreted as part of a more general movement towards a weaker role in the labour market for women relative to men. Women with newborns are less likely to move out of working at home than mothers in the 'pre-school children' group and men with newborns, while women with first newborns are significantly more likely to move into working at home than men at the same time. Interestingly, mothers with a last child entering school are more likely to stop working at home than all other groups of mothers, although the differences are not all significant and there is no significant difference with men at the same point. This suggests that women may be adjusting their place of work to fit new demands at the critical times.

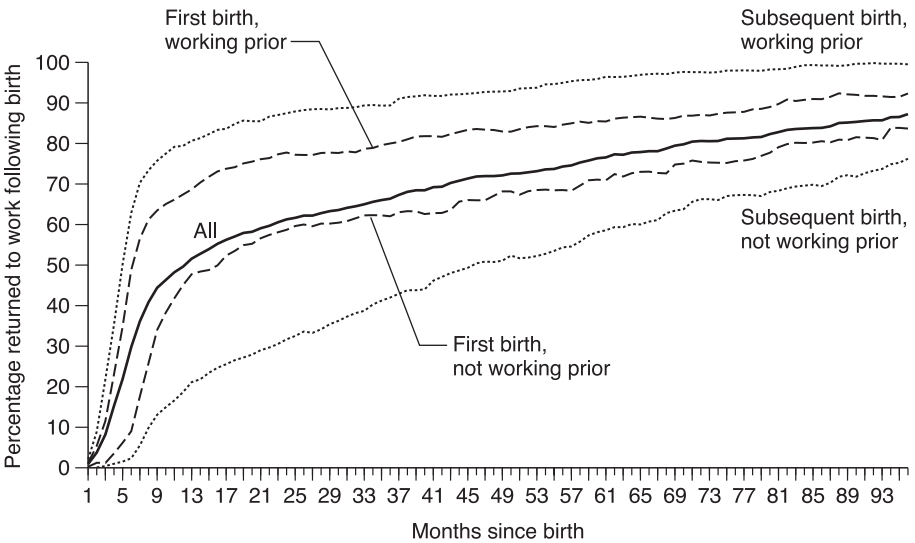
Overall, birth and school entry are critical times for work participation and wage growth. Crucial developments also occur at these times for some of the characteristics capturing the nature and conditions of work, including the weekly hours of work, the permanency of the position, the supervisory level and the place of work. While the modifications to these work characteristics could be interpreted as reflecting changes in mothers' needs for particular work characteristics at the critical times, the movement away from permanent and supervisory positions could also be seen as a weakening in relative labour market position for women.

IV. Women's employment following birth

This section focuses on employment changes around the time of childbirth using a sample of mothers with newborns. This sample contains 2,070 women who have a dependent child born since the previous interview or in the past 12 months in the absence of a previous interview. The sample also includes step, adopted and fostered children currently living in the household with a date of birth since the previous interview or in the previous 12 months in the absence of a prior interview. Prior interviews are available for 1,651 of these mothers with newborns, allowing the analysis for this group to be conditioned on pre-birth characteristics for this subsample.

FIGURE 7

Work return rates after childbirth



Note: The proportions are weighted using BHPS weights.
Source: Sample of mothers with births in previous eight years from waves 1–13 (1991–2003) of the BHPS. The average sample size is 972 for the 'all' sample, 275 for the 'first birth, working prior' sample, 151 for the 'first birth, not working prior' sample, 223 for the 'subsequent birth, working prior' sample and 323 for the 'subsequent birth, not working prior' sample. The sample size ranges from 2,047 in month 1 to 691 in month 96 for the 'all' sample, from 564 to 201 for the 'first birth, working prior' sample, from 336 to 102 for the 'first birth, not working prior' sample, from 463 to 154 for the 'subsequent birth, working prior' sample and from 684 to 234 for the 'subsequent birth, not working prior' sample.

Figure 7 plots the percentage of women who have returned to work[9] at some point since birth in the 96 months following childbirth.[10] It should be noted that the graph presents the proportions returned irrespective of whether the mother has more children in the future. Roughly half of all women (the middle line on Figure 7) have returned to work at some point by a year after the birth, but only an additional quarter have returned by the end of five years since birth. Indeed, even by eight years after birth, almost 15 per cent of mothers have never returned to employment at any point.[11]

[9]The term 'return to work' is used regardless of whether the woman was in work prior to the birth or, indeed, has ever worked.

[10]The precise date that the mother returned to work could not always be identified in the data for two main reasons. First, the panel may not have continued long enough to cover the return date; 27 per cent of mothers with newborns have censored return dates. Second, mothers who have returned to working for their previous employer at the time of the interview following birth are likely to report the start date for their employment with that employer rather than the date they returned from maternity leave. In these cases, the return date was imputed as the midpoint between the birth and the first date when the mother was known to be back in work.

