Determinants of Australian mothers' employment

An analysis of lone and couple mothers

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Abstract

While the lower rates of employment of lone mothers as compared with couple mothers has been well documented, the reasons for the employment gap are less well understood. This paper uses data from the 1996 Australian Census to analyse the factors which explain the employment gap.

The analysis reveals that the determinants of the probability of employment are generally similar for lone and couple mothers, although there are several important differences. In general, factors that are typically associated with lower rates of employment, and could be considered a barrier to employment, have a larger negative effect upon the probability of employment of lone mother than couple mothers. Importantly, it is found that the presence of children have a similar impact on the employment of lone and couple mothers.

The analysis also reveals that around one-third of the employment gap is due to differences in the characteristics of the lone and couple mothers. This gap is explained by differences in a number of characteristics. Of particular interest is that only a small amount of the employment gap explained by differences in educational attainment. The remaining two-thirds of the employment gap is caused by variables impacting on the employment rates of lone and couple mothers differently.

Determinants of Australian mothers' employment: An analysis of lone and couple mothers

Introduction

One of the most dramatic changes to the Australian labour market in recent decades has been the increase in the number of families with children in which no adult is employed. There is evidence that Australian children are being increasingly divided into those who live in families that are "work rich" (both adults employed) and those who live in families that are "work poor" (no adults employed) (Gregory 1999). Recent comparative studies find that while Australia has a relatively low overall level of joblessness among persons of working age, joblessness among families with children is among the highest in the OECD (Oxley et al. 1999).

A substantial part of the increase in the number of job poor families is the result of the increase in the number of lone-parent families, who have a higher rate of joblessness than couple families (Gregory 1999; Whiteford 2001). In 1996, 21 per cent of families with children were lone-parent families, compared with 7 per cent in 1969. The majority (85 per cent) of lone-parent families are headed by lone mothers (ABS 2000). A high proportion of these families receive welfare payments, with the proportion of lone-parent families in receipt of income tested benefits being among the highest in the OECD.

At the time of the 1996 Census the employment rate of lone mothers with dependent children was 44.5 per cent, and of couple mothers it was 58.5 per cent. Since the 1996 Census there have been some increases in the employment rates of lone and couple mothers, but the gap in employment rates has only narrowed slightly (ABS 2000).

These trends have long been a policy concern. In the 1970s it was noted that lone-mother families experienced high rates of poverty and the policy remedy was seen as adequate social security provision (Henderson, Harcourt and Harper 1970). By the 1990s the policy remedy had shifted to being in terms of supplementing the pension with income from other sources, primarily income from employment (Shaver 1998). The most recent review of the social security system emphasised the importance of paid employment (McClure 2000).

Another area of concern is that living in a family in which no adult is employed may have adverse consequences on children in these families. There are several reasons for thinking this, including the consequences of material deprivation and poverty, the impact of not having a working adult in the household for the development of attitudes towards work, and the possibility of inter-generational transmission of disadvantage. There are also concerns about the costs of income support payments to lone parents for the Federal Budget.

These concerns have led to the focus of public policy on increasing the employment rates of lone mothers. Government policies have generally been aimed at improving the skill level and job readiness of lone mothers, providing child care subsidies for work-related child care, and increasing the financial incentives for lone mothers to take up paid employment.

The most common explanations for the lone mother–couple mother employment gap revolve around the impact of dependent children on lone mothers' availability to work, and possible financial disincentives for lone mothers to enter the workforce.

For example, it is sometimes argued that the demands and responsibilities of caring for young children are greater for lone mothers than for couple mothers who can often share child care responsibilities with their partner (see, for example, Swinbourne, Esson and Cox 2001).

It is also sometimes argued that the financial incentives to seek paid employment are relatively low for lone mothers. It has been demonstrated that over quite large ranges of earned income, the interaction between the income support system, the tax system and earned income means that the gain in income after taking into account loss of benefits and tax paid can be quite small. While both lone and couple mothers may be entitled to receive income support payments in the form of pension payments and family payments, a higher proportion of lone mothers than couple mothers are eligible for payments, and also for higher levels of payments, since couple mothers' receipt of these payments is subject to the level of their partner's income. For an overview of the incentive effects generated by the interaction between the income support, the tax systems and earned income see Ingles (2000).

A third category of explanation, which has received little attention in Australia, is that the lower employment rate of lone mothers as compared with couple mothers is the result of lone mothers having characteristics (such as age and number of children, and educational attainment) that make them less employable than couple mothers. It may be that these characteristics, rather than being a lone mother per se, account for their lower employment rate.

However, the validity or relative importance of these explanations is not well understood. There is very little existing empirical analysis of the reasons for lone mothers having lower employment rates than couple mothers. The only previous Australian research which uses statistical techniques to analyse the determinants of the lone mother–couple mother employment gap is Ross and Saunders (1990). Using data from the 1986 Income Distribution Survey, these researchers found that children have a similar impact on the probability of employment of lone and couple mothers. The very rapid growth in the proportion of lone-parent families since 1986 makes it important to re-examine the impact of children of different ages on the probability of employment of lone and couple mothers, as well as the impact of other determinants of employment.

Aim and structure of paper

This paper uses data from the 1996 Australian Census to estimate statistical models of the determinants of the probability of employment of lone and couple mothers. These results are used to explore the relative importance of the

different explanations for the lone mother–couple mother employment gap. In particular, the extent to which the employment gap is explained by differences in the characteristics of the lone and couple mother populations is quantified. The effects of a range of factors, such as educational attainment and age and number of children, in explaining the likelihood of employment of lone and couple mothers are analysed.

