

# Foregone earnings from child rearing

*Changes between 1986 and 1997*

*When people think about the costs of raising children they generally include only the direct expenditure involved. However, there are other costs that are often ignored. A recent study looks at the impact of children on their mothers' lifetime earnings – a hidden cost of raising children.*



**MATTHEW GRAY AND BRUCE CHAPMAN**

**T**here are a number of costs to parents of raising children. These costs can be divided into two types: direct and indirect. Direct costs are the additional costs that a household has because of the presence of children. Indirect costs, on the other hand, refer to the loss of income that a household experiences because one or both parents spends time out of paid employment or takes a lower-paying job in order to look after the children.

There has been a great deal of research on both the conceptual issues surrounding the measurement of the direct costs of raising children as well as estimates of these costs (see AIFS 2000 for a summary). The indirect costs of raising children have received much less attention, with the only existing estimates for Australia being Beggs and Chapman (1988).

Using data on Australian women from 1986, Beggs and Chapman (1988) inferred that earnings differences between women according to the number of children they have were the result of choices made with respect to time allocation. That is, if a woman chose to spend time in child rearing activities this was seen to have a market “opportunity

cost”; earnings were foregone as a result of these activities. The study followed the methodology of comparing the earnings of women in regression analyses, controlling for a host of human capital, demographic and fertility characteristics.

That research suggested that in 1986 a first child was associated with a woman with secondary level education earning (after tax) over her lifetime about \$435,000 (in 1997 terms) less than women with no children. Second and third children were associated with about \$75,000 and \$55,000 lower lifetime earnings respectively (Beggs and Chapman 1988).

This paper reports on the results of research which conducts a similar exercise using contemporary information. It is always of interest to re-examine labour market relationships and their changing dimensions after a significant period of time. This is particularly true in a context of changes in female fertility and employment experience, which have been major social phenomena over the last half of this century.

In Australia in recent decades, women with young children have increasingly combined



Using the results discussed in this paper, Richardson (2000) argues that the total earnings foregone by Australian women each year is about \$37 billion. According to Richardson (2000: 24): “By extraordinary coincidence, this is the same figure as we calculated for the direct expenditure on children. We may conclude that the foregone earnings of mothers roughly doubles the cost of children to the family.”

### ***Estimating the foregone earnings from child rearing: conceptual issues***

The question asked in this paper is what is the difference in the lifetime earnings of a woman with a particular fertility pattern and what their lifetime earnings *would* have been had they never had children. In practice, we do not know what a mother would have earned had she never had children. The empirical approach adopted is to compare the earnings of women with children to those of childless women who are in other respects similar (in terms of a range of personal characteristics).

Lifetime earnings are determined by the stream of annual earnings which, in turn, are determined by whether or not a woman is employed and, if employed, the number of hours she works each year, and the hourly wage rate. The presence of children and the number and age of children may impact upon each of these factors which determine lifetime earnings.

The basic story is that raising children takes time, and that the issue concerns both how much time out of the labour market is involved, and at what rate the market values this time. Since earnings require employment, the effect of children on labour force participation is fundamental. Raising children affects parents' choices about whether to participate in the labour market. For parents who choose to do so, the presence of children affects choices about the number of hours spent in paid employment.

Child rearing can also affect the hourly wage rate in two ways. First, it impacts on women's labour market experience, an important wage determinant. Second, periods of absence from the labour market are associated with a diminution of the value of labour market skills, a process known as “atrophy” (Mincer and Polachek 1974). There is evidence for Australia that atrophy decreases women's wages (Rummery 1992).

As discussed above, what a woman would have earned had she never had children is unknown, and earnings losses are therefore defined as the difference between what a woman with a particular pattern of child bearing earns and what otherwise

employment, particularly part-time work, with motherhood. Possible explanations for this are increases in the availability of child care, increasing availability of maternity leave, and changes in attitudes – with younger women being likely to have positive attitudes to work.