[11]Figure 7 is consistent with similar previous statistics. McRae (1996) reports that 20 per cent of women had not returned to work at some point during the first seven years following birth, which is

Figure 7 also shows that the rate of return depends upon whether the birth is a first or subsequent birth, and whether the mother was working prior to the birth (defined as any work in the previous year).[12] On average, mothers with first births return more quickly than mothers with subsequent births, but mothers with subsequent births who were working prior to the birth have the quickest return rates, and mothers with subsequent births who were not working prior to the birth have the slowest return rates. To look at this another way, because so many women work prior to their first birth, knowledge of a woman's previous work history is not very useful in predicting how long she will stay out of work after the first birth. On the other hand, whether a woman is working prior to a subsequent birth is an extremely good predictor for whether she will work after that birth. This empirical observation could result in two ways. It may merely reflect that women vary in their attachment to work but that this only affects whether a woman works or not once she has a child. On the other hand, it may reflect that there is dynamic persistence in labour market choices, so that the choices that women make after the first birth directly affect the options open to them after subsequent births. The case that there is persistence in work participation is strengthened by the finding that the relationship is significant and sizeable in models that contain controls for a wide range of measured demographic and family characteristics and for the possibility of distinct types of women in their propensity to return more quickly (unobserved heterogeneity).[13] Hence, while this does not mean that if all women returned to work between births then this would reduce the average length of absence to the average duration of those who currently work prior to birth, it could potentially have a sizeable impact on post-birth behaviour.

From a policy perspective, one of the most important issues for the length of absence following birth is the impact of maternity leave and maternity pay rights. Maternity leave can be defined as the right to return to a particular job within the entitlement period. This may encourage some mothers to return sooner than they would have done in the absence of

similar to the proportion shown in Figure 7 for 84 months after birth. The report by Hudson, Lissenburgh and Sahin-Dikmen (2004) of 80 per cent of mothers returned by 13–17 months after birth is for a sample of mothers fulfilling the employment requirements for statutory maternity leave and pay, who would be expected to return more quickly than the representative sample used here.

[12]Estimation of survival models for the length of absence from work following childbirth showed that several factors were significantly related to how quickly mothers return to work. Mothers who already have older children or who go on to have a subsequent child, mothers with multiple births, younger and less educated mothers, black mothers, mothers with health problems, mothers with non-working or no partner, mothers with higher-earning partners, mothers with partners with shorter work hours, mothers previously working shorter hours, mothers working for higher hourly wages and mothers who previously worked in the private rather than public sector have significantly longer absences than those with first newborns. The mother's occupation and the time of day worked prior to the birth are also related to the length of absence. See Brewer and Paull (2006) for further details.

[13]See Brewer and Paull (2006) for a full exposition of these models.

maternity leave, either because it is simply easier to return to their old job without the need for job search or application to the position or because they shorten their absence to ensure that they return within the entitlement period and can automatically return to their previous position. On the other hand, maternity leave may encourage some mothers to lengthen their absence (but only within the entitlement period) as they are no longer fearful that a longer absence may reduce the likelihood that they will be able to return to their old position. For both reasons, the right to maternity leave creates an incentive for mothers to return to work around the point of termination of the entitlement period. The presence of maternity pay creates an incentive for mothers to take longer absences from work for two reasons. First, the monetary loss from each month not worked is smaller in the presence of maternity pay (a 'substitution effect'). Second, the additional income during absence from work means that the mother can afford to take more time off work (an 'income effect'). It should be noted that the latter effect creates an incentive for the mother to lengthen her absence even beyond the end of the period of maternity pay.

There has been considerable variation in maternity leave rights and maternity pay over the period analysed here (September 1991 to December 2003), both in terms of the qualifying conditions and in the period of entitlements and pay levels. The newborns sample was divided into four categories of maternity leave and maternity pay entitlements:[14]

1. no entitlements;
2. three to four months' paid maternity allowance (MA);
3. three to four months' paid statutory maternity pay (SMP);
4. three to four months' paid SMP and six to seven months' unpaid leave.[15]

Those in categories 2 and 3 may also be eligible for an identical period of unpaid maternity leave. It should be noted that entitlements are not directly

[14]Mothers in category 1 of the entitlements constituted 39 per cent of the newborns sample, while categories 2, 3 and 4 made up 10 per cent, 10 per cent and 36 per cent respectively. The qualifying conditions for maternity allowance over the 1991–2003 period required that the mother was not entitled to statutory maternity pay, was employed or self-employed for 26 weeks during approximately the year prior to birth and had either paid the appropriate National Insurance contributions or had earned at least the MA threshold. MA was paid either at the standard rate or at a higher/variable rate for 18 weeks, depending upon the employment and earnings history. The qualifying conditions for SMP over the 1991–2003 period required the mother to have been continuously employed by the same employer for approximately 26 weeks prior to birth and to have had sufficient earnings during this period. SMP was paid for 18 weeks, with a higher rate for the first six weeks (conditional on employment history until July 1994). Details on the estimation of the eligibility for MA, SMP and unpaid leave are presented in the appendix. From April 2003, mothers of newborns could be entitled to six months' paid leave and 12 months' unpaid leave, but there were too few observations within the sample of newborns to include these as additional categories.

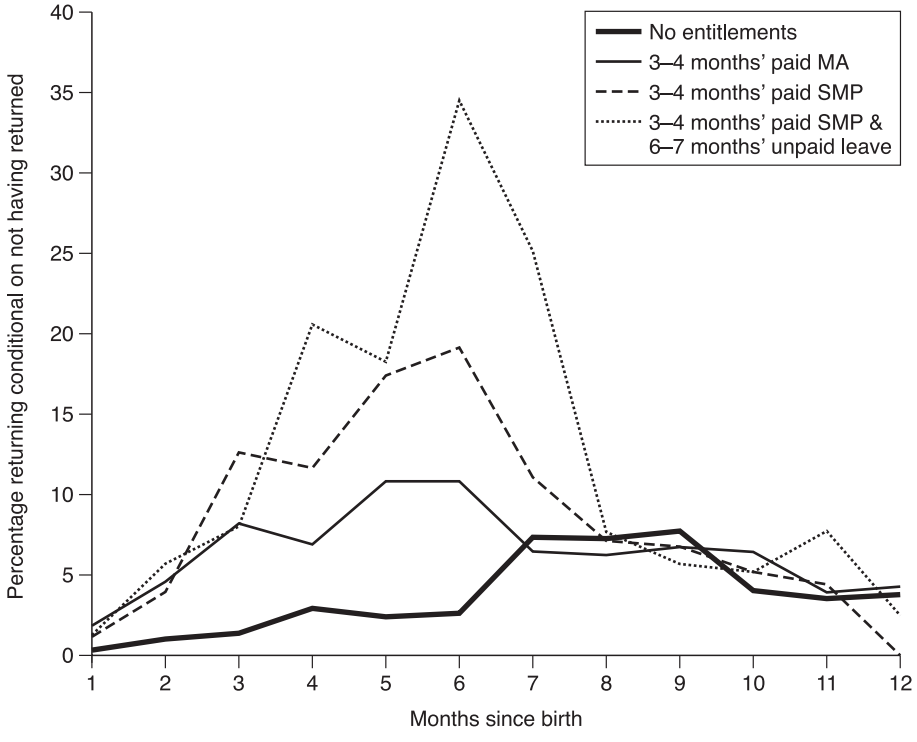
[15]The paid and unpaid leave entitlements run concurrently so that the three to four months of paid leave counts as the first three to four months of the unpaid leave.

observed in the data but the categories are defined by statutory rights derived using the mothers' work histories and employer tenure. Paid leave has been divided into MA and SMP as the SMP payment can be considerably higher than the MA payment for the first six weeks of entitlement.

Figure 8 presents monthly hazard rates for returning to work in the first 12 months after birth for each category. The graph shows the probability of returning to work in each month conditional on not having returned before that month. Those not eligible for either maternity leave or pay have low rates of return throughout the 12 months, although the probability of return is slightly higher in months 7 to 9. Relative to this baseline, all the groups

FIGURE 8

Monthly hazard rates for returning to work after birth by leave entitlements



Note: The hazard models are estimated using BHPS weights.
Source: Sample of mothers with births in previous year from waves 1–13 (1991–2003) of the BHPS. The average sample size is 770 for the 'no entitlements' sample, 158 for the '3–4 months' paid MA' sample, 162 for the '3–4 months' paid SMP' sample and 231 for the '3–4 months' paid SMP and 6–7 months' unpaid leave' sample. The sample size ranges from 941 in month 1 to 552 in month 12 for the 'no entitlements' sample, from 225 to 98 for the '3–4 months' paid MA' sample, from 261 to 87 for the '3–4 months' paid SMP' sample and from 425 to 83 for the '3–4 months' paid SMP and 6–7 months' unpaid leave' sample.

eligible for some type of maternity right have much higher return rates in the first seven months, but there is little difference between all four groups in the propensity to return from eight months after the birth. The difference cannot be attributed solely to differences in maternity rights, because entitlement to maternity rights depends on past labour market attachment and, even in the absence of maternity rights, we would expect women with a strong market attachment to return to work after childbirth faster than women with a weak labour market attachment.

However, the differences in the patterns of returns between the eligible groups are still informative. Those eligible only for three to four months of paid MA exhibit a fairly even distribution in their return rates across the months: there is a peak at months 5 and 6 and a dip at month 7, which may suggest a slight bunching in returning a couple of months after the pay has terminated. Those eligible only for three to four months of paid SMP exhibit a very interesting pattern, with a distinct jump up in the return rate in month 3 (after the higher rate of pay has terminated at six weeks) and a marked peak in the propensity to return to work in months 5 and 6, the two months following termination of the pay. The relatively high proportion returning in month 5 could also indicate a desire to return within time to claim the maternity leave rights to return to their previous job, but this would be more likely if followed by a dip in the return rate in month 6. Those eligible to both three to four months of paid SMP and six to seven months of unpaid leave have a quite different pattern: there is a sharp jump up in the propensity to return in month 4 following the termination of the paid leave, but this is overshadowed by the much stronger peaks in months 6 and 7, marking the end of the estimated entitlement to unpaid maternity leave. The subsequent drop in the propensity to return in month 8 is indicative that mothers may well be returning to work earlier than they would have done in the absence of the maternity leave right.

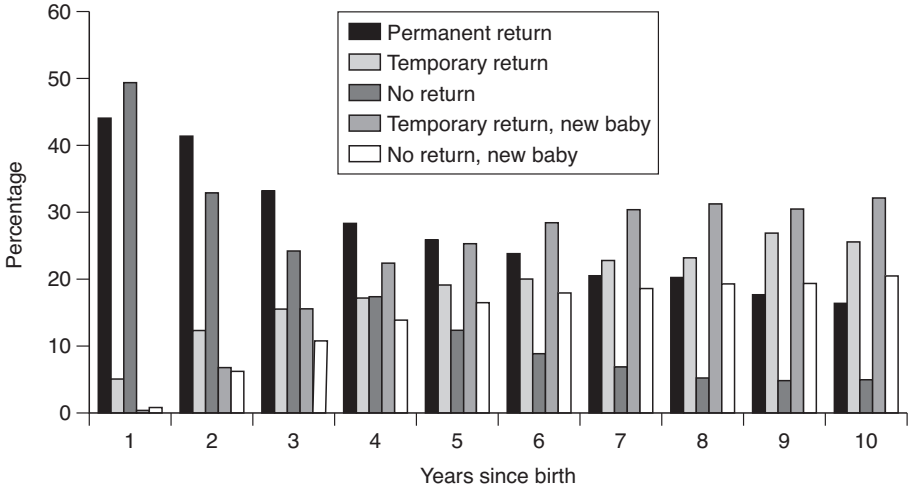
Overall, the picture suggests that eligibility for maternity pay is associated with a greater tendency to return in the month or two after termination, consistent with the idea that the presence of maternity pay may enable mothers to afford to extend their absence from work to slightly longer than they would otherwise have done. However, it also suggests that unpaid maternity leave rights have a strong impact, encouraging women both to extend their absence from work to the point of termination of the unpaid maternity leave and, for those who would otherwise have remained absent longer, to shorten their absence to ensure that they benefit from the maternity leave rights to return to their previous job. From a policy perspective, this is an encouraging finding: the maternity leave and pay entitlements may be enabling some mothers to take the longer maternity leave they desire, while others find the maternity leave rights sufficiently

beneficial to return to work earlier in order to benefit from them. It also suggests that increasing the period of entitlements for these rights may well increase the length of time that mothers remain absent from work. However, it should be borne in mind that this may have other effects: longer absences following birth for mothers may mean a greater deterioration in work skills or a decline in mothers' attachment to formal paid work, or employers may view it as more burdensome to employ women likely to take maternity leave. Hence, there is a need to weigh up the potential benefits of mothers being able to spend longer away from work following birth against the potential drawbacks of longer absences.

Although mothers may return to formal paid work quickly after birth, they may not remain permanently in employment. Aside from natural fluctuations in employment, many new mothers may soon face the interruption of a subsequent birth. Even in the absence of further children, combining work and motherhood is always a new experience for first-time mothers (and often a new one for mothers of subsequent children) and some may return to formal work only to discover that it is not the best choice. In addition, child-related demands or the pleasure of being a full-time carer may change as the child grows, inducing some mothers to switch out of

FIGURE 9

Permanent and temporary return to work and subsequent births



Notes: The proportions are weighted using BHPS weights. A temporary return is defined as one where the mother has worked since the birth but has also reported a spell not in work since returning to work. A permanent return is one where the mother has reported only spells of work since returning to work.
Source: Sample of mothers with births in previous 10 years from waves 1–13 (1991–2003) of the BHPS. The average number of observations is 1,077 and the number of observations ranges from 1,808 for one year after birth to 402 for 10 years after birth.

work as the child gets older. The permanency of the return to employment is highlighted in Figure 9. The graph shows that the return to work after birth is often temporary or interrupted by a subsequent birth. Ten years after birth, 53 per cent of mothers have had a subsequent birth, 17 per cent have permanently returned, 26 per cent have temporarily returned and 5 per cent have not returned at all.[16] It is insightful to compare these numbers with those for fathers in the 10 years following birth: 54 per cent have partners who have had a subsequent baby, 27 per cent have worked permanently, 17 per cent have been both in and out of work (equivalent to a temporary return) and 2 per cent have not worked at all (equivalent to no return). This means that while 40 per cent of mothers who have returned to work within 10 years and have not had a subsequent birth have remained permanently in work, some 61 per cent of fathers in the same position have remained permanently in work. This suggests that even if mothers return to work after birth and have no subsequent children, the chances that they will remain in work are much lower than would be expected from normal labour market dynamics. Hence, policy initiatives aiming to enhance the work participation of mothers need to focus not just on encouraging them to return to work following the birth but also on ensuring that they remain in work.

V. Women's employment at school entry

Greater detail on the dynamics in mothers' work participation around the time a child enters compulsory schooling at the age of 4 or 5 is presented in this section using a sample of mothers with children entering school. This sample consists of 2,078 mothers with a child aged 5 on 1 September of the autumn of interview. As mentioned above, although age at school entry is not uniform across the country, a child aged 5 on 1 September of the autumn of interview must have started school at some point in the prior year. Most of the mothers in this sample have a reported work status both for the September during the autumn of interview (following the year of school entry) and for the June 15 months earlier (prior to the year of school entry). Such completeness is not surprising given that, even in the absence of a prior interview, work histories are collected in reverse chronological order until the last reported spell of work covers the previous September.

Changes in mothers' work participation around school entry are presented in Table 7. Five points in time are considered: the June prior to

[16]A temporary return is defined as one where the mother has worked since the birth but has also reported a spell out of work since returning to work. A permanent return is one where the mother has reported only spells of work since the initial return to work. By definition, the advent of a new baby means that a return cannot be permanent.

TABLE 7

Changes in mothers' employment with school entry

	School entry with pre-school sibling			*School entry with no pre-school sibling*		
	All	Conditional on work in previous June		All	Conditional on work in previous June	
		Not in work	*In work*		*Not in work*	*In work*
Percentage in work:						
in previous June	39.8	0.0	100.0	57.7	0.0	100.0
in September	41.6	6.7	92.9	59.2	9.9	94.5
in January	41.6	12.4	84.6	60.3	18.0	90.3
in April	43.3	15.9	83.8	61.5	20.9	90.3
in following September	43.6	20.0	82.2	62.8	29.2	88.6

Note: The proportions are weighted using BHPS weights.
Source: Sample of mothers with school entry from waves 1–13 (1991–2003) of the BHPS. The number of observations for the previous June to school entry was 886 mothers with school entry and a pre-school sibling and 1,056 mothers with school entry and no pre-school sibling.

school entry, the September at the likely point of school entry, the January and April marking the start of new terms within the first school year, and the following September when the child is embarking on their second academic year in school. As in the earlier analysis, the sample is divided into those with younger pre-school siblings in the household and 'last' children entering school where there are no such siblings. As the potential impacts of school entry on mothers' employment can have opposing influences, the 'all' columns in Table 7 present the aggregate picture, while the remaining columns condition on initial work status and highlight the turnover aspect.

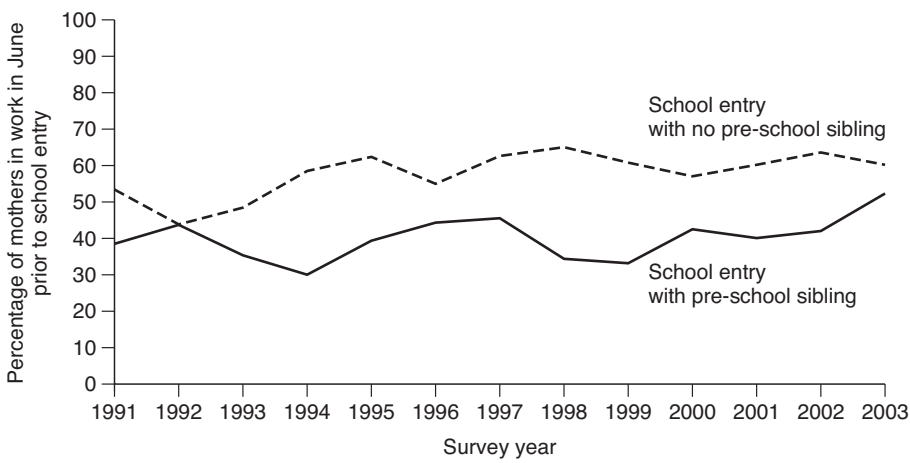
Some 40 per cent of mothers are reported as being in work in the June prior to a child with younger pre-school siblings entering school, while 58 per cent of mothers are in work in the June prior to the last child entering school. For both types of school entry, this aggregate proportion rises by around 2 percentage points over the following six months and by a total of 4–5 percentage points by the September following school entry, with a slightly higher degree of increased participation for mothers with their last child entering school. At the aggregate level, therefore, school entry marks an important, but not dramatic, rise in work participation. Indeed, given the argument of some recent policy debate that mothers should be able to undertake formal paid work once their youngest child starts school, the increase in work participation of 5.1 percentage points over the period of school entry for the last child may seem surprisingly small.