The rest of this paper is structured as follows. The next section describes the labour force status of lone and couple mothers. Then the theoretical and empirical issues involved in analysing labour force status are presented. The next section describes the extent to which various characteristics affect the probability of employment for lone and couple mothers. The final section discusses the implication of the results for public policy.

Labour force status of lone and couple mothers

Before proceeding with an overview of the employment outcomes and educational attainment of lone and couple mothers, it is important to establish a clear definition of lone and couple motherhood.

Throughout this paper "lone mothers" are defined as women who do not have a spouse or partner usually present in the household and who form a parent–child relationship with at least one dependent child usually resident in the household. "Couple mothers" are defined as women who have a spouse or partner usually present in the household and who form a parent–child relationship with at least one dependent child usually resident in the household. A "dependent child" is defined as a child living in the household aged 15 years or younger, or a child aged 16–24 years who is a full-time student.[1]

The analysis in this section is based on the full counts of lone and couple mothers as defined above from the 1996 Australian Census and is restricted to mothers of working age – that is, aged 15–64 years.

Employment rates

This section presents an overview of the employment rates of lone and couple mothers at the time of the 1996 Census. For both groups the rate of employment increases as the age of the youngest dependent child increases (Table 1).

Lone mothers have substantially lower rates of employment than do couple mothers. At the time of the 1996 Census the employment to population rate for lone mothers was 44.5 per cent as compared with 58.5 per cent for lone mothers (Table 1). The gap in employment rates of lone and couple mothers is the greatest when the youngest child is young and narrows as the age of the youngest child increases. For example, when the youngest dependent child is aged less than four years of age the employment rate of lone mothers is 27.1 per

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1   In addition, to be regarded as a child, the individual can have no partner or child of his/her own usually resident in the household.

cent, which is much lower than the employment rate of 45.8 per cent of couple mothers. As the age of the youngest dependent child increases, the gap in the employment rate of lone and couple mothers narrows. The employment rates of lone and couple mothers with a youngest dependent child aged 18–24 years are 67.0 and 68.0 per cent respectively.[2]

These statistics are commonly interpreted to mean that the presence of young children decreases the employment rates of lone mothers more than those of couple mothers. As noted above, it is often argued that this is the caused by lone mothers having greater difficulties with child care or because of disincentive effects generated by the income support system for lone mothers with a child under 16 years of age.

However, this interpretation assumes that the characteristics of the lone and couple mother populations do not differ systematically by the age of the youngest child. This assumption may be incorrect since the there are movements into and out of lone motherhood. For example, in Australia lone motherhood is most commonly the consequence of separation or divorce (ABS 1997). If the rates of inflow or outflow from lone motherhood for women with different characteristics, such as educational attainment, vary by the age and number of children, then the composition of the lone-mother population will vary systematically by the age and number of children. If the same group of mothers were followed over time, a different picture of the relationship between employment rates and the age of the youngest child may emerge. Unfortunately,

Table 1. Employment rates of lone and couple mothers, 1996		
	Lone mother *Per cent*	Couple mother *Per cent*
Age of youngest child		
0–4 years	27.1	45.8
5–11 years	47.8	64.8
12–14 years	57.0	70.8
15–17 years	65.6	71.9
18–24 years	67.0	68.0
Total	**44.5**	**58.5**

Notes: Employed include respondents working as either an employee, an employer, own account worker. Contributing family workers are classified as being not employed.
Source: Unpublished cross-tabulations from the 1996 Census.

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2   The employment rates presented above are derived from cross-sectional data which provide a snapshot of labour force status at the time of the survey. To the extent to which lone and couple mothers are moving in and out of employment this snapshot will underestimate the numbers who are employed over some period of time, say one year. In order to measure the numbers who are employed during a year, longitudinal or retrospective data are needed. While there is no comprehensive Australian data, the Survey of Employment and Unemployment Patterns (SEUP), a longitudinal survey over the period 1995–1997, provides some information on the labour force dynamics of lone mothers. The SEUP survey reveals that, while 38 per cent of lone parents worked for the whole year from September 1995 to September 1996, a further 25 per cent worked for part of the year, and 30 per cent had more than one job. In summary, more than 60 per cent of lone parents were employed at some stage during the year, but this was likely to cover two or more work episodes (Whiteford 2001).

there is no suitable long-running representative Australian longitudinal data available. However, indirect evidence can be obtained by comparing the average characteristics of the lone-mother and couple-mother populations with children of different ages.

Educational attainment

Examining the level of educational attainment by the age of the youngest dependent child reveals substantial differences between lone and couple mothers. Table 2 shows that, overall, 34.4 per cent of couple mothers had a post-secondary qualification. This was substantially higher than for lone mothers, of whom 25.4 per cent had a post-secondary qualification. A greater proportion of couple mothers than lone mothers had a degree qualification or higher (14.8 per cent compared with 9.1 per cent). Overall, couple mothers were also more likely than lone mothers to have a diploma level qualification (10.1 and 7.7 per cent respectively).

When the difference in educational attainment of lone and couple mothers is considered by age of the youngest child a clear pattern emerges (see Table 2). Among couple mothers the level of educational attainment does not vary with the age of the youngest child. For example, the proportion of couple mothers with a degree was much the same regardless of the age of the youngest child.

In contrast, for lone mothers there is a very clear relationship between educational attainment and the age of the youngest child. Lone mothers with a youngest child aged 0–4 years have the lowest levels of educational attainment. As the age of the youngest child increases so does the educational attainment of lone mothers. For example, of lone mothers whose youngest child was under five years of age only 4.7 per cent had a degree. For those whose youngest child is 5–11 years old 9.7 per cent have a degree. For those whose youngest child is aged 15–17 years 14.1 per cent have a degree, very similar to the average proportion of couple mothers.

As might be expected, the converse pattern applies in relation to having no post-secondary qualifications. Among couple mothers the proportion with no qualifications is much the same regardless of the age of their youngest child. However, among lone mothers the proportion with no qualifications steadily declines as the age of the youngest child increases.

In summary, a wide educational gap exists among lone and couple mothers with very young children, but largely disappears by the time the youngest child is at secondary school. This increase is unlikely to be explained by lone mothers upgrading their educational qualifications at a much faster rate than do couple mothers. The most likely explanation for the change in education qualifications among the lone mothers as children get older is that the transitions into and out of lone parenthood differ systematically by the age of the youngest child and highest level of education attainment.

It is worth reiterating that only children aged over 16 years who are in full-time education are considered. It is probable that mothers with a higher level of educational attainment are more likely to have children who remain in full-time education beyond the age of 15 years and particularly beyond the age of 18.

Table 2.	Post-secondary qualification by relationship status and age of youngest child					
	Age of youngest child (years)					
	0–4	**5–11**	**12–14**	**15–17**	**18–24**	**Total**
	Per cent					
Couple mothers						
Degree	15.7	14.8	12.8	12	15.1	14.8
Diploma	9.5	10.5	10.4	10.6	12.0	10.1
Vocational	10.3	9.3	8.6	8.6	8.0	9.5
No qualification	64.4	65.4	68.2	68.8	64.8	65.6
Total	**100**	**100**	**100**	**100**	**100**	**100**
Number couple mothers	767,940	599,533	227,468	170,080	84,782	1,849,803
Lone mothers						
Degree	4.7	9.7	12	14.1	18.5	9.1
Diploma	4.9	8.2	9.6	11	12.4	7.7
Vocational	8.3	9.0	8.5	8.6	8.3	8.7
No qualification	82.0	73.1	69.9	66.3	60.8	74.6
Total	**100**	**100**	**100**	**100**	**100**	**100**
Number lone mothers	135,455	145,467	55,513	37,031	17,108	390,574

Note: Excludes mothers who do not state or inadequately described their qualifications.
Source: Unpublished cross-tabulations from the 1996 Census.

The finding that the lone mother–couple mother educational attainment gap narrows as the age of the youngest child increases in a similar way to the way the lone mother–couple mother employment gap narrows raises an important question. How much of the apparent differential effects of young children on the employment rates of lone and couple mothers is due to differences in educational attainment or other characteristics which are related to the likelihood of being employed?

This question is analysed in more detail in the following sections using regression techniques, which allow for the effects of variables, including number and age of children, on the probability of employment to be estimated while holding constant the effects of other factors.

Modelling the determinants of employment

In this section the data used in the estimates of the determinants of the probability of employment are discussed. The conceptual framework used in the paper is examined and the empirical model is described.

Data

The probability of employment is modelled using data from the 1996 Census Household one per cent sample file. This data set is used because it is one of the few Australian data sets which contains a large enough sample of lone mothers. The census data contains information on labour force status, on educational and demographic characteristics, including the number and age of children of mothers, and on household level data, which contains information on other people in the household. Of particular importance for this study is the information on any partner who lives in the household.

Conceptual framework and empirical model

A mother's probability of employment will be determined by whether she seeks employment (supply labour) and her chance of finding suitable employment. Economic theory hypothesises that a person's decision as to whether to supply labour or not involves a trade-off between time spent at home on "market-substitution" activities, leisure, and paid work.

Clearly the decision is highly complex and involves many factors. For example, the composition of and dynamics within a household are important and the labour supply decision needs to be considered in terms of household, or family needs, and the interactions that occur between household or family members. For mothers, the age of their children is likely to be very important as the balance between paid work and child bearing and child rearing responsibilities change (Killingsworth 1983; Hersch and Stratton 1994). In addition to the financial incentives to participate in the labour market, there are likely to be issues surrounding child care and domestic labour that differ between lone and couple mothers.

The chances of finding employment will be determined by whether mothers can find suitable employment. This will be determined by the productivity of the person, the minimum wage and conditions at which they are prepared to accept employment (reservation wage), and possibly employer attitudes towards employing women with children. Mothers' preferences about paid employment will also be an important determinant of the probability of employment. See Ehrenberg and Smith (1997) for further discussion of models of the determinants of the probability of employment.

The model of employment outcomes can be expressed in a general form as:

$E_i^* = X_i\beta + \varepsilon_i$

where E_i^* is a latent (unobserved) variable that captures the propensity towards employment of individual i, X is a row vector of observed factors, β is a column vector of coefficients to be estimated and ε is a stochastic error term. Two observable outcomes are derived from E_i^* with reference to an arbitrary threshold of zero. Thus, the individual is held to be employed (U = 1) where E_i^* exceeds zero and not employed (U = 0) otherwise. This observed indicator variable (U) becomes the dependent variable in the analysis.

Given the binary nature of the dependent variable, a logit or probit model is appropriate. The logit model is used in this paper. With this model, the natural logarithm of the odds ratio of the probability of employment (E) to the probability of non-employment (1-E), log[E/(1-E)], is expressed as a linear combination of the explanatory variables, namely:

$log \left(\frac{E}{1-E} \right) = X_i\beta + \varepsilon_i$

The specification of the logit model includes a number of variables which both economic and sociological theory suggests will be related to employment status,[3] or which previous empirical studies have shown to be important determinants.[4]

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3 See Ehrenberg and Smith (1997) for a discussion of the theoretical literature.
4 Relevant empirical studies include Beggs and Chapman (1990), Harris (1996) and Le and Miller (2000).

While the details of the construction of the variables can be found in Appendix A, the remainder of this section provides a rationale for the empirical specification used. The omitted categories of the respective variables are also listed in Appendix A with summary statistics being provided in Appendix B.

The models estimated are reduced form employment equations; structural labour supply and labour demand models are not estimated. As a starting point, the estimation is based on the specification used in standard employment equation and labour supply studies. A summary of the variables included is presented in Table 3.

Age is included to pick up life cycle effects and as a measure of potential labour market experience. Age squared (AGE^2) is included to allow for a non-linear relationship between age and the probability of employment. Highest level of education attainment is measured by a set of variables: left secondary school aged 14 years or younger, left secondary school aged 15 or 16 years, left secondary school aged 17 years or older, vocational qualification or a diploma, or degree or higher level qualification. The omitted (or reference) category has no post-secondary qualification and left secondary school aged 15 or 16 years.

The impact of child rearing on the probability of employment is captured using a set of variables. The first series of variables reflects whether the age of youngest dependent child in the household is four years of age or younger, 5–11 years, 12–15 years, or 16–24 years. A number of studies have found that having more than one young child dramatically reduces the likelihood of a mother being employed (Chapman, Dunlop, Gray, Liu and Mitchell 2001). Therefore variables are included which capture the effects of having more than one child aged under four years, and having more than one child aged 5–11 years. Finally, there is a dummy variable that captures the effects of having four or more children in total. The omitted category is has a youngest child aged four years or younger.

These age ranges of children have been chosen because they reflect institutional features of the Australian educational and income support systems. The age of four years or younger is chosen because five is around the age of starting school.[5] The age of 12 years is chosen because it is the age at which most children have started secondary school. The age cut-off of 16 years is chosen because it is the age at which parents lose eligibility for parenting payments.

Table 3. Variables included in estimation model
Age and age squared
Educational attainment
Age of youngest child
Number of children of different ages
Housing tenure Regional location
Indigenous origin
English language proficiency
Year of arrival in Australia (if a migrant)
Partner's income (couple mothers only)

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5   There is some variation between states in the age of starting school (more information is needed here but the key point is that in some states in 1996 it was five years and in others six, thus five is the youngest age at which children can start school).

The motivation to seek employment and the intensity of job search is likely to be related to the financial commitments of the family. The stronger the financial need, the stronger the motivation might be to seek employment (see Harris 1996). A major financial commitment for families is housing costs, so families who own their own house outright may have less need for income compared to people with a mortgage or who are renting accommodation. Therefore a set of dummy variables, which indicate housing tenure (purchasing a house, owning house outright and renting accommodation) is included. The omitted category is purchasing a house.

The level of labour demand varies across different geographic regions of Australia and is clearly an important determinant of job opportunities, so a variable measuring geographic region of residence is included. Unfortunately the level of geographic information on the public release census data set is very aggregated and it is therefore only possible to include a variable for living in a capital city as compared to living outside of a capital city. The omitted category is living outside of a capital city. A variable indicating Indigenous origin is included since this group has a much lower employment rate than do other groups in Australian society (Hunter and Gray 1998).

Having poor spoken English is strongly related to labour market opportunities and hence employment rates (Le and Miller 2000). Therefore variables for speaking English only, speaking English well, and speaking English poorly are included. The omitted category is speaking only English at home. Being a migrant is strongly related to labour market opportunities and amongst migrants there is a very strong relationship between number of years since arrival in Australia and labour market status (Le and Miller 2000). Thus included are variables measuring arrival in Australia between 1991 and 1996, between 1981 and 1990, and prior to 1981, and being born in Australia. The omitted category is being born in Australia.

Finally, economic theory and a number of previous empirical studies have found that partner's income is an important determinant of the labour supply decision of women. Therefore, for couple mothers, partner's income as an explanatory variable is included. Partner's income squared is included to allow for any non-linear relationship.[6]

The sample used in the estimation includes all women aged 15–64 years who had a dependent child aged less than 16 years of age or a dependent child aged 16–24 years who was a full-time student.[7] The estimation sample comprised data on 14,732 couple mothers and 3,196 lone mothers. Given the focus on

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6   A proxy for partner's income for lone mothers might be child maintenance received or even government income support payments (which could be said to replace partner's support). However, it was not possible to determine what proportion of a mother's own income was drawn from these sources, so no proxy for partner's income could be included when estimating the probability of employment for lone mothers.
7   Mothers living with a same sex partner are excluded as are mothers for whom the age of youngest child in the family could not be identified due to the temporary absence of another dependent child on census night. These restrictions resulted in a loss of 1.3 per cent or 289 of the sample. The sample size is further reduced by excluding the "not stated" category in each of the variables included in the analysis.

exploring whether the determinants of the probability of employment of lone and couple mothers differ, the model is estimated separately for lone and couple mothers. This allows the effects of each of the explanatory variables on the probability of employment to differ between the two groups.

Estimation results

This section presents the results of the estimates of the determinants of the probability of employment of lone and couple mothers. Particular attention is paid to comparing the determinants of the probability of employment for lone and couple mothers. Overall, the models appear to be well-specified and the estimates broadly consistent with the findings of other studies (Beggs and Chapman 1990; Ross and Saunders 1990; Chapman, Dunlop, Gray, Liu and Mitchell 2001).

Because the effects of changes in the explanatory variables on the probability of employment varies with the value of *all* the explanatory variables in the model, simply reporting these coefficients conveys very little. Thus the effects of each of these variables on the probability of employment are illustrating using "marginal effects". The marginal effects show the effects of each of the explanatory variables *relative* to a particular type (base case) of mother. In this analysis the base case has been set as having the mean value on the continuous variables of mother's age and partner's income and as having the modal value for the attributes represented by the sets of dummy variables (age and number of children, education, English language ability, indigenous status, migrant status, and housing type).[8]

This means that the base case against which all marginal effects must be compared is a mother who: is 37 years old; has only one child, and that child is aged 0–4 years; has no qualifications and left school aged 15 or 16 years; speaks only English; is Australian born; is not an Indigenous Australian; is purchasing a home; and for couple mothers has a partner earning $709 per week. The coefficient estimates are presented in Appendix C.

Table 4 shows the marginal effects for lone mothers and couple mothers. As discussed, the marginal effects show the change in the probability of employment for a discrete change in each of the explanatory variables relative to the base case probability.

Educational attainment

As an example to the interpretation of the marginal effects, consider the effects of educational attainment. For couple mothers, having a degree or diploma level qualification is estimated to increase the probability of employment by 21.1 percentage points as compared with an otherwise similar couple mother with a highest level of educational attainment of having left secondary school aged 15 or 16 years of age. The underlying coefficient is statistically significant at the 5

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8 The mean and modal values are calculated for the combined lone and couple mother populations. The only exception is partner's income which is calculated using only data from couple mothers.

per cent level. For lone mothers the effect is similar, with a degree or diploma level qualification being estimated to increase the predicted probability of employment by 23.2 percentage points.

Having a vocational qualification increases the probability of employment of lone and couple mothers by 10.9 and 16.7 percentage points respectively. For those without post-secondary qualifications, the age at which they left school has a substantial impact on the likelihood of employment of both lone and couple mothers, although the effect differs. For couple mothers, having a left secondary school aged 17 or over, and having no post-secondary qualification, is estimated to increase the probability of employment by 4.7 percentage points. For lone mothers, staying on at secondary school until 17 or older increases the probability of employment by 7.3 percentage points as compared with having left secondary school aged 15 or 16 years of age. Leaving school at a young age (14 years or younger) has a much larger negative impact on lone than couple mothers. Leaving school this early reduced the probability of employment for couple mothers by 8.1 percentage points compared with 16.3 percentage points for lone mothers.

Table 4. Marginal effects on the probability of employment by family type, 1996	Couple mothers *Per cent*	Lone mothers *Per cent*
Degree or diploma level qualification	21.1*	23.2*
Vocational qualification	10.9*	16.7*
No post-secondary qualification and left school aged 17 years or older	4.7*	7.3*
No post-secondary qualification and left school aged 14 years or less	-8.1*	-16.3*
Youngest dependent child aged 5–11 years	14.2*	14.3*
Youngest dependent child aged 12–15 years	19.9*	19.3*
Youngest child aged 16–24 years	22.7*	28.6*
Has 2 or more children aged under 4 years	-17.1*	-25.2*
Has 2 or more children aged 5–11 years [a]	5.8*	-6.0*
Has four or more children	-10.5*	-13.7*
Good spoken English	-6.5*	-16.4*
Poor spoken English	-25.8*	-41.3*
Indigenous	0.2	4.5
Outside capital city	-2.8*	-5.0*
Migrant who arrived prior to 1981	0.9	2.6
Migrant who arrived 1981-1990	-0.6	6.2
Migrant who arrived 1991-1996	-18.9*	-12.4
Own house outright	-8.4*	-12.7*
Renting	-18.7*	-19.4*
Partner's income	0.7*	

Notes: The marginal effects are calculated relative to a base case mother who has one child aged 0–4 years, 37 years old, no post-secondary qualification and left school aged 15 or 16 years of age, speaks only English, born in Australia, lives in a capital city, is not an Indigenous Australian, is purchasing home and, for couple mothers, has a partner earning $709 per week. The marginal effects for the dummy (binary) variables are calculated for a change in the value of the variable from zero to one. For continuous variables the marginal effects show the effect for an incremental increase. In the case of age it shows the effects of a five-year increase in age and for partner's income it is calculated for a $100 per week increase in income.
* indicates that the underlying coefficient is statistically significant at the 5 per cent confidence level.
[a] The marginal effects for having two or more children aged 5–11 years is the change in probability of having two children aged 5–11 years as compared with having one child aged 5–11 years and no children aged 0–4 years.
Source: Derived from Appendix Table C1.

Age and number of children

As expected, both the age and number of children has a strong impact upon the probability of employment of both couple and lone mothers.

Couple mothers who have a youngest child aged 5–11 years are estimated to have a 14.2 percentage point higher probability of employment than otherwise similar mothers with a youngest child aged 0–4 years. Having a youngest child aged 12–15 years increases the probability of employment by 19.9 percentage points, while the couple mother with a youngest dependent child aged 16–24 years has a 22.7 percentage point higher probability of employment than an otherwise similar mother with a youngest child aged 0–4 years.

Having multiple children under the age of four years is estimated to reduce the probability of employment by 17.1 percentage points as compared with having only one child under the age of four years. Similarly, having two children aged 5–11 years is estimated to decrease the probability of being employed by 5.8 percentage points as compared with having one child aged 5–11 years and no child aged 0–4 years. Having four or more children is estimated to decrease the probability of being employed by 10.5 percentage points as compared with having a youngest child aged 0–4 years.

The same general pattern applies to lone mothers. The major difference is that having two preschoolers has a greater negative impact on lone mothers than on couple mothers. For lone mothers the probability of employment is reduced by 25.2 percentage points as compared with 17.1 percentage points for couple mothers. A second difference is the greater positive impact among lone mothers of the youngest child being over 16 years. This increases the probability of employment by 28.6 per cent. One reason for the substantial impact of the youngest child being aged over 16 is likely to be that the eligibility for the sole parent pension (now parenting payment single) ceases when the youngest child turns 16. Having four or more children is estimated to reduce the probability of employment of lone mothers by 13.7 percentage points as compared to an otherwise similar mother with a youngest child aged 0–4 years.

The specification of variables measuring the number and age of children imposes several restrictions on the way in which children can impact upon the probability of employment. The main restriction is that the impact of children is the same irrespective of the education level of the mother. However, economic theory predicts that the higher income earning potential of people with higher levels of educational attainment will mean that the impact of children on the likelihood of being employed will differ by education level. The impact of children on the probability of employment can be allowed to differ by level of educational attainment by including interaction terms between the variables representing level of educational attainment with the variables representing age and number of children. When this model is estimated, none of the interaction terms are significant for lone mothers, and only two are significant for couple mothers. It can therefore be concluded that the impact of children upon the probability of employment does not differ by educational attainment.[9]

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9   Results of the model estimated with the interaction between age and number of children and educational attainment are available upon request from the authors.

English language skills

English skills are found to be an important determinant of the probability of being employed. For couple mothers, speaking a language other than English at home, but having good spoken English, is estimated to reduce the probability of employment by 6.5 percentage points as compared with mothers who speak only English at home. For lone mothers the negative effect is more than twice as large, with lone mothers having a 16.4 per cent lower probability of employment compared with the comparable lone mother who spoke only English at home.

Having poor English was an even greater barrier to employment. Among couple mothers it reduced the employment probability by 25.8 percentage points. Among lone mothers, the effect of poor English was even greater – reducing the probability of employment by 41.3 percentage points. While this effect cannot simply be attributed to the causal effect of poor English, it is a stronger predictor of a lower probability of employment amongst lone than couple mothers.

Indigenous origin and geographic location

Being of Indigenous origin is found to have no statistically significant effects for lone or couple mothers. This result is surprising given that Indigenous women, in general, have much lower employment rates than other women (Hunter and Gray 1998).[10] Living outside of a capital city is estimated to reduce the probability of employment for couple mothers by 2.8 percentage points and by 5.0 percentage points for lone mothers.

Migrant status

Mothers who are recent arrivals to Australia have a substantially reduced probability of employment compared with longer-term migrants. Couple mothers who arrived within the previous five years had a 18.9 percentage point lower probability of employment compared with comparable Australian-born mothers. Lone mothers were less affected by being recent arrivals, but recent arrival nevertheless had a marginal effect of 12.4 per cent. Longer-term migrants are estimated to have a very similar employment probability as Australian-born mothers. The similarity in employment probabilities of longer-term migrants and Australian-born mothers may be, in part, explained by these migrants being more likely than more recent migrants to have gone through Australian education.

Housing tenure

Housing tenure is strongly related to the probability of being employed for couple and lone mothers. Owning a house outright is estimated to reduce the probability of being employed by 8.4 and 12.7 percentage points for couple and lone mothers respectively as compared with those in the process of purchasing their home. This probably reflects the lower financial demands on home-owners

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10 There non-significant result for being of Indigenous origin for lone and couple mothers is unlikely to be due to there being two few Indigenous lone mothers in the sample— there are 128 in the estimation sample.

as compared to those with debt on their home. Mothers who are renting are the least likely to be employed, with couple and lone mothers being 18.7 and 19.4 percentage points respectively less likely to be employed than are those who are in the process of purchasing their home.

The strong negative effects of being a renter may be explained by the financial disincentive effects generated by the income support system for those in public housing, or in private rental accommodation and receiving government rent assistance. Eligibility for public rental accommodation or rent assistance can be lost, or the amount of assistance reduced, as earned income increases. This can lead to very high effective marginal tax rates for lone mothers as compared with couple mothers, and a consequently reduced participation in the labour market.

The negative effect of the impact of being a renter on the probability of employment may also be because living in rental accommodation is correlated with unobserved factors related to the probability of employment. The main candidate here is past employment history. However, for both couple and lone mothers there are good reasons to expect that the link between past employment history and current housing tenure may be quite weak since many couple mothers have intermittent work histories, and housing tenure may be more dependent on their partner's employment history. For lone mothers, housing tenure will be related both to employment history and, if they were previously in a marriage or defacto relationship, housing tenure in that relationship as well as the terms and conditions of their separation from their partner.

Partner's income

Partner's income has a statistically significant but relatively small effect on the couple mother's probability of employment. An increase in partner's income from $706 per week to $806 per week is estimated to increase the probability of employment of the base case couple mothers by 0.7 percentage points. Partner's income has an inverted U-shaped relationship with the probability of employment, with the maximum probability of employment for the base case mother at a partner's income of about $1,150 per week.

In broad terms, the determinants of the probability of employment of lone and couple mothers are similar. For many variables the level of the effect was indistinguishable. However, there are several variables, which have a differing size of effects for lone and couple mothers. In general, factors that are typically associated with low rates of employment and could be considered a barrier to employment have a larger negative effect upon the probability of employment of lone mothers than couple mothers Beggs and Chapman 1990; Ross and Saunders 1990; Harris 1996; Le and Miller 2000; Chapman, et al. 2001). These include having two pre-schoolers, having the very low level of educational attainment of having left school aged 14 years or younger, speaking a language other than English at home, and in particular having poor spoken English.

Of particular importance is that the impact of children upon the probability of employment is very similar for lone and couple mothers, with the only real exception being having two children under the age of four. This result is quite

important because it implies that the apparent narrowing of the gap in employment rates as the age of the youngest child increases is only in part due to children of different ages having differential effects on the employment rates of lone and couple mothers, with the remainder being explained by other factors.

Factors generating the employment gap

The extent to which there are differences in the effects of variables on the probability of employment between lone and couple mothers is captured by differences in the coefficients (and marginal effects). Within the statistical framework used in this paper, the gap in employment rates between lone and couple mothers can be attributed either to differences in the characteristics of the two groups of mothers or to differences in the effects of various characteristics on the probability of employment for each group.

Even when a particular characteristic is estimated to have the same impact on the probability of employment of couple and lone mothers, different employment outcomes for lone and couple mothers are still apparent. If the two groups have overall difference in their characteristics (for example, in overall level of post-secondary qualifications) then there will be differences in their overall employment rates. For example, if educational attainment has the same impact on the employment probabilities of lone and couple mothers but couple mothers have a higher average level of education than do otherwise similar lone mothers, then couple mothers will have a higher probability of employment.

This section uses an alternative presentation of the models estimated in this paper to identify the role of differences in characteristics of the lone and couple mother populations in explaining the lone mother–couple mother employment gap. One way of estimating the effect of the different characteristics of lone and couple mothers is to perform some "thought experiments". The question is asked: "What would the employment probabilities be for lone mothers if they had the same characteristics as couple mothers, except for partnering status?". Thus if lone mothers had the same educational attainment, same English skills, the same profile of young and older children and so on, what do we expect their probability of employment would be? Similar "thought experiments" or hypothetical scenarios can be used to identify the effects of statistical equality for particular attributes – educational attainment and age and number of children.

Table 5 presents estimates of the impact of statistical equality of educational attainment and number and age of children. (See Appendix D for a formal mathematical presentation of the decompositions.)

Table 5 presents the results of the three hypothetical scenarios. The derivation of the figures in Table 5 and their interpretation need some explanation. The top panel of Table 5 shows the predicted probability of employment for lone and couple mothers calculated using the respective coefficients and average characteristics. These are titled base case probabilities. The second panel shows the expected probability of employment of lone mothers under the three hypothetical scenarios. The first hypothetical, labelled "Scenario 1", shows the predicted probability of employment of lone mothers if they had the same

Table 5.	Decomposition of the lone mother–couple mother employment gap, 1996	
		Predicted probability of employment *Per cent*
		Predicted probability of employment
Lone mother coefficients and characteristics		46.0
Couple mother coefficients and characteristics		62.6
		Hypothetical scenarios
Scenario 1	If lone mothers had same characteristics as couple mothers	51.5
Scenario 2	If lone mothers had couple mothers education profile	48.7
Scenario 3	If lone mothers had same number and age of children as couple mothers	42.7

Notes: The base case employment probabilities for lone and couple mothers are calculated using the respective coefficients and average characteristics. The lone and couple mother base case probabilities give the expected employment rates of lone and couple mothers with the average characteristics. The probability of employment for the three scenarios or "though experiments" are calculated using the lone mother coefficients and can therefore be thought of what the employment rate would be if they had all or some of couple mother characteristics.
Source: Calculations based on Appendix Table C1.

"average" characteristics as couple mothers but retained the lone-mother coefficients. "Scenario 2" is the predicted probability of employment of lone mothers if they had the same education profile as couple mothers, but all other characteristics are held at their lone-mother value. "Scenario 3" is the predicted probability of employment of lone mothers if they had the same number and age of children as couple mothers, but all other characteristics are held at their lone-mother value.

The predicted probability of employment of lone mothers is 46.0 per cent and for couple mothers 62.6 per cent. Therefore, the overall predicted gap in the employment rate of the "average" lone and couple mothers is 16.6 percentage points.

Scenario 1 shows that if lone mothers have identical characteristics to couple mothers the probability of lone mothers is estimated to increase by 5.5 percentage points to 51.5 per cent. This means that around one-third of the difference in employment rates of lone and couple mothers is explained by differences in the characteristics of the two populations. Even so, couple mothers would still have an 11.1 percentage point greater probability of employment.

Even though this simple hypothetical scenarios identifies different characteristics of lone and couple mothers as being partly responsible for the employment gap, this does not provide a great deal of guidance for narrowing this gap. Most of the attributes can not easily, if at all, be changed by public policy intervention, should it be thought desirable that the employment gap needs to be narrowed. One factor which is open to policy interventions is educational attainment. Earlier analysis in this paper demonstrated the positive employment value of post-school qualifications and the negative value of early school leaving. Given that lone mothers have a lower level of educational attainment than couple mothers, increasing the educational attainment of lone mothers to the same level as couple mothers is likely to increase the employment rates of the lone-mother population.

The effect of this can be estimated by calculating the probability of employment for lone mothers using lone-mother characteristics for all variables except education where couple-mother characteristics are substituted (Scenario 2). When this is done, the probability of employment of lone mothers increases to 48.7 per cent – an increase of 2.7 percentage points

This means that the effect of increasing the education levels of lone mothers to that of couple mothers is likely to have only a very modest effect on employment rates of lone mothers on its own, separated from other characteristics. Additional research designed to identify other characteristics of lone and couple mothers that affect employment may point to other interventions that could improve the probability of lone mothers being employed.

The third scenario shows the effects of changing the number and age of lone mothers' children. This can be estimated by calculating the probability of employment for lone mothers using lone-mother characteristics for all variables except number and age of children where couple mother characteristics are substituted. When this is done, the probability of employment of lone mothers decreases to 42.7 per cent. This confirms the earlier findings that it is not the age and number of children per se which reduces lone mothers' chances of being employed.

Concluding comments and policy implications

It has long been debated whether or not the lower rate of employment of lone mothers is a problem from a social policy perspective. On the one hand, the high rate of joblessness may have adverse consequences for children growing up in such families. On the other hand, it is argued that all mothers, including lone mothers, should have the option to care for their children themselves and not be required to place them in child care while the mother is working.

This dilemma has led to some ambivalence in government policy as to whether increasing the employment rates of mothers in general, and lone mothers in particular, is desirable. In many ways the answer to this question depends upon the reasons for employment or non-employment.

This paper used data from the 1996 Census, to estimate a model of the determinants of the probability of employment, of lone and couple mothers. The analysis in the paper reveals that the determinants of the probability of employment are generally similar for lone and couple mothers, although there are several important differences. In general, factors that are typically associated with lower rates of employment, and could be considered a barrier to employment, have a larger negative effect upon the probability of employment on lone mothers than on couple mothers. These include having a low level of educational attainment, speaking English as a second language and, in particular, having poor spoken English.

The analysis also reveals that around one-third of the difference in the employment rate of lone and couple mothers is due to differences in the characteristics of the two groups. This gap is explained by differences in a number of the characteristics. Of particular interest is the surprisingly small

amount of the employment gap explained by differences in educational attainment. The remaining two-thirds, or the majority of the employment gap, is caused by variables impacting on the employment rates of lone and couple mothers differently. Importantly, while there are some differences in the impact on lone and couple mothers of having two or more pre-school aged children, in general children of different ages have remarkably similar effects for lone and couple mothers. Having poor spoken English and low levels of educational attainment have a much larger negative impact on the employment probabilities of lone mothers than couple mothers.

The finding that children have a similar impact upon the probability of employment of lone and couple mothers is important because it implies that the apparent narrowing of the gap in employment rates as the age of the youngest child increases is only in part due to children of different ages having differential effects on the employment rates of lone and couple mothers. The explanations of the lone mother–couple mother employment gap being the result of young children having a greater impact upon the likelihood of employment of lone mothers appears to have quite limited explanatory power.

It is important to note that while a wide range of factors are included in the model of the determinants of the probability of employment, there are several potentially important factors which are not asked about in the census data and so are not included in the models estimated. Of particular relevance here is the role non-resident fathers play, and in particular the provision and level of child support payments.

The methodology used in this paper does not provide direct evidence on why factors such as poor English, early school leaving and multiple young children have a much greater negative impact on lone mothers than on couple mothers. If the processes lying behind this differential impact can be identified we would be in a better position to know whether it is desirable to try to intervene. If such interventions to alter the impact of variables were possible and desirable, then policy interventions could be targeted to altering the processes that lead to lower employment rates rather than just focussing on the attributes of lone and couple mothers. Understanding the processes which determine how decision about work are made in Australian families is the continuing focus of Institute research.

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Appendix A. Variable definitions

Age measures age of mother in years. In the 1996 Census public release data set, age is grouped into five-year age bands. A continuous measure of age is created by using the mid-point of the age bands.

Lone mother is defined as a woman who has no spouse or partner usually present in the household but who forms a parent–child relationship with at least one dependent child usually resident in the household.

Couple mother is defined as a woman who has a spouse or partner usually present in the household and who forms a parent–child relationship with at least one dependent child usually resident in the household.

Couple relationship is based on a consensual union, and is defined as two people residing in the same household who share a social, economic and emotional bond usually associated with marriage, and who consider their relationship to be a marriage or marriage-like union.

Dependent children is defined as all children in the household aged 15 years or younger, or a child in the household who is aged 16–24 years and is a full-time student. The Census data do not record the exact relationship between a dependent child and their "mother". Since the sample is restricted to women who have given birth to a child, a small number of mothers who have only step, adopted or fostered child(ren) are excluded. However, the impact of this restriction will be very minimal because the number of women in this category is quite small.

Age of youngest child 0–4 years is set to one if the age of the youngest dependent child is 0–4 years, and zero otherwise.

Age of youngest child 5–11 years is set to one if the age of the youngest dependent child is 5–11 years, and zero otherwise.

Age of youngest child 12–15 years is set to one if the age of the youngest dependent child is 12–15 years, and zero otherwise.

Age of youngest child 16–24 years is set to one if the age of the youngest dependent child is 16–24 years, and zero otherwise.

Having two or more children aged 0–4 years is set to one if has two or more children aged 0–4 years of age, and zero otherwise.

Having two or more children aged 5–11 years is set to one if has two or more children aged 5–11 years of age, and zero otherwise.

Have four or more children is set to one if has four or more children, and zero otherwise.

Degree/diploma is set to one if the respondent's highest educational qualification is a higher degree, a post-graduate diploma, bachelor degree, under-graduate diploma, or an associate diploma, and zero otherwise.

Vocational is set to one if the respondent's highest educational qualification is a skilled vