Childcare and Mothers' Employment: Approaching the Millennium

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Abstract: *Childcare provision in the UK has evolved alongside the expansion of mothers' employment, transforming the experiences of successive generations. This paper reviews some mixed evidence on outcomes of maternal employment and offers a detailed examination of the working mothers' use of childcare. In particular, it looks at the differential use of formal and informal childcare provision using the first survey of Millennium Cohort Study, which is compared, as far as possible, with evidence from the earlier birth cohort studies in 1970 and 1958. The affordability and trustworthiness of formal childcare remains a constraint on its use and indirectly on labour supply for some mothers.*

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1. *Introduction*

The growth of the female labour force in the last decades of the Twentieth Century in Britain has entailed the emergence of paid childcare as an activity visible to the policy maker and (at least partially) to the National Accounts and Audit Office. Not only does it almost entirely employ female workers, it permits many more women to participate in other sectors and contribute cash to family income. In conjunction with maternity leave and other employment provisions relating to family responsibilities, paid childcare can assist in increasing the size of the female labour force and also help sustain its long-term productivity. It conserves human capital by helping women maintain career continuity, and helping them and/or their employers avoid the cost of retraining when mothers only return to the labour market after a long break (Joshi and Davies, 1993). Affordable childcare has also become an important part of the income maintenance strategy in assisting low income families, particularly lone mothers, from welfare to work as part of the Child Poverty target.

Freeing maternal time for paid work is only one reason for investment, public or private, in the provision of non-maternal childcare. Another fundamental aspect is its impact on the current and future well being of children. It can contribute both to children's consumption and to investment in their future education and productivity. This distinction is closely related to the dual function of childrearing (and formal education) in custody and cultivation.

Making sure children are safe, healthy and learning is the responsibility of parents and society more generally. In practice, the care of children is provided from various sources: the family, the informal economy, the private market and public provision. Child rearing has a mixture of custodial and developmental functions, the balance of which varies by the age of the child, and many other factors including time and place.

Most people would agree with Ermisch (1989) and Abraham and Makie (2005) that there are limits in the extent to which childrearing tasks would normally be provided outside the family, however expert the professionals. Likewise few would expect parents to be the only agents involved in educating the next generation of citizens. The child-care 'industry' is at a shifting interface between the economy and the family.

Purchased formal childcare does more than provide a custodial service for employed mothers, it is also used by other families where the mother does not have a job. Moreover, it is also not the only or exclusive means by which employed mothers make arrangements for children who are not old enough to look after themselves. An important facility is the right to leave from employment for parental purposes such as maternity, paternity and other parental leave. There is the possibility of looking after the child while working (self-provision) e.g. while working at home, or of using family or other informal care-giving. For children aged 5 and over the major source of 'cover' is the school. Indeed as the Atkinson Review (2005) notes, schools are producing more than one output: 'educating children and providing childcare' (para.6.22).

The growth of women's employment has reflected the facilities available for children at increasingly young ages, and it is widely believed that further expansion of women's employment in terms of hours or participation has been, or remains, constrained by the availability of affordable childcare. Yet there may be limits on both the parental demand side and the supply of childcare workers to underpin further expansion.

The costs and benefits to the child are a concern both for parents and policy makers. The extension of early years educational services to pre-school children has

potential long term benefits in terms of child development as well as facilitating maternal employment.

Although the 'education' of children, broadly defined, becomes visible as children encounter paid teachers in schools or pre-schools, upbringing is in fact a process which starts, and continues, in the family. The New Home Economics literature based on the household production model posited by Gary Becker (1991), offers a rationale for the reason why childcare has been traditionally seen as an issue for mothers' rather than fathers' employment. The family is thought of as a production unit, where each member of the unit specializes in a particular aspect of family production, depending on each member's comparative advantage. A gap between the pay of men and women, would reinforce (and be reinforced by) the traditional division of labour between market and home production for men and women. Specialization would be most extreme in families with young children where, biological differences would mean that mothers tended to take care of children at home, while fathers went out to work. However, Ermisch (1989) has elaborated the New Home Economics Model to allow for the possibility of purchased childcare. Where the mother's wage is sufficiently high, or the cost of childcare sufficiently low (or subsidized), specialization between parents need not occur (nor need the inhibiting effect of high women's wages on fertility).

The relationship between the cost of care and maternal employment decisions may also play a role in the types of care chosen by parents. A basic rational choice model predicts that a mother will decide whether or not to take paid work (or for how many hours) having weighed up the expected costs and benefits of doing so. This will depend on her wage minus the cost of childcare. Lack of affordable childcare (where childcare costs are high relative to wages) may constrain a mother's employment decisions, both in terms of her decision of whether to work but also for how many

hours she works if she does.. A number of empirical studies have confirmed this negative relationship between childcare costs and maternal employment (see Blau and Robins 1989; Connelly 1990; Heckman 1974 for example).

This article attempts to review the combination of arrangements that British families have made to share the care of their children over recent decades, recognizing that the arrangements have a variety of sources from the informal, market and state sectors, a variety of purposes and a variety of consequences. Section 2 reviews the context of trends in mothers' employment and childcare use. Section 3 reviews outcomes for children of maternal employment and childcare arrangements in Britain over four decades up to 2001. Section 4 offers a detailed examination of new evidence of who makes what childcare arrangements in the Millennium cohort study which is compared with preceding cohort studies. Section 5 discusses constraints on both supply and demand of childcare services and the implication for labour supply, before we draw together our conclusions.

2. *Trends in Maternal employment and childcare use*

Over the years the need for home production was reduced in all advanced economies and women became freer to enter employment (Goldin 1990). The movement of women into employment was aided by increasing educational attainment of women and a narrowing of the gender wage gap,[1] which not only enticed women into the labour market but also increased their bargaining power within the family. Moreover, economic restructuring[2] shifted the focus of the economy away from manufacturing and toward the service sector where demand for physical strength was reduced and demand for less gendered skills, such as computing, greatly increased (Krueger 1993).

The extent to which responsibility for young children remained an inhibiting force on mother's employment varied across countries. In the early post-war decades, Anglo-Saxon countries more than others were characterized by mothers staying out of the labour market while they had young children. But at least by the 1980s there were countries which subsidized early education or day-care, such as France and Sweden, where the employment of mothers of young children was common (Joshi and Davies, 1992, OECD 1988).

In Britain, the post-war years have seen large increases in the number of women in the labour market, particularly mothers of dependent children, though the presence of children, especially young children, remained a barrier to labour force entry for longer. At the 1951 census somewhere around one in six of all mothers of dependent children were employed. This rose to 26 percent, 39 percent and 47 percent in the 1961, 1971 and 1981 censuses respectively (Joshi 1985). By the turn of the Millennium, the proportion reached nearly two thirds (65 percent in both 2001 and 2002 Labour Force Surveys) compared to 72 percent for women with no children in 2002.

The rise in employment rates of mothers started for those with school age children, employment rates of mothers with pre-school children remained lower for longer, rising from around 15 percent in the 1950s to 54 percent in 2001, with most of the increase occurring since the mid 1980s (Martin and Roberts 1984; Desai et al 1998; Twomey 2002). Even so, there still remains a considerable gap in the employment rates of women with and without children and women with differently aged children. In 2001 mothers with children aged 0 to 4 had an employment rate of 54 percent, compared to 74 percent for mothers of primary school aged children (5 to 10) and 79 percent for mothers of secondary school aged children (11 to 15) (Twomey 2005). These aggregate numbers mask differences in maternal employment by full-

time/part-time status. Indeed, the presence of children, especially of pre-school age remains particularly inhibiting to full-time employment, which in 2001 stood at 18 percent of mothers whose youngest child was under 5; 26 percent for those with a youngest child of primary school age; 37 percent with a youngest child aged 11 to 15 and; 49 percent among women with no dependent children.