The work proportions conditional on the work status in the June prior to school entry show the degree of entry into and exit from work over the

period. For those with a younger pre-school sibling, some 20 per cent of those initially not working have moved into work by the September following school entry, and some 18 per cent of those initially working have moved out of work over the same period. Indeed, the aggregate increase in work participation of almost 4 percentage points masks the fact that some 19 per cent of mothers switched between working and not working over this period.[17] As might be expected, the proportion entering work is greater (29 per cent) for those with a last child entering school and the proportion moving out of work is smaller (11 per cent). Interestingly, however, the proportion of mothers who switch between working and not working is also 19 per cent.[18] Hence, while policy discussion has tended to focus on school entry as an important time for mothers with their youngest child entering school to return to work, it is, in fact, a time of change both into and out of work for a substantial proportion of all mothers with children entering school.

FIGURE 10

Changes in mothers' employment prior to school entry over time



Note: The proportions are weighted using BHPS weights.
Source: Sample of mothers with school entry from waves 1–13 (1991–2003) of the BHPS. The average number of observations is 68 for the 'school entry with pre-school sibling' sample and 81 for the 'school entry with no pre-school sibling' sample. The number of observations for mothers with school entry and a pre-school sibling ranges from 41 in 2002 to 97 in 1993. The number of observations for mothers with school entry and no pre-school sibling ranges from 61 in 2003 to 101 in 1996.

[17]The 19 per cent figure is calculated using the facts that 39.8 per cent of mothers are in work in the June and that 20.0 per cent of those not working and 17.8 per cent of those working change their work status.

[18]The 19 per cent figure is calculated using the facts that 57.7 per cent of mothers are in work in the June and that 29.2 per cent of those not working and 11.4 per cent of those working change their work status.

One recent policy development that may have influenced the impact of school entry on mothers' work is the introduction of 12.5 hours of free nursery education for all 4-year-olds (from 1998) and all 3-year-olds (from 2004). In theory, this provision may blunt the impact of school entry by encouraging some mothers to return to work prior to the school entry. To examine whether there has been a marked change in mothers' work participation prior to school entry with the introduction of the policy in 1998, Figure 10 presents the proportion of mothers in work in the June prior to school entry over the 1991–2003 period.[19]

While there has been a slight upward trend in mothers working just prior to school entry, there is no marked change in the post-1998 period. It might be anticipated that free nursery education provision would have greatest impact on mothers who would not need to also provide care for non-eligible younger siblings (school entry with no pre-school sibling), but the proportion in work has remained almost constant in the post-1998 period for this group. There is some increase in work participation after 1998 for mothers with younger pre-school siblings, although (with the exception of 2003) the proportions in work are not unusually high by historical standards. This suggests that the impact of school entry on mothers' work participation has not been blunted by the introduction of the provision of free nursery education.

VI. Conclusions

The theory that gender differences in the formal labour market stem from the presence of children in the home is supported by many of the findings in this paper. In particular, there is a distinct point of divergence in men's and women's work behaviour when children are born and there is a very clear persistence of gender differences following childbirth. Although the years prior to the arrival of children are also marked by some distinct gender differences, particularly in the wage and hours of work, the magnitudes of these differences are of a much smaller order than those in the presence of children, suggesting that they either represent anticipatory effects of the impact of children or are driven by factors of much smaller significance.

The evidence is also broadly consistent with the view that newborns and new schools are critical times in women's employment. Births clearly mark a dramatic decline in work participation for women. The length of absence from work following a subsequent birth is closely related to whether the mother was in work between births, while maternity pay and leave entitlements appear to influence the precise timing of the return to work. In

[19]The change in 2004 cannot be examined as the sample ends in 2003.

addition, a return to work following birth is often only temporary: even in the absence of subsequent births, the likelihood that a mother will remain in work is much lower than would be expected from normal labour market dynamics. A child starting compulsory school at age 4 or 5 is also a critical time for mothers' work. The moderate rise in the aggregate rate of participation masks a high degree of turnover over this period: mothers with remaining pre-school children are unusually likely to leave work, while those with their youngest child entering school are especially likely to move back into work. The impact of these critical times on wages is more subtle: the gradual decline in women's relative wages appears to stem from the accumulation of several shorter periods of unusually low wage growth for women around the times of birth and school entry. Important changes in other work characteristics also occur around the critical times, particularly the sharp movement into part-time work following birth and the general transitions towards non-permanent positions and non-supervisory roles at both critical points.

Appendix: Variable definitions

Variable	*Definition*
Age	Age in years
Children	'Own' children under the age of 17 living in the household at the time of interview, including own natural, adopted, step and foster children
Number of children	Number of children
Age of youngest child	Age of youngest child
Broad children type	1. No children: combined 'before children' and 'no children yet' Before children: no current children but children reported in subsequent interviews No children yet: no current children and either aged under 33 or known fertility history without any previous children 2. With children: children currently living in household 3. After children: no current children but either children who have left the household (according to wave B fertility history or previous interviews) or children aged over 17 living in the household
Detailed children type	1. No children: as defined in 'broad children type' 2. First newborn: birth since last interview or in previous 12 months and no older children in the household 3. Subsequent newborn: birth since last interview or in previous 12 months and older children in the household 4. Pre-school children: youngest child under age 5 and no child entering school 5. School entry with pre-school child: child aged 5 on 1 September and sibling less than five years younger

Variable	*Definition*
	6. School entry with no pre-school child: child aged 5 on 1 September and no sibling less than five years younger
	7. Primary school: youngest child aged over 4 (and not school entry) and under 11
	8. Secondary school: youngest child aged 11 or over
	9. After children: as defined in 'broad children type'
Education	Highest qualification:
	0. None
	1. NVQ1 / Below GCSE
	2. NVQ2 / GCSE
	3. NVQ3 / A level
	4. NVQ4–5 / College
	5. Other
Ethnicity	Ethnic group:
	1. White
	2. Black
	3. Other
Health problem	0. No health problem
	1. Positive answer to either being registered disabled or 'health limiting type of work'
Partner	0. No partner
	1. Spouse or non-married partner, living in same household
In work	0. No work
	1. Did paid work or had a job last week and was not on maternity leave for current report; main activity was work and not on maternity leave for retrospective spells
Weekly hours	Usual weekly work hours (including usual overtime)
Full-time work	0. Usual weekly work hours <30
	1. Usual weekly work hours 30+
Hourly gross wage	Usual monthly gross pay divided by 4.3 and divided by usual weekly hours; trimmed to missing if less than £0.50 or greater than £75
Earnings	Usual monthly gross pay divided by 4.3 (= usual weekly gross pay); trimmed to missing if hourly gross wage is less than £0.50 or greater than £75
Employer tenure	Number of months with current employer or in current spell of self-employment, calculated using work histories from current and previous interviews and job history in wave C
Sector of work	Sector:
	1. Private (private firm or nationalised industry)
	2. Public (civil service / central government or local government or NHS / higher education)
	3. Other (non-profit organisation or armed forces or other)
Self-employed	0. Employed
	1. Self-employed

Variable	*Definition*
Permanent position	0. Non-permanent job (seasonal or fixed contract)
	1. Permanent job
Supervisory position	0. Non-supervisory position (not manager)
	1. Supervisory position (manager or foreman)
Work at home	Place of work:
	0. Employer / Business premises / Driving or travel / From van or stall / Client or customer premises
	1. At home / From home
Time of day worked	1. During the day
	2. am or pm (mornings only or afternoons only)
	3. Some evenings / nights (evenings only or at night or both lunch and evenings)
	4. Varies (rotating shifts or varies)
	5. Other
Firm size	Midpoint of category for how many people employed:
	1. 1–2 (midpoint = 1.5)
	2. 3–9 (midpoint = 6)
	3. 10–24 (midpoint = 17)
	4. 25–49 (midpoint = 37)
	5. 50–99 (midpoint = 75)
	6. 100–199 (midpoint = 150)
	7. 200–499 (midpoint = 350)
	8. 500–999 (midpoint = 750)
	9. >1,000 (midpoint = 1,500)
	10. Don't know: less than 25 (midpoint = 12)
	11. Don't know: 25 or more (midpoint = 1,000)
Experience	Number of months in work since leaving full-time education, calculated using work histories from current and previous waves and work histories in waves B and C
Year	Interview wave: 1991–2003 corresponding to waves 1–13 (A–M)
3–4 months' paid MA	Entitlement to 12–18 weeks' paid maternity leave at the rate of maternity allowance
	Eligibility estimated for mothers who had worked for any six months between 15 and four months prior to birth for births between September 1990 and March 1998, between 19 and four months prior to birth for births between April 1998 and July 2000, and between 15 months prior to birth and birth for births between August 2000 and March 2003
	(Includes mothers who may also be entitled to unpaid ordinary maternity leave (OML) of 14–18 weeks from November 1994)
3–4 months' paid SMP	Entitlement to 12–18 weeks' paid maternity leave at the rate of statutory maternity pay
	Eligibility estimated for mothers who had been continuously employed between nine and four months prior to birth for births between September 1990 and March 2003
	(Includes mothers who may also be entitled to unpaid ordinary maternity leave (OML) of 14–18 weeks from November 1994)

Variable	*Definition*
3–4 months' paid SMP and 6–7 months' unpaid leave	Entitlement to 12–18 weeks' paid maternity leave at the rate of statutory maternity pay and 29 weeks' unpaid maternity leave Eligibility estimated for mothers who had been continuously employed between 26 and three months prior to birth for births between September 1990 and April 2000 and between 14 and three months prior to birth for births between May 2000 and March 2003 (Estimated eligibility for the unpaid leave implies eligibility for the SMP paid leave)

References

Anderson, D., Binder, M. and Krause, K. (2002), 'The motherhood wage penalty: which mothers pay it and why?', *AEA Papers and Proceedings*, vol. 92, pp. 354–8.

Anderson, T., Forth, J., Metcalf, H. and Kirby, S. (2001), *The Gender Pay Gap: Final Report to the Women and Equality Unit*, London: Women and Equality Unit.

Barrow, L. (1999), 'An analysis of women's return-to-work decisions following first birth', *Economic Inquiry*, vol. 37, pp. 432–51.

Blau, F. (1998), 'Trends in the well-being of American women, 1970–1995', *Journal of Economic Literature*, vol. 36, pp. 112–65.

— and Kahn, L. (1996), 'Wage structure and gender earnings differentials: an international comparison', *Economica*, vol. 63, pp. S29–62.

— and — (2000), 'Gender differences in pay', *Journal of Economic Perspectives*, vol. 14, no. 4, pp. 75–99.

Brewer, M. and Paull, G. (2006), *Newborns and New Schools: Critical Times in Women's Employment*, Department for Work and Pensions Research Report no. 308, Leeds: Corporate Document Services.

Browning, M. (1992), 'Children and household economic behavior', *Journal of Economic Literature*, vol. 30, pp. 1434–75.

Burgess, S., Gregg, P., Propper, C., Washbrook, E. and the ALSPAC Study Team (2002), 'Maternity rights and mothers' return to work', University of Bristol, Leverhulme Centre for Market and Public Organisation, Working Paper no. 02/054.

Callender, C., Millward, N., Lissenburgh, S. and Forth, J. (1997), *Maternity Rights and Benefits in Britain 1996*, Department of Social Security Research Report no. 67, London: Stationery Office.

Dex, S., Joshi, H. and Macran, S. (1996), 'A widening gulf among Britain's mothers', *Oxford Review of Economic Policy*, vol. 12, no. 1, pp. 65–75.

—, —, — and McCulloch, A. (1998), 'Women's employment transitions around child bearing', *Oxford Bulletin of Economics and Statistics*, vol. 60, pp. 79–98.

Grimshaw, D. and Rubery, J. (2001), *The Gender Pay Gap: A Research Review*, EOC Research Discussion Series, Manchester: Equal Opportunities Commission.

Harkness, S. and Waldfogel, J. (1999), 'The family gap in pay: evidence from seven industrialised countries', London School of Economics, Centre for Analysis of Social Exclusion, CASEpaper no. 29.

Hudson, M., Lissenburgh, S. and Sahin-Dikmen, M. (2004), *Maternity and Paternity Rights in Britain 2002: Survey of Parents*, DWP In-House Report no. 131, London: Department for Work and Pensions.

Joshi, H. (1990), 'The cash opportunity cost of childbearing: an approach to estimation using British data', *Population Studies*, vol. 44, pp. 41–60.
— (2002), 'Production, reproduction and education: women, children and work in contemporary Britain', *Population and Development Review*, vol. 28, pp. 445–74.
— and Hinde, A. (1993), 'Employment after childbearing in post-war Britain: cohort study evidence on contrasts within and across generations', *European Sociological Review*, vol. 9, pp. 203–27.
—, Macran, S. and Dex, S. (1996), 'Employment after childbearing and women's subsequent labour force participation: evidence from the British 1958 birth cohort', *Journal of Population Economics*, vol. 9, pp. 325–48.
— and Paci, P. (1998), *Unequal Pay for Women and Men: Evidence from the British Cohort Studies*, Cambridge, MA: MIT Press.
—, — and Waldfogel, J. (1999), 'The wages of motherhood: better or worse?', *Cambridge Journal of Economics*, vol. 23, pp. 543–64.
Macran, S., Joshi, H. and Dex, S. (1996), 'Employment after childbearing: a survival analysis', *Work, Employment and Society*, vol. 10, pp. 273–90.
McRae, S. (1993), 'Returning to work after childbirth: opportunities and inequalities', *American Sociological Review*, vol. 9, pp. 125–37.
— (1996), *Women's Employment during Family Formation*, London: Policy Studies Institute.
Paull, G. and Taylor, J. (2002), *Mothers' Employment and Childcare Use in Britain*, London: Institute for Fiscal Studies.
Waldfogel, J. (1995), 'The price of motherhood: family status and women's pay in a young British cohort', *Oxford Economic Papers*, vol. 47, pp. 584–610.
— (1997a), 'The effects of children on women's wages', *American Sociological Review*, vol. 62, pp. 209–17.
— (1997b), 'Working mothers then and now: a cross-cohort analysis of the effects of maternity leave on women's pay', in F. Blau and R. Ehrenberg (eds), *Gender and Family Issues in the Workplace*, New York: Russell Sage Foundation.
— (1998a), 'Understanding the "family gap" in pay for women with children', *Journal of Economic Perspectives*, vol. 12, no. 1, pp. 137–56.
— (1998b), 'The family gap for young women in the United States and Britain: can maternity leave make a difference?', *Journal of Labor Economics*, vol. 16, pp. 505–45.
—, Higuchi, Y. and Abe, M. (1998), 'Maternity leave policies and women's employment after childbirth: evidence from the United States, Britain and Japan', London School of Economics, Centre for Analysis of Social Exclusion, CASEpaper no. 3.