Between 1986 and 2000 the rate of employment of women with a youngest child aged less than five years increased from 36 to 45 per cent. There has been a similar increase in the employment rate of women with a youngest child aged five to fifteen years, from 58 to 67 per cent (ABS Cat. No. 6224.0).

The analysis in this paper is therefore restricted to the impact of child rearing on mother's earnings. The main reason for this is that while things may be changing, child rearing still has a far bigger impact upon mothers' employment than it does on father's.

The results presented in this paper suggest that over the period 1986–1997 there has been a substantial fall in the foregone earnings from child

## ***Raising children affects parents' choices about whether to participate in the labour market.***

rearing. In 1997 a first child was associated with a decrease in after-tax lifetime earnings of about \$162,000. The additional earnings losses from second and third children is relatively small – an additional \$12,000 and \$15,000 respectively.

similar childless women earn. Empirically this is achieved using statistical techniques (regression analysis) which allow us to estimate the relative importance of a range of variables, including the number and age of children, in determining

earnings. This framework allows for the effects of measurable characteristics that are related to earnings to be taken into account. Characteristics include educational attainment, partner's income and labour market experience.



Of more significance are unmeasured variables, and what they might mean for labour market and fertility choices. There are a host of these, and it is likely that they are significant confounding factors in an interpretation of income differences as reflections only of the presence and number of children. The most critical are as follows.

of his wife. In particular, if the mother chooses to do less paid work because of a desire to spend time rearing children, it is highly probable that her decision will impact on the father's choice concerning both market time allocation and commitment in other ways to paid employment. Indeed, decisions about fertility and market time allocation for the household is a dynamic and ongoing process.

The broad point can be made another way. The so-called "forgone earnings from child rearing" should not be taken to be a measure of the direct cost of children, since whether or not to have children, and the number to have, will not be independent of other choices made in a household that have income consequences. Fertility is likely to be related to labour market opportunities. And because many variables are not measured, nor

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The decision to have a child, and after that, further children, is likely to reflect a woman's interest in and capacity to spend time rearing offspring versus time spent in the labour market. Related to this is that the choice to participate in paid work, and the number of hours chosen, will be conditioned in part by her comparative advantage in paid employment.

Fertility, child rearing and labour market decisions must be understood as reflections not only of the mother's decision, but also as choices made in the context of the household for at least two reasons.

First, a woman's choices will be conditioned in part by the characteristics of her partner. Usually these characteristics are ignored in the simple analyses of foregone earnings from child rearing, but should affect our interpretation of the effect of children on a woman's earnings.

Second, the husband's labour market decisions may be influenced by the labour market decisions

household decision modelled, the estimation techniques employed in the following exercise should not be interpreted simply as the market opportunity cost of children. However, the results are still an important indication of what the presence of children means for the loss of earnings.

### ***The Negotiating the Life Course Survey***

The data used in this analysis are from the first wave of an Australian random sample panel study initiated in the Research School of Social Sciences at the Australian National University in 1996 and known as *the Negotiating the Life Course Survey* (NLCS). The survey began in 1997 with the sample numbering approximately 2400 people, who were then aged 18–54 years. While the plan is to follow this group over a ten-year period, currently there is only one wave available, meaning that the analysis in this paper uses a single cross-section of data.

## **MODELLING LABOUR FORCE PARTICIPATION AND**

**T**he determinants of labour force participation and earnings are estimated separately as functions of individual characteristics, including the presence, age and number of children. This enables the relative effects of children on each of the labour market variables to be identified. The results of each of these estimations are then used to calculate the foregone earnings from child rearing.

Variables taken into account in the regression analysis include: marital status; labour market experience; length of employment with current employer (tenure); and attitudes about combining work and family and educational attainment. Theoretical models suggest, and empirical results have found, that the income of a

woman's partner is an important determinant of her labour supply decision; consequently the estimation includes this variable.

A more technical concern is that because the data are collected at one point in time, they do not allow us to capture the effects of changes in the relationships over time. But if there have been structural changes, not taking them into account imposes the incorrect assumption that the circumstances of an average 50 year old woman in 1997 will be replicated by the average 25-year-old woman when she is 50, in the year 2022. Given the large changes in female participation over the last several decades, this is not credible.

The survey gathered information on both individual level and household variables and contains almost 300 questions on the following issues. At the level of the individual, data are available on demographic variables including educational attainment, family structure, employment status and income sources of respondents and their partners. As far as households are concerned, the survey includes information concerning time allocation and child care arrangements. Importantly, the survey provides direct measures of labour market experience allowing the ongoing impact of children upon labour market experience and hence earnings to be captured. The sample used in the estimates of the impact of child rearing upon women's annual earnings consists of 981 women aged 18–55 years in 1997.

As expected, the proportion of women employed decreases as the number of children increases. For example, 81 per cent of women with no children were employed, 61 and 60 per cent of women with one or two children respectively were employed, and just 57 per cent of women with three or more children were employed.

The data suggest that average annual after-tax earnings decrease with the number of children. Women with no children had the highest average annual after-tax earnings of \$18,292. There is a large drop in average annual earnings of about \$6,000 between a childless woman and those with one child. Women with two or more children earned, on average, slightly less than did women with one child.

### **Method and results**

Economic theory suggests that a range of variables determine earnings. For our exercise, the important behavioural issues concern choices and outcomes related to labour market participation, hours worked, and hourly wages. The theoretical basis underlying these relationships is well known and will not be documented here (see Ehrenberg and Smith 1997 for a good discussion of the theoretical basis).

See the accompanying box for a discussion of the statistical modelling of the impact of child rear-

ing on labour force participation and earnings used in this analysis.

The earnings foregone from child rearing are estimated using a three-step procedure. First, we estimate the relationship between the number and age of children and the probability of employment. Second, for those who are employed, we estimate the impact on annual earnings. These estimates are then combined to produce an estimate of the effect of children on lifetime earnings. The total impact of child rearing on annual earnings will depend upon the combined effect of the impact upon the probability of employment and the impact upon annual earnings if employed.

### **Probability of employment**

The analysis of the determinants of employment revealed that labour market experience, educational attainment, age cohort and partner's level of income all had impacts on the chances of a woman being in paid employment. But the existence of children, particularly young children, totally dominated the other variables in determining the probability of employment. It is found for the average woman that ever having had a child permanently decreases her chances of being employed by 7 per cent.

Compared to having no children, having one child under the age of three years of age decreases the chances of employment by 30 per cent, while the presence of two children under the age of three decreases the chances of employment by a massive 63 per cent.

Once children reach the age of three years the negative impacts upon the chances of employment are much smaller. For example, compared to having no children, having one child aged between three and fifteen years decreases the chances of employment by 9 per cent.

### **Annual earnings**

We now turn to the estimates of the determinants of annual earnings for employed women. Labour market experience, tenure, educational attainment and age cohort are all found to be determinants of earnings.

There is a permanent effect on a mother's earnings from ever having had a child. It significantly

## **EARNINGS**

To take the above issue into account, at least in part, we have included controls for women's age cohort. This approach means that, for example, women aged less than 25 are allowed to have different earnings levels than other age cohorts, in addition to the controls for the usual age–earnings relationship.