The increase in the employment of mothers has been disproportionately drawn from among higher paid and higher qualified women. Lone mothers are the least likely to be employed. In 2001 they had participation rates in full-time employment of 22 percent and in part-time employment of 27 percent. In contrast, married and cohabiting mothers of dependent children had full-time and part-time participation rates of 28 and 43 percent respectively (Twomey 2002).

The increase in participation by mothers of ever younger children reduced the break in employment after childbearing that it had been customary to take and involved greater numbers of women not breaking their employment careers by more than permitted for maternity leave. In the 1980s and 1990s, the extension of maternity leave provisions, coupled with the use of mainly private sources of childcare, enabled an increasing number of mainly more highly educated women to sustain continuous careers. They were the ones who could afford to purchase childcare rather than provide it all themselves, leading to a polarization of 'work rich, time poor' couples and those on low incomes where mothers still tended to stay at home (Dex et al 1996).

The increase of mothers in the labour market has created new challenges for the family and other institutions responsible for childcare. For most mothers with young children below school age, employment requires finding an alternative source of childcare. For those with school aged children, the supervision provided at school

may need supplementing. The type of childcare used varies considerably, from relying on a grandparent to hiring a child-minder or a nanny.

A very broad distinction that can be made between the various forms of childcare is between formal and informal care. Formal arrangements include day-nurseries, playgroups and child-minders, while informal care includes care provided by partners, relatives, older children, friends and neighbours[3]. Broadly speaking the formal arrangements are likely to involve paid employment of the care givers, most of which will appear in the incomes and / or expenditure sections of the National Accounts, even if the service is free to the families using it. Some informal care may be remunerated in cash rather than kind or reciprocal obligations, but for the purpose of this paper we assume that few of these informal cash transactions are formally recorded and that informal childcare is part of the informal economy.

Since the 1990s, the government has encouraged the movement of mothers to work partly as a way for families with young children to avoid or escape poverty, particularly single mothers. A range of initiatives were set in place to make employment a viable option for working parents and to offer alternative childcare arrangements. In 1990 employers who provided workplace childcare were offered tax relief (but there were very few of these). There were increasingly generous disregards for childcare costs in the in-work benefit, Family Credit, starting in 1992 (Finlayson et al 1996). Until the New Labour government of 1997, policies lagged behind arrangements made privately. Then the introduction of the National Childcare Strategy in 1998 (DfES 1998) signalled a change of emphasis. It included an increase in the provision and accreditation of facilities across local authority, private and voluntary sectors and a cash subsidy to low income users of formal childcare which was part of the Working Families Tax Credit (now the Working Tax Credit) . This currently allows parents to claim up to £175 per week for 1 child and between £200

and £300 per week for 2 or more children, attending approved settings. There are obstacles to public subsidy of unregulated providers. The expansion of childcare services in England involved local partnerships first in disadvantaged areas in the National Neighbourhood Nurseries Initiative and Sure Start, with flagship Early Excellence Centres integrating childcare and early education. In its 2002 Child Care Review, the UK government reaffirmed its vision of good quality, affordable childcare for all parents and a commitment to increase the budget for early years and childcare (Strategy Unit 2002). The most recent commitment from the government towards the provision of childcare services was the introduction of the Childcare Bill to Parliament on 8th November 2005. The Bill aims to further integrate childcare and early years education with the onus on local authorities to ensure childcare provision meets the needs of working parents and to improve the outcomes of all children under 5 by introducing the Early Years Foundation Stage to teach 3 year olds maths, language and literacy skills.

Table 1: Childcare arrangements of parents of dependent children

	1980 Employed Mothers	1994 Employed Mothers	2001 All Families
	%	%	%
No arrangement	50	33	44
Husband/Partner	31	33	
Child's Grandparent	17	32	24
Older sibling	5	18	3
Other relative (or friend 2001)	6		10
Any non-parental informal arrangement	28*	n.a	37
Childminder	10	11	5
Person employed in child's home	5	2	3
Any day nursery or crèche	5	5	10
Any nursery school or playgroup	1	6	13
Other arrangements (including out of school club)	1	4	6
Any formal	22*	28**	31 ***
Out of school **Sample size** **(all mothers of dependent children, with jobs)**	*1367*	*3438*	*5416*

Percentages do not add to 100 as more than one type of care may be used.

*subtotals within sectors do not correct for overlap of use within them

**this figure is reported for the 3087 cases excluding those where the father is not employed

*** Proportion of families with *working* mothers using any formal childcare is 33% (Woodland et al p 212)

Sources:

1980 – Women and Employment Survey, Martin and Roberts 1984 Tables 4.9 and 4.10. Arrangement during term time. Great Britain.

1994 – PSI/DSS programme of research in Low Income Families, Finlayson et al 1997. Referees to survey week whether or not term time. Great Britain.

2001 – Repeat Study of Parents' Demand for Childcare, Woodland et al NCSR 2004 edition. Table 3.7, Arrangements in reference week. England only.

The way British families have combined different sources of childcare use over a 21 year period from 1980 to 2001 can be seen in Table 1. The changing incidence of its use and its changing visibility make it difficult to present the information in a completely consistent way as noted below and in the notes to the table. Nevertheless, it is evident that there has been a rise in the proportion of families

making arrangements for children. Informal sources remain more numerous than formal.

These results are not just produced because of the increased employment of mothers. The earlier two years data refer only to families with working mothers but the 2001 data include families where the mother is not employed and it is apparent in Woodland et al (2004) that these families also use most types of childcare/early education.. Overall, the proportion of working mothers of children of all ages who had any sort of formal arrangement (in a week) of 2001 was 33 percent, so there is consistent evidence of rise in the use of formal arrangements since 1980 among them, from 22 percent to 33 percent[4]. Other survey data from the early 1990s continues the picture of most childcare arrangements being informal (Witherspoon and Prior 1991; Meltzer 1994; Ward et al 1996 and reports of the DWP's FACS survey which followed the Low Incomes survey quoted in Table 1). Ward et al (1996) report on childcare use in 1991 by employed mothers born in 1958. Nearly half (48%) used informal care apart from partners and 20% used some formal arrangement, with 8% overlapping.

It is a sign of the times that these comparisons are difficult to make. Childcare arrangements for non-employed mothers were not reported in the earlier surveys, while the later survey focused on the employment status of both parents, where present, presenting very few analyses identifying families with employed mothers. By this time, all parental care, whether by the mother or the father is regarded as outside the scope of a childcare enquiry, whereas father care is visible as at least one of the arrangements used in 1980 and 1994. Half of the working mothers in 1980, and one third in 1994, reported no arrangement at all. This reflects the younger age composition of the children concerned in 1994. Noteworthy too is the incidence of grandparent care (mostly grandmothers) 17 percent in 1980, 32 percent in 1994, back

down to 24 percent in 2001, where it nevertheless formed the provider supplying the greatest number of childcare hours.

Table 2 Childcare Arrangements of Children 0 – 14 in England 2001 and 1999

	Age group of child					**%**
In reference week:	**0 – 2**	**3 – 4**	**5 – 7**	**8 – 11**	**12 – 14**	**All children**
No non-parental care	46	20	51	58	74	52
Informal only	24	12	26	27	22	23
Mixture	9	21	6	4	1	7
Early years education and formal childcare only	20	46	16	11	3	17
'Registered Formal:'						
2001	23	32	14	12	3	15
1999	17	29	9	8	2	11
Weighted base 2001	*1523*	*1150*	*1776*	*2359*	*1531*	*8339*
Unweighted base 2001	*1548*	*1184*	*1866*	*2454*	*1605*	*8657*
Weighted base 1999	*1646*	*1146*	*1918*	*2433*	*1620*	*8761*
Unweighted base 1999	*1490*	*1013*	*1643*	*2105*	*1442*	*7693*

Notes: Children in all families, including those with non-employed mothers or fathers
Informal Grandparents, non-resident parents, other relatives, friends and neighbours.
Registered Formal: National Childcare Strategy definition of 'formal' excludes unregistered childminders, pre-school provisions offered for less than 3.5 hours per day and paid care in own home such as nanny/au pair. These are included in **formal** care, broadly defined, in rows 3 and 4.

Source: 2001 – Repeat Study of Parents' Demand for Childcare, Woodland et al NCSR 2004 edition. Tables 3.22 & 5.14.

Table 2 presents further details of childcare use in England in 1999 and 2001, by the age of the child using the service. There is one observation per child, nearly two per family in the 2001 column of the previous table. Again there is no condition that the mother must be employed, but, unlike Table 1, the first 4 rows add to 100 because multiple uses have been summarized into four categories: no non-parental care; informal only; formal only and a mixture of the latter. Only 7 percent of children experience mixed care modes. This is more common at the family level, as families with more than one child use different sorts of care. As the table shows, the use of the different sectors varies by child's age. The three to four year olds have

most care provision - they are not old enough to attend school (not counted as childcare here) but old enough for a variety of provisions, notably playgroups and nursery schools, as witnessed by their 46 percent attendance at 'early years education and formal childcare'. Including the 21 percent attending a mixture of formal and informal gives 67 percent of these children exposure to some formal care, broadly defined, in contrast to older and younger children. The school-aged children encounter relatively few formal arrangements (such as after school care) as they get older, but remain around one third users of informal care throughout primary school years. The children under 3, who include the generation surveyed in the Millennium Cohort, are nearly half (46 percent) looked after exclusively by their parents. Like the 5 to 7 year olds there are about one third receiving informal care, of which 9 percent of children have both formal and informal arrangements. Apart from this overlap, another fifth (20 percent) of children receive non-parental care exclusively from formal providers[5].

The second panel of this table uses a more restrictive definition of 'formal providers' to include those within the purview of the National Childcare Strategy. It includes all children receiving any of these services regardless of whether they also receive other services, informal or 'unregistered formal'. It shows that in 2001 15 percent of children received registered formal services, 23 percent if they were aged under 3 and 32 percent if they were aged 3 to 4 years. The row beneath the 2001 results, derived from an earlier survey in 1999, confirms that these services were spreading under the aegis of the strategy. The overall rate of receipt had risen 4 points in two years from 11 to 15 percent, and for the youngest group registered childcare use had gone up 6 points from 17 percent to 23 percent.

Before turning to further details on the sorts of families making childcare arrangement in cohort survey data, we review the literature on the outcomes for children.

3 Outcomes for Children

This is a contentious and complex issue. Traditional views that a good mother is someone who 'is there' for their children and who prioritizes her child's needs over her own (including employment related needs) colour the way in which many people regard maternal employment (Dex 2003). On the traditional view, separation of mothers from young children is thought of as bad for a child's emotional and cognitive development. In the case of infants, this reflects a simplification of psychological 'attachment theory' (Bowlby 1951) which not only stressed an infant's need for continuity and stability of contact, but originally assumed that this could come only from one parent. Theoretically a mother's employment might be thought of as being negatively associated with child development because it deprives the child of time spent with his or her mother; impeding bonding between mothers and infants and perhaps slowing brain development. Moreover, time spent at work reduces the nurturing and teaching time a mother would spend with a child and thus, both emotional and cognitive development are potentially delayed.

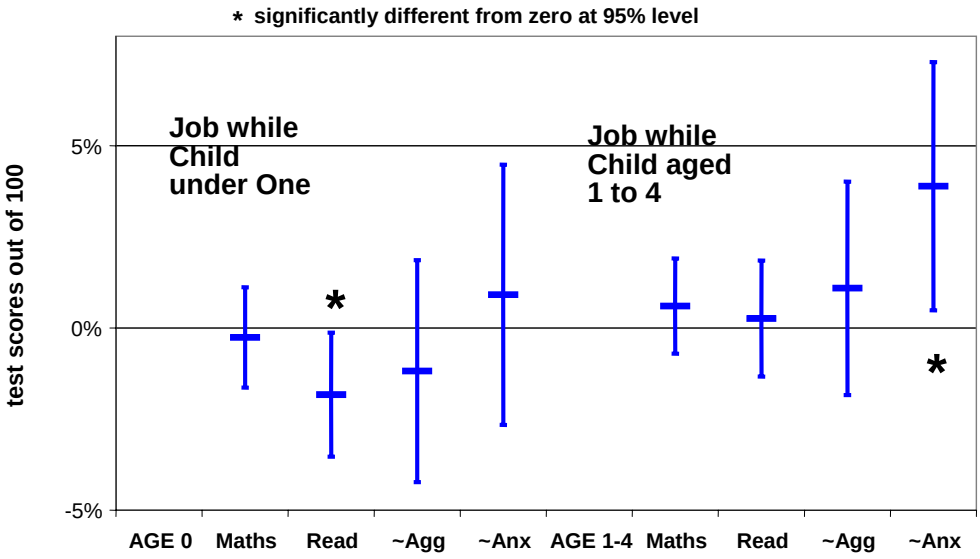
As practice and attitudes change, there is also growing evidence about outcomes for children. Most of that relates cognitive and behavioural outcomes to the experience of day care settings and comes from the USA where young children frequent such settings more commonly. The consensus, emerging from research to date, is that long hours of non-maternal childcare for children under the age of 3 can have adverse effects on children's development, but this varies according to individual circumstances. Additionally, there is recognition that there can also be

beneficial effects for children with working mothers. How children suffer (or benefit) depends on the quality of alternative maternal care (see National Institute of Child Health and Human Development Early Child Care Research Network, 1997; Love et al., 2003; Desai et al 1989; Brooks-Gunn et al 2002; Han et al 2002).

Examples of studies linking maternal employment to child outcomes in the US include Blau and Grossberg (1992) who use the National Longitudinal Survey of Youth (NLSY) and find a negative effect on a picture vocabulary test for 3 and 4 year old children whose mothers were employed within the first year of their child's life (but a reverse sign on employment in the second year). Han et al (2001), using the same source, find the negative effects of maternal employment during infancy on cognitive scores at ages 3 to 4 persist for some children to age 7, when there are also negative behavioural outcomes for some, but not all.

In the UK, Ermisch and Francesconi (2001), using evidence from the British Household Panel Survey (BHPS) find modest negative effects of having a working mother for children aged 0 to 5 on their educational attainment as young adults, as did Joshi and Verropoulou (2000), for educational attainment (but not other early adult outcomes) in the 1970 birth cohort.

Figure 1 Estimated Effects of Mother's employment on child scores



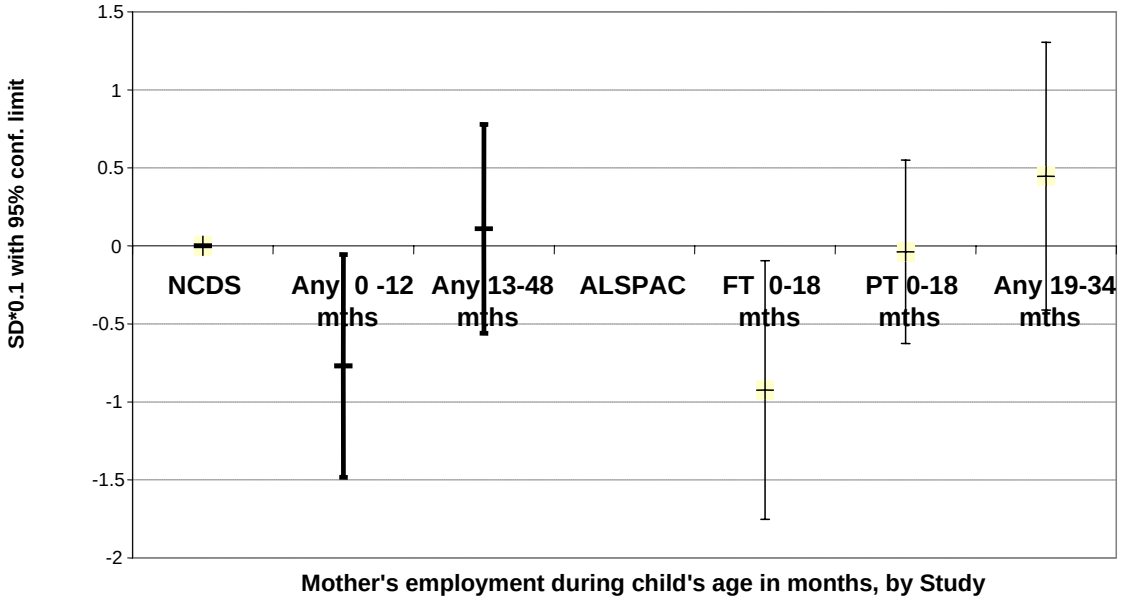
Source: Second Generation of 1958 cohort surveyed in 1991

The same authors, examining the second generation children in the NCDS, born mostly in the early 1980s and assessed when their mothers were all aged 33, found a significant negative association between maternal employment in the first year of a child's life and reading scores in later childhood (Joshi and Verropoulou 2000). Figure 1 shows the estimated impact on four child development scores, measured at various school ages, according to whether or not the mother had been employed in the child's pre-school years. We look separately at employment at any time in the first year of the child's life and at any employment between the first and fifth birthday. The scores, measured out of 100, are for reading, maths and behavioural adjustment in a direction away from aggression and anxiety. The children were assessed at ages ranging from 5 to 17; their average age was about 9. Details of the model from which these estimates are taken are given in Appendix 1. Of the 8 estimates plotted, only one is significantly negative. The positive result for the anxiety outcome associated with maternal employment in the later pre-school years

suggests the possibility of benefits to social adjustment from the presumed exposure to other children before age 5.

The finding of relationships between cognitive outcomes and employment resembled those of Gregg et al (2005) following children born in Avon in 1991 to 1992 up until age 7 (see Figure 2). They also find a significant negative association with literacy at age 7 of a mother's full-time employment in a child's first 18 months, but in each study the magnitude was modest, and associations with other outcomes were either not significant or were of the opposite sign. The probability of maternal employment having an impact on reading rather than other outcomes was also found in the analysis of assessments at age 7 of the original members of the 1958 birth cohort (Davie et al 1972).

Figure 2 Estimated impact of early maternal employment on reading/literacy scores compared with no job



Source: Second Generation of 1958 cohort (NCDS), authors' analysis in Appendix 1, and Avon Longitudinal Study of Parents and Children(ALSPAC), analysed by Gregg et al (2005)
Background variables controlled.

Although there was little information in the NCDS Second Generation Study on childcare arrangements at earlier dates before the age 33 interview, there was much more detail in the Avon Survey. Gregg et al's (2005) study also shows that the services of day care providers may be beneficial, since the children of mothers who worked full-time when they were under 18 months who attended day care centres appeared to be protected from any adverse effect of maternal employment. It was in the families who relied on informal care, particularly grandmothers, where the adverse outcomes were observed.

When it comes to formal day care at older pre-school ages, there is evidence of benefits to children of early education (NICHD 2002; Sylva et al. 2004). In the latter study, 'EPPE' followed a sample of English 3 year olds up to the age of 7, through a range of pre-school settings. They find that good quality pre-school attendance improves cognitive and behavioural outcomes once school starts and point out that the home learning environment also plays a role.

Another channel for a positive relationship is the fact that maternal employment increases family income which is positively related to child outcomes (Stafford 1987, Joshi & Verropoulou 2000). Moreover, Bianchi (2000) argues that despite the increased labour force participation of mothers in the US, the time they spend with their children and the attention they give to them has remained relatively constant. Working mothers try to maximise their time with children and fathers spend more time with their children than in the past. In addition, increases in educational attainment of parents and maternal experiences in the labour force are positively associated with the improved ability to stimulate and educate young children.

The rather fragmentary evidence suggests that early maternal employment had more impact on educational outcomes for children born earlier, taking the results for children born in 1970 (Joshi and Verropoulou 2000) or later that decade (Ermisch and

Francesconi 2001) than for children born in the 1980s (Figure 1) or in Avon in 1991 to 1992. A possible explanation for this could be that the later cohorts have only been observed at relatively young ages and that possible cumulative or 'sleeper' effects could worsen their outcomes in later teenage years.. Or it could be that the childcare provision likely to have accompanied the early maternal employment has changed in such a way that one might be more optimistic about the likely long-term impact on children.

To examine this we therefore turn to some very recent and historic information about childcare arrangements made for young children as revealed primarily in the National Birth Cohort Studies.

4 Evidence on Childcare arrangements

It is possible to use three British Birth Cohorts (see Appendix 2 for details) to examine the growth of employed mothers over time, in particular the percentage of mothers (of pre-school children) in each of the cohorts who were working after the birth of their child. In due course it will be possible to track the outcomes for children with different parental employment and childcare arrangements, but so far results from the Millennium Cohort are only available for the first Survey, when the cohort were babies aged 9 to 10 months. We can look back at the early years of the two preceding birth cohorts, but conditions were different. The information on the 1958 cohort children was collected from their mothers at age 7 in 1965 and covers the whole 5 year period before the child went to school. Similar, but not identical, questions were put to the mothers of the 1970 cohort when the children were 5 years old in 1975. These cohorts span the years when cross-sectional employment rates for mothers of pre-school children rose from around one in six in the 1960s to one in four in the 1970s and to over one in two in the 2000s.

Fourty-nine percent of mothers in the Millennium Cohort were in work by the time the babies were 9 months old (Table 3). This compares with 48 percent of mothers of the 1970 Cohort over all five pre-school years and 29 percent of mothers of 0 to 4 year olds in the 1958 Cohort. It is important to note that these earlier surveys yield longitudinal measures over a 5 year reference period, which produces a higher incidence of employment at some point in the period than the conventional cross-section. The surveys do not record how many would have been in employment by the time the child was 9 months old, but it is clearly considerably less than the rate recorded in 2001. Also the 49 percent recorded here in the MCS for mothers of infants aged 9 months is not far below the employment rate that year for mothers of all children under 5 in 2001 (54 per cent) suggesting that a substantial proportion of mothers are returning to employment relatively early in the pre-school period.

Table 3 Percentage of mothers in employment across the three birth cohorts (and WES)

	NCDS 1958-1963 (0-4 years)	**BCS70 (Child 0-4 years)**	**WES 1980 (Cross section of children 0-4)**	**MCS (Child at 9 months)**
Percent	29	48	27	49
Base sample nos Mothers	*13966*	*11474*	*1038*	*18484*

Note NCDS reports mothers having any paid work before the child went to school
BCS70 reports mothers having any paid work at up to the age 5 interview which job started more than a year earlier
WES has a much shorter reference period of one week, and collects the current position of a cross section of women with children under 5.
MCS has a week's reference period and refers to mothers with children all aged 9-10 months in 2001-2 All MCS percentages are weighted. This estimate from Dex and Joshi (2005) Table 8.1
All surveys cover Great Britain, MCS also includes Northern Ireland and hence covers UK.

We can compare the characteristics of employed mothers in each of the cohorts. The employed can also be compared with all mothers, including the non-employed in the same cohorts. When we do this (Tables 4a, 4b and 4c) we can see that working mothers in MCS are older and less likely to be lone mothers than non-employed MCS mothers and both working and non-working mothers in the other two cohorts. Three quarters of MCS working mothers were working part–time when their baby was nine-months old. Nearly two thirds of employed mothers were in relatively skilled groups of the National Socio-Economic Classification: Professional and Managerial, and Intermediate. For the BCS70 (Table 4b) the classification of occupation is not identical to that used in MCS but it is clear that the occupational status of MCS working mothers is higher than that of BCS70 mothers. The proportion of mothers working part-time in MCS is also higher compared to both other cohorts. Table 4c for NCDS, uses a similar classification to Table 4b but on the occupations of fathers, rather than mothers, for whom, in 1965, this was not asked. Fathers who are partnered to employed women are clearly of lower socio-economic status than those partnered to non-employed women. It seems likely that for the earlier cohort employment of mothers is more widespread among those who are worse off.

Table 4a. Characteristics of mothers in the Millennium Cohort Study (MCS)

	All mothers	**Mothers employed when child aged 9 months**
Mean Age at birth	29.0	30.0
Percent of mothers:	%	%
Age at baby's birth		
19 years or less	7.0	3.2
20 to 29 years	43.7	41.0
30 to 39 years	47.0	53.3
40 and older	2.3	2.5
Living in a family with		
partner and cohort child	34.9	45.4
partner, cohort child and other children	49.8	47.5
single adult and cohort child	7.6	4.4
single adult ,cohort child and other children	7.7	2.7
Working part-time	-	75.5
Working full-time		24.5
Manager or professional	-	43.3
Intermediate occupation	-	21.4
Small employer	-	5.6
Low supervisory position	-	4.6
Semi-routine and routine position	-	25.1
Unweighted observations	*18337*	*7860*

- Not applicable

Percentages are weighted. Sample numbers unweighted, after deletion of cases with missing data.

Table 4b. Characteristics of mothers in the 1970 Birth Cohort (BCS70)

	All mothers	Mothers employed when child under 5
Mean Age at birth	25.8	25.8
Percent of mothers	%	%
Age at baby's birth		
19 years or less	10.2	10.7
20 to 29 years	66.4	66.1
30 to 39 years	21.2	21.1
40 and older	2.1	2.1
Living in a family with		
partner and cohort child	9.2	11.7
partner, cohort child and other children	85.0	81.4
single adult and cohort child	1.5	2.1
single adult, cohort child and other children	4.3	4.8
Working part-time	-	71.7
R.G Social Class (based on current employment of mother when child age 5)	-	
I Manager or professional	-	0.6
II Intermediate occupation	-	15.9
III non-manual	-	29.6
III manual	-	8.9
IV semi-skilled	-	33.7
V unskilled	-	11.3
Observations	*11400*	*5559*

- Not applicable

Table 4c. Characteristics of mothers in the 1958 Birth Cohort (NCDS)

	All mothers	Mothers who had been employed 1958-1963 (child 0-4 years)
Percent of mothers	%	%
Living in a family with		
partner and cohort child	8.1	10.4
partner, cohort child and other children	88.1	82.8
single adult with cohort child	0.8	1.7
single adult, cohort child and other children	3.0	5.1
Working part-time	-	69.4
R.G Social Class (based on current employment of father when child age 5)		
I Manager or professional	5.3	3.1
II Intermediate occupation	14.7	10.3
III non-manual	10.0	9.0
III manual	45.5	47.8
IV semi-skilled non-manual	1.8	2.3
IV semi-skilled manual	16.1	18.9
V unskilled	6.6	8.6
Observations	*14585*	*4144*

- Not applicable

Comment [H1]: Georgia: isn't this the occupation of the FATHER? Can you provide data for the first column?

By necessity nearly all employed mothers have to rely on some form of non-maternal childcare while they are at work. In the most recent data available (MCS) 96 percent of employed mothers used non-maternal childcare. We examine the use of different types of care arrangements for pre-school children in the three British birth cohorts in Table 5. On the whole the picture is similar across all cohorts and reflects the general trend shown in Tables 1 and 2. The majority of care is informal[6].

Table 5. Broad types of childcare for working mothers of young children across the three birth cohorts and the 1980 Women and Employment Survey

	NCDS 1958-1963 (0-4 years)	BCS70 (0-4 years)	WES 1980 (Cross section of children 0-4)	MCS (Child at 9 months)
Informal only	73.5	19.9	74	62.9
Formal only		39.0*		25.1
Both formal and informal		41.1*		12.0
At least some formal	26.5	(40-80)	26	(37.1)
Observations	*4144*	*4246*	*276*	*7708*

Notes: Informal care includes self provision and care provided by partners, grandparents, other relatives and friends. Formal care includes nanny, childminder, nursery, crèche provision. In NCDS and BCS70 the care reported took place some time in the pre-school period, although not necessarily at the same time as the mother was working. Note also that these surveys have a longer reference period – 5 years- rather than one week in WES and MCS.
*Formal only in BCS70 and the mixed category each reduces to 20 per cent if 'playgroup only' is discounted (see note 6).

The broad categories of formal and informal care are derived from data on their constituent parts, shown in Table 6. These are multi-code categories reflecting the fact that families may make a variety of care arrangements for their children.

The largest provision for working mothers in the MCS and WES comes from the family: grandparents and partners. In the MCS 47 percent of employed mothers used grandparents to care for their child at some point and for 31 percent of employed mothers their partners looked after their child at some time. The corresponding figures for WES were 47 and 34 percent. In the 1970 cohort, it is not possible to identify grandparents from other relatives but nearly 39 percent of children in the BCS70 aged between 0 and 4 years old were looked after by a relative. A further 26 percent were looked after by their father.

Of the formal provision, the type of care provided is related to the age of the child. In the MCS the most common formal arrangement is provided by nurseries or

crèches. 18 percent of MCS mothers use this form of care with a further 14 percent of MCS working mothers using a childminder and 2 percent employing a nanny to look after their child. The formal pre-school arrangements reported retrospectively in 1965 and 1975 were not necessarily while, or because, the mother was employed. For the 0 to 4 year olds in the NCDS the most frequent form of formal care reported were state nursery schools and nursery classes. 24 percent of the 0 to 4 year olds in the BCS70 were also reported to have gone to state nursery schools before starting school, but the most frequently reported pre-school provision for this cohort was the playgroup with 52 percent of children (apparently) attending this type of setting (see note 6).

Despite problems of different definitions, age span of child and reference periods, it seems clear that the difference between the use of informal (only) care and the use of some formal care has been reduced, with more parents using formal arrangements in 2001-2002 in the MCS than in 1980 and the earlier NCDS period. The BCS70 results do not, unfortunately provide an unambiguous account of how much the children with working mothers were 'exposed' to different child care arrangements while their mothers worked.

Table 6. Any source of childcare for working mothers of young children: three Birth cohort studies and the Women and Employment Survey

	NCDS 1958-1963 (0-4 years)	BCS70 (0-4 years)	WES 1980 (Cross section of children 0-4)	MCS (Child at 9 months)
Partner	*	25.8	47	30.8
Grandparent	*	38.6	34	46.7
Other relative, friend, neighbour	*		7	13.5
Nanny	*	*	4	2.1
Childminder	*	6.9	16	13.6
Nursery/Creche	7.4	7.8	4	18.3
State nursery school or class	12.5	24.3	4	-
Private nursery school	4.9	8.0	1	-
Playgroup	5.3	52.2	3	-
Observations	4144	4246	226	7708

Notes: This table includes multiple child care arrangements so will not add to 100 percent. It excludes self provision. See note to Table 5 on the varying reference periods.
* not mentioned on questionnaire - not applicable to age of child

Table 7a. Combinations of sources of childcare for mothers in the Millennium Cohort Study

	Working Mothers			Full -Time Student Mothers
	Part-Time	Full-Time	All*	
Informal Only	68.0	46.7	62.9	57.0
Formal only	21.6	36.5	25.1	34.6
Both formal and informal	10.4	16.8	12.0	8.4
Observations	*5637*	*2041*	*7708*	*135*

See notes for table 2
* All includes observations where hours are unknown.

Table 7b . Combinations of sources of childcare for mothers in BCS70 (child 0-4)

	Part-Time	Full-Time	All
Informal only	18.4	23.6	19.9
Playgroup only	45.2	26.7	40.0
Other formal only	19.3	22.8	20.1
Both other formal and informal	17.1	26.9	20.0
Observations	*2966*	*1199*	*4246*

Playgroup arrangements shown separately (as it is not clear that many of them would have been for sufficient hours to be considered effective, formal childcare, see note 6).

Table 7c. Combinations of sources of childcare for mothers in NCDS1 (1965)

	Working Mothers		
	Part-Time	**Full-Time**	**All**
Informal Only	76.8	66.0	73.5
At least some Formal Care	23.2	34.0	26.5
Observations	*2877*	*1267*	*4144*

Notes: formal care includes LA and private nursery school or class, day nursery or playgroup

Table 7a looks at the main type of childcare used by MCS mothers depending on whether they work full or part-time, also distinguishing students. The results show clear differences between the various groups of mothers. Over half of full-time working mothers use some formal care for their child, 43 percent of full-time students and only 32 percent of mothers working part-time use any formal care. A similar picture emerges from the earlier cohorts in Tables 7 b and 7 c.

Among the working mothers in the MCS paying for any formal childcare, around 5 percent were receiving Working Families Tax Credit. to help pay for its costs. However, the majority of non-users of childcare may still not have been able to afford it. We use regression to examine several covariates of using formal childcare. Because the dependent variable is dichotomous (either employed mother uses formal childcare (1) or she does not (0)) a probit model is used in the estimation. The results are shown in Tables 8a (MCS) and 8b (BCS70 and NCDS).

For the MCS, older mothers, those who have no other children, those who work full time, mothers in professional jobs or with partners in professional jobs are more likely to use some formal child care. Since formal care tends to be specific to the age of child it is easier to use if arrangements only have to be made for one child. Moreover, the marginal cost of an extra child may also be lower in the informal sector than in the market for childcare places. The greater use of formal care by full-timers suggests that there may be higher costs to additional hours in the informal sector than

in the market. The association with high status occupations is likely to reflect greater ability to pay. It may also be the case that the greater use of formal care by mothers employed full-time reflects the non-availability of informal care on a full-time basis.

The other cohorts show similar patterns, to the extent that where comparable information is available, mothers working full-time were 11 to 13 percentage points more likely to use formal childcare in all three estimates. The presence of other children reduced the use of formal care by around 6 points in each earlier model and 10 points in MCS. Women doing manual (or routine) jobs were about 30 percent less likely to be using formal care in both MCS and BCS70 (where the inclusion of father's occupation made little further contribution to explaining variation). The social class of the mother's occupation was not collected in NCDS but the higher the social class of father, the more likely is the mother to use formal childcare. In none of the three samples of working mothers does lone parenthood make a difference, once employed. If playgroups are counted in formal care for BCS70 (not shown), the negative association with father's class is similar, the mother's occupation is weaker and the association with full-time employment is reversed. This finding confirms the suspicion that playgroups, at least at that time, were primarily a short-hours educational provision and not intended as custodial care arrangements providing support for maternal employment.

Table 8a. Likelihood of using formal childcare for employed mothers in the MCS

	Some formal care
Mothers age	.044*** (.004) [.016]
Non-White	-.356*** (.104) [-.130]
Presence of older siblings	-.275*** (.039) [-.100]
Mother works full-time	.349*** (.045) [.128]
Mothers occupation: **Intermediate**	-.429*** (.059) [-.147]
Mothers occupation: **Small employer and self-employed**	-.841*** (.093) [-.242]
Mothers occupation: **Low support and technical**	-.735*** (.093) [-.219]
Mothers occupation: **Semi-routine and routine**	-1.085*** (.061) [-.331]
Fathers occupation: **Intermediate**	-.329*** (.082) [-.112]
Fathers occupation: **Small employer and self-employed**	-.379*** (.068) [-.128]
Fathers occupation: **Low support and technical**	-.488*** (.070) [-.162]
Fathers occupation: **Semi-routine and routine**	-.664*** (.063) [-.215]
Lone mothers	.099 (.075) [.037]
Controls for region	Yes
Observations	*6929*

Note: Base category for mothers and fathers occupation: professional and managerial
*** significant at the 1% level; ** 5%; * 10 % (standard errors) [marginal effects]

Table 8b. Likelihood of using some formal childcare for employed mothers in the BCS70, 1970-5 and NCDS, 1958-1965

	BCS70 (Playgroup not 'formal')		NCDS	
Presence of other siblings	-.123** (.058)	[-.480]	-.255*** (.063)	[-.087]
Mother left school before age 15	.041 (.079)	[.016]	-.206*** (.055)	[-.069]
Mother works full-time	.302*** (.045)	[.118]	.320*** (.045)	[.107]
Mother's current occupation (1975) Reference RG Class I				
II	-.320 (.291)	[-.118]		
III non-manual	-.434 (.290)	[-.160]		
III manual	-.461 (.299)	[-.164]		
IV	-.538* (.291)	[-.196]		
V	-.527* (.298)	[-.185]		
Father's occupation: Reference RG Class I				
II	-.071 (.098)	[-.027]	-.301** (.132)	[-.089]
III non-manual	.070 .111	[.028]	-.421*** (.136)	[-.120]
III manual	-.060 (.093)	[-.023]	-.493*** (.122)	[-.156]
IV (non-manual in NCDS)	.036 (.104)	[.014]	-.489** (.186)	[-.132]
IV (manual in NCDS)			-.602*** (.130)	[-.168]
V	.115 (.131)	[.045]	-.490*** (.141)	[-.136]
Lone Mother	.013 (.159)	[.005]	-.035 (.146)	[-.011]
Controls for region	No		No	
Dummies for missing data	All significant		All significant	
Observations	*4246*		*4144*	

Note: Base category for mothers and fathers occupation : RG Social Class= I
*** significant at the 1% level; ** 5%; * 10 % (standard errors) [marginal effects]

5 Demand and supply constraints and other considerations

Childcare choice is likely to reflect the quality of the service provided, at least as judged professionally by expected impact on child outcomes. Characteristics of childcare quality commonly found to be negatively associated with child outcomes include group size and staff - child ratios. Positive associations are found between child outcomes and qualifications of care providers, stability of staff, the structure and content of daily activities and the space and facilities of the child care setting (Kisker and Maynard 1995).

This means that, on average, formal care settings (with qualified staff and a structured curriculum provided in specially equipped facilities) may be more associated with the positive development of a child than less formal childcare settings. In a model of childcare as a standard economic commodity – with a relationship between quality of care, costs and parental decisions about childcare – one would assume that parents would want their child to have good quality care and are prepared to pay for it (all else equal). If we believe parents are rational actors we would therefore expect most parents to opt for formal childcare arrangements, provided they feel comfortable about entrusting childcare to a market transaction, and can afford to do so. Yet evidence presented in this paper shows the majority of care is provided in the non-formal sector.

We can try to estimate whether decisions are influenced by income and cost by looking at factors associated with the hours of (formal) childcare purchased. These include the price paid for that care family income (equivalised), whether the mother works full-time[7], the area in which the family lives and other controls. Such detail is only available in the MCS. If the economic model of childcare described above is correct we would expect that as the price of formal childcare increases - then the quantity of formal care purchased should decrease. Also, on the assumption that

childcare is a normal good, an increase in income would shift the demand curve up, with a positive coefficient on the income variable. We can see from Table 9 that both these coefficients have the expected sign, implying elasicities of minus and plus 0.2 respectively. Although they may suffer from selection and endogeneity bias, these results are consistent with the idea that demand for formal childcare hours is related to its price and to the household income. This finding is consistent with the direct responses given to surveys that an important reason for not using formal childcare for some parents is that it is not affordable (eg. Woodland et al 2004).

Table 9. Determinants of (log) hours of childcare purchased in the MCS by employed mothers paying for care: Regression analysis of log hours

(Log) Cost of care per hour#	-.212*** (.053)
(Log) Income	.220*** (.033)
Mothers age	.003 (.073)
Non-White	.019 (.057)
Presence of older siblings	.072** (.028)
Mother works full-time	.444*** (.027)
Lone mother	.236*** (.044)
Mothers occupation **Reference Group Managerial and Professional**	
Intermediate	-.057* (.033)
Small employer and self-employed	-.297* (.161)
Low support and technical	-.097 (.069)
Semi-routine and routine	-.120* (.065)
Fathers occupation: **Reference Group Managerial and Professional**	
Intermediate	-.045 (.057)
Small employer and self-employed	-.067 (.048)
Low support and technical	-.023. (..043)
Semi-routine and routine	-.015*** (.051)
Controls for region	Yes
R-squared	.358
Observations	*1643*

Note: Base category for mothers and fathers occupation: professional and managerial
*** significant at the 1% level; ** 5%; * 10 %
# Before childcare tax credit

Another potential reason for not using formal childcare may be related to supply constraints. Indeed, many parents believe that there is a shortage of childcare options available in their area. Subsidies may not be effective if childcare places and trained staff are not available (Paull and Taylor 2002; Woodland et al 2004; Bell and Finch 2004). Paull and Taylor (2002) examined formal childcare provision at the end of the 1990s for preschool children in day nurseries, playgroups, child-minders, out-of-school clubs and holiday schemes. They show that if care was shared equally among all children each child would have care for one and a quarter days each week. This is likely to be an underestimate as their analysis excludes nannies and au-pairs but as these make up a relatively small part of the childcare market the underestimate should not be large. They conclude that levels of regular full-time formal childcare provision in 1999 could provide places for a minority of the child population.

Moreover, the analysis shows large differences in the provision of services across local authority areas. Some areas such as London have relatively good provision, others particularly in the North West have very low provision. In addition, some areas are shown to have very specialized provision: Inner London has high levels of day nurseries and low levels of playgroup and childminder places. So even in areas with a relatively high overall provision, parents might not find the type of care they prefer.

There was continuing evidence of unmet demand for formal care in the dedicated surveys of parents' demand for childcare in 1999 and 2001 reported by Woodland et al (2004), falling slightly over the two years. Among those already using care there was a considerable demand to include more formal care in the package of arrangements. In 2001 85 percent thought some formal provision would be ideal, including 72 percent who would like a mixture of formal and informal. There was also demand for more flexibility, also noted by Dex (2003). Only a minority of

working mothers (25 percent) wanted better childcare in order to increase their hours of work, but 60 percent of non-working mothers said they would go out to work or study with access to 'good quality, convenient and reliable childcare' (Woodland et al 2004).

Parents' decisions about childcare involve more factors than those that professionals perceive as relating to child outcomes. Parents tend to place greater emphasis on finding a safe and healthy environment (Kisker and Maynard 1995), trust, love, flexibility (from their point of view), a convenient location and convenient hours. Dependability of childcare arrangements (Dex 2003, Sonnenstein 1991, Blau 1995) may be an important element. This may be why, beyond its lower cost, mothers choose informal care by family members or friends even if the quality of care, on expected developmental outcomes may be low.

In particular the large role still played by grandparents, mainly in practice grandmothers in the care of babies at the turn of the Millennium illustrates that there is still an active frontier between the family the economy. Grandmothers may not have formal qualifications in child development, but they have a track record of having brought up their own children, and they have an ongoing relationship with the mother and the child which poses strong competition against the prospect of entrusting a young child to strangers. Where the care of children does involve strangers grandparent care can also provide a good complement.

Grandparents, as well of course as fathers, also have an opportunity cost of their time, which will tend to increase over time. Women born in the 1950s and 1960s, who are now becoming grandmothers, have greater earning power and attachment to the labour force than their predecessors. Their choices and constraints should also be recognised in the National Childcare Strategy and in employment policy towards people with caring responsibilities.

Conclusion

Evidence presented in this paper suggests that childcare use, both formal and informal, combines with parental time and formal education to produce care for children and release mothers' time for paid work for those who choose to do so. The balance of use varies with the age of the child, the circumstances and location of the family, and has varied over time. The evidence assembled here shows that informal sources of care continue to play an important role in the way families balance work and parenthood in the Millennium, particularly for babies. The characteristics of those families which use substantial formal care continue to be disproportionately those where parents are better off and the mother works full-time. The affordability of formal childcare remains a constraint on its use and indirectly on labour supply. One may anticipate more use of formal services by more families as children born in, and after, 2000 pass into their pre-school years. The longitudinal study of them will also start to produce evidence on child outcomes.

As women's work has been moving across the "Production Boundary" into the sphere of the paid economy, the business of child-rearing has also made a shift. Part of this shift is across the production boundary into formal childcare and the education sector, but it has also involved a reallocation of labour within the household, extended family and community. The economy is likely to have gained more from the utilization and accumulation of women's human capital than it has lost in the alternative resources devoted to the care of children not at school. However, is should not be assumed that these resources are themselves costless, in infinitely abundant supply, nor that all arrangements made are necessarily in the children's best interest. Options for mothers (and fathers) to spend more time in the self-provision of childcare, should be available and apppreciated as well as policies to make sure that

non-parental day care services cater to the development as well as the custody of children. While the latter has been incorporated into the 2005 Childcare Bill the former has not. Public policy should not ignore the needs of parents who chose to look after children themselves, to use informal provisions or to use a combination of childcare options. The need for parental inputs is particularly important at early ages, but not exclusively then. It is necessary to understand the interconnections between employment and family life and informal care. We need to ensure the productivity of all those involved in childrearing is preserved and promoted by encouraging mothers to maintain contact with the labour market after child birth. In addition the productivity of carers needs to be recognised and rewarded. Again, while the Childcare Bill aims to address this issue for formal carers, it should also be recognised that there are also many carers in the informal arena.

Parents need to balance work and 'life' which includes their caring responsibilities. Children need a balance between care, custody and education. This may come from a combination of sources. Families, employers and society at large, need there to be a choice of good quality options. In particular there is a need to recognise the opportunity cost of grandmother time, and for employment legislation to recognize caring responsibilities shared within the extended family.

There has been controversy about whether informal carers such as grandmothers should be eligible for Childcare credit. There is likewise controversy over this payment not being available to mothers who stay at home. The value of direct parental care has been recognised in the progressive extensions of parental leave. In moving away from a climate where any employment of a mother which separated her from a young child was frowned upon, there should not be a swing to a situation where full-time continuous employment is regarded as ideal or compulsory. There are a wide variety of combinations of arrangements being made, with varying

degrees of official recognition and support. Subsidization of good quality child care facilities should benefit the children, even if they are taken up by families who would have been willing to pay more, but the option for self-provisioning also needs support.

Non-parental childcare is not a panacea, but an important part of a bigger package of education, employment, income support, transport and social services. Flexible integration of the options and provisions remains a long-term challenge. Our prospective study of the many dimensions of the Millennium children's lives should chart the outcomes of the new century's childcare arrangements and continue to help policy makers pursue this cross-departmental goal.

[1] Due both to changing human capital more equal treatment (Joshi & Paci 1998).

[2]. It is widely believed that technological change was the driving factor behind the movement (see Berman et al 1998), Other explanations include the reduction of international trade barriers, or institutional changes such as de-unionisation (Freeman 1992).

[3] Formal Childcare is defined more narrowly for some purposes, e.g. the National Childcare Strategy, or eligibility for Child Care Credit, to exclude unregistered child minders, nannies and very short hours playgroups open for less than 3.5 hours per day. We refer to this definition as Registered Formal.

[4] Ignoring, among other things, the change in coverage from GB to England. Childcare is now a devolved policy area.

[5] The extent of diversity within the formal sector can be gauged from the following average places per provider : 36 in nurseries, 24 places in playgroups, and 4 per childminder (Paull and Taylor, 2002 data for 1999).

[6] Discounting the anomalous exception of playgroups in BCS70. The reports of play groups attended at some point in the years 1970 – 75 are substantially and suspiciously out of line with the cross-sectional reports from other Surveys (see Table 6). Even if this is not an undetected coding error, we would not necessarily take reports of such attendance as effective or 'formal' childcare, rather than play opportunities. They characteristically lasted for a, few hours per week and were run by voluntary groups, with unqualified and volunteer staff, including mothers themselves. Not until the National Child Care Strategy around 2000 were may of these groups run by qualified professional, and recognized as formal. It is also likely

that they were only attended for a relatively short number of months, judging by surveys around 2000 (Bell and Finch 2004).

[7] Ignoring, in this crudely descriptive exercise, the possibility that working full-time, or being in employment at all may be affected by the price of childcare.

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Appendix 1
Estimates of outcomes for children of the employment of mothers born in 1958: NCDS Second Generation

Table A1 shows means and standard deviations for the variables used in the analysis of the impact of mother's employment when the child was a preschooler on child outcomes when the child was school age. The data used come from the 2nd generation of the 1958 Cohort, NCDS (see Joshi and Verropoulou, 2000). The mothers were all aged 33 at the time of the survey, and the children were aged 5-17.

Table A1. Variable distributions: Children aged 5-17, NCDS Second Generation

	Mean	St. Deviation
Outcome Variables		
PIAT Math Score	0.479	0.199
PIAT Reading Recognition	0.514	0.238
External behavioural adjustment (non-aggression)[a]	0.679	0.246
Internal behavioural adjustment (non-anxiety) [a]	0.691	0.279
Baseline Predictors (child level)		
Child's age in months	108.95	38.245
Child's age squared (divided by 100)	14.618	15.989
Child's sex: female	0.507	0.500
Child's Birth Order	1.651	0.908
Child Level Predictors		
Interaction: Mother's Employment History by her highest qualifications		
First year of child's life		
Some employment	0.271	0.444
Employment missing	0.171	0.377
Child aged 1 to 4		
Some employment	0.573	0.495
Employment missing	0.110	0.313
Family level predictors		
Mother's educational attainment		
Less than 'O' Level	0.353	0.478
'O' Level	0.403	0.491
'A' Levels or more	0.245	0.430
First child born at 20 or earlier	0.319	0.466
Social housing	0.272	0.445
Mother's reading score at 7	0.801	0.206
Mother's general ability at 11	0.543	0.181
Maximum no. of cases[b]	1,730 children	1136 families

a. Mother's report on child behaviour .

b. Data present on at least one dependent variable. N of non-missing cases for each one: Maths 1,506; Reading 1,520; External Behaviour (Non-Aggression) 1,570; Internal Behaviour (Non-Anxiety) 1,579.

Table A2 presents regression coefficients, showing the impact of the explanatory variables on four child outcomes, with t-statistics. The analysis is based on the use of a multivariate multi-level model. The data are hierarchically structured: four outcomes are analyzed together for each child while children are nested within families. This is a slightly revised version of results reported in (Joshi and Verropoulou, 2000).

Table A2. Mother's Employment History when child is under age 1 and ages 1 to 4 and children's outcomes

	Maths		**Reading**		**Non-Aggression**		**Non-Anxiety**	
	b	**t-stat**	**b**	**t-stat**	**b**	**t-stat**	**b**	**t-stat**
Constant	-0.2260	-11.09	-0.3171	-12.33	0.4923	10.90	0.7116	13.87
Age	0.0058	51.79	0.0065	45.95	0.0008	3.29	-0.0010	-3.84
age squared	-0.0031	-15.29	-0.0034	-13.37	0.0005	1.13	0.0026	5.40
Girl	-0.0096	-1.90	0.0196	3.09	0.0824	7.22	-0.0442	-3.30
birth order	-0.0024	-0.69	-0.0159	-3.56	-0.0261	-3.34	0.0280	3.10
mother's employment when child under 1								
some work when child 0	-0.0026	-0.37	-0.0183	-2.11	-0.0118	-0.76	0.0091	0.50
missing work status when child 0	-0.0053	-0.51	0.0011	0.08	0.0039	0.17	0.0422	1.56
mother's employment when child aged 1 to 4								
some work when child 1 to 4	0.0060	0.90	0.0026	0.32	0.0109	0.73	0.0389	2.24
missing work status when child 1 to 4	0.0097	0.85	0.0019	0.13	0.0050	0.20	-0.0367	-1.23
mother's highest qual (ref: less than 'O' level)								
O' Level	0.0040	0.55	0.0250	2.76	0.0508	2.97	0.0309	1.60
A' Level or more	0.0255	2.86	0.0430	3.81	0.0409	1.96	-0.0103	-0.44
mother's reading score at 7	0.0428	2.54	0.0883	4.15	0.0338	0.84	-0.0355	-0.79
mother's general ability score at 11	0.1143	5.52	0.1391	5.32	0.1013	2.09	0.0378	0.69
became mother at 20 or before	-0.0330	-3.65	-0.0113	-0.99	-0.0112	-0.52	0.0076	0.31
Social Housing	-0.0232	-3.44	-0.0415	-4.87	-0.0542	-3.35	0.0087	0.48

Table A3. Variances and Covariances of the Model reported in Table A1

UNEXPLAINED ELEMENTS (multiplied by 100)		variance	s.e.	cov(m,r) variance	s.e.	cov(m,agr) cov(r,agr) variance	s.e.	cov(m,anx) cov(r,anx) cov(agr,anx) variance	s.e.
	mother	0,22	0,04	0,17	0,04	0,03	0,07	-0,09	0,08
				0,35	0,07	0,13	0,09	-0,06	0,10
						1,62	0,23	1,38	0,19
								1,44	0,30
	child	0,76	0,04	0,44	0,04	0,24	0,07	0,16	0,09
				1,21	0,07	0,35	0,09	0,10	0,11
						3,81	0,22	0,08	0,19
-2Loglikelihood		-5175,13						5,87	0,33

Appendix 2 The National Birth Cohort Studies

Three of the four national birth cohort studies are housed at the Centre for Longitudinal Studies, Institute of Education in an ESRC Resource Centre. All three of these studies, following births from 1958, 1970 and 2000-1, provide evidence used in this paper, as follows:

The **National Child Development Study (NCDS)** is a multi-disciplinary survey of all those living in Great Britain who were born in a week of March 1958. The original cohort size was 17,000 births. Follow up interviews took place with mothers when the cohort members were aged 7, 11, 16, and with the cohort members themselves at 16, 23, 33, 42 and 46. At age 33, the children of a one-in three sample of the cohort were also assessed. Those children who were old enough to complete cognitive tests and whose mothers were cohort members are studied in Appendix 1.

The **1970 British Cohort Study (BCS70)** is also a continuing, multi-disciplinary longitudinal study which takes as its subjects all those living in Great Britain who were born in a week of April, 1970, also around 17,000 births. Follow-up interviews took place with mothers when the children were aged 5, 10, 16, and data were collected directly from cohort members at 16, 26, 30 and 34 years. The latter survey also included a sample of cohort members' children.

The **Millennium Cohort Study (MCS)**, for which the sample population was drawn from all live births in the UK over 12 months from 1 September 2000 in England & Wales and 1 December 2000 in Scotland & Northern Ireland. The sample was selected from a random sample of electoral wards, disproportionately stratified to ensure adequate representation of all four UK countries, deprived areas and areas with high concentrations

of Black and Asian families. The original sample achieved was nearly 19,000 children. The first follow-up took place at age 3, and the third and fourth surveys are planned for age 5 and age 7, with further follow-up intended.

The fourth national birth cohort study, is the MRC National Survey of Health and Development of people born in 1946.

Full details about these studies can be found from the Centre for Longitudinal Studies,. www.cls.ioe.ac.uk, and the ESRC funded data sets are available from the UK Data Archive.