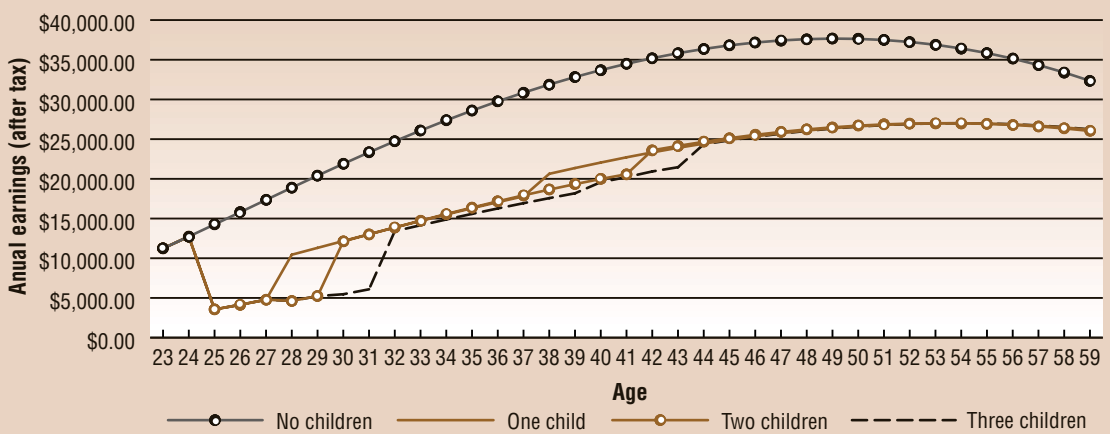
The relationship between children and the probability of employment and earnings if employed is captured in a number of ways. A variable is included which takes the value of one if a woman has ever had a child. In addition, there are a series of variables to indicate whether a woman has: one child under three years of age; two or more children under the age of three

years; one child between the ages of three and fifteen years; two children between the ages of three and fifteen; and three or more children between the ages of three and fifteen.

The extent to which women with children spend more time out of employment than do childless women will be reflected in them having less labour market experience at any given age. Part of the impact of children upon earnings will therefore be captured through the experience variable, which has repeatedly been found to be an important determinant of both the probability of employment and earnings.

**– Matthew Gray and Bruce Chapman**

**Figure 1** Lifetime earnings profile of women with completed secondary education, by number of children



Source: Constructed from estimates based on the Negotiating the Life Course Survey, 1997.

reduces a woman's annual earnings by 27 per cent. And, strikingly, a woman with two or more children under three is found to have an additional 63 per cent fall in her annual income. Variables associated with various number of children between three to fifteen are negative but do not have a statistically significant impact on annual earnings.

**Women's lifetime earnings**

The estimates of the impact of child rearing upon the probability of employment and annual earnings if employed are used to simulate the lifetime earnings profile of women under four hypothetical scenarios related to the number of children and the mother's age when the children are born.

The hypothetical woman is assumed to marry at age 23 and face the decision of whether or not to have a child at age 25 years. If she decides not to have the child at this time, she remains childless. Women becoming mothers at age 25 then decide at age 27 whether or not to have a second child, with women not having a second child at age 27 being assumed to only ever have one child. Women with two children then face the choice of whether or not to have a third child, to be born at age 29, with women choosing not to do so being assumed to have only two children in their lifetime. Those women choosing a third child at age 29 do not have any further children.

**Table 1** Lifetime earnings by number of children, women completing secondary school

	Total lifetime earnings	Per cent of childless earnings
<b>Number of children</b>		
Childless	\$434,956	—
1 Child	\$272,484	62.6
2 Children	\$260,969	60.0
3 Children	\$245,981	56.6

Note: The lifetime earnings presented in this table are the net present value of lifetime earnings calculated using a 5 per cent discount rate.

Source: Estimates are based on the Negotiating the Life Course Survey, 1997.

Figure 1 presents the simulated earnings profiles for the different scenarios associated with choices about children for women who have a highest level of educational attainment of year 12. The earnings losses are represented by the difference between the age-earnings profile of childless women and the age-earnings profile of women with children.

Clearly, having children has a marked negative and persistent influence on a woman's lifetime earnings profile. As reported above, earnings differences are greatest when the child or children are very young. Although earnings rise as the children grow older, they never reach the earnings level of women who never had a child.

Table 1 presents lifetime earnings for each of the scenarios described above. These calculations allow us to quantify the earnings loss for each scenario over the entire lifetime of a woman. The calculations in Table 1 are for a woman with a highest level of educational attainment of completed secondary school (the results for women with other levels of educational attainment are similar).

It is clear that there is a considerable earnings reduction associated with having a child. In percentage terms, women with one child are estimated to earn 63 per cent of what they would have earned had they remained childless. This amounts to a loss of 37 of total lifetime earnings.

In absolute dollar amounts, women are estimated to forego \$162,474 after tax over their lifetimes. Also, the results suggest that the decision to have another child after the first does not translate into further substantial earnings losses. The subsequent drop in after-tax lifetime earnings from having the second child after the first is \$11,515. Having more than two children, however, is associated with a slightly larger earnings loss of \$14,788. Although this is larger than moving from the first to the second child, the earnings loss is still relatively small in comparison to the earnings decreases associated with having any child at all.

Estimate of net relative earnings associated with child rearing should take into account the effects of social security payments, which in Australia are

**Table 2 Comparison of estimated impact of children upon earnings, 1986–1987**

Educational attainment	Degree		Completed secondary		Incomplete secondary	
	1986	1997	1986	1997	1986	1997
<b>Earnings loss</b>	<b>Per cent of earnings of woman with no children</b>					
1 child	58.6	65.7	46.0	62.9	37.5	61.6
2 children	47.8	63.6	36.9	60.6	29.7	58.8
3 children	38.8	59.3	30.0	55.8	24.2	53.3

Sources: The estimates for 1986 are based upon Beggs and Chapman (1988). Estimates for 1997 are based on the Negotiating the Life Course Survey, 1997.

related to the number and age of children. Using a simulation approach, the estimates of foregone income can be adjusted for the two types of family payments, which were related to the number and age of children: Basic Family Payments; and Additional Family Payments. While adjusting for the effects of children on family payments reduces the foregone income of children for the hypothetical women, in general the adjustments make relatively little difference to the magnitudes of the foregone income.

### Changes over time

In the context of the increases in the labour force participation of women with children over the period 1986–1997, it is of interest to assess whether there has been a fall in the earnings foregone from child rearing.

As discussed, Beggs and Chapman (1988) conducted similar research using 1986 data with a similar method to that used in this paper. However, they used a different specification to capture the impact of children upon earnings. The most important difference is that Beggs and Chapman used variables for having children aged less than five years and aged five to fifteen years whereas the specification for this analysis is for having children aged less than three years and aged three to fifteen years.

In order to allow direct comparison of the earnings foregone in 1986 (as estimated by Beggs and Chapman) and 1997 (as estimated in this paper) we estimate the impact of children on lifetime earnings using the same specification of children as used by Beggs and Chapman. The results are presented in Table 2.

The estimates presented in Table 2 suggest that the after-tax earnings foregone from child rearing have, in percentage terms, fallen dramatically between 1986 and 1997. Under the scenario that a woman has one and only one child when she is aged 25, the Beggs and Chapman estimates imply a lifetime earnings loss of 54 per cent whereas the estimates for 1997 suggest a lifetime earnings loss of only 34 per cent.

Most of the changes in the earnings–children relationships over the last decade or so are related to increased participation in the labour force amongst women with young children. For example, in 1986 a 26-year-old woman that had completed high school and had one child under the age of five had a probability of employment of 15 per cent,

whereas in 1997 an equivalent woman had a probability of employment of 40 per cent. Exploring this issue further should be given high priority.

### Conclusion

The paper presents estimates of the relationship between child rearing and lifetime earnings of Australian women. The results suggest that, for women who have completed secondary education, having one child decreases after-tax lifetime earnings by around \$160,000 dollars. Having additional children is estimated to decrease lifetime earnings further, but the additional effects are relatively small.

There appears to have been a very large decrease in the impact of children upon earnings between 1986–1997. The fall in the earnings losses during this period is likely to reflect increasing numbers of women with young children being in paid employment, as well as increased hours of work.

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**Dr Matthew Gray** is a Principal Research Fellow at the Australian Institute of Family Studies. **Professor Bruce Chapman** is the Director of the Centre for Economic Policy Research at the Australian National University. This article presents a revised and distilled version of the paper *The Foregone Earnings from Child Rearing Revisited*, by Bruce Chapman, Yvonne Dunlop, Matthew Gray, Amy Liu and Deborah Mitchell, published by the Australian National University, 1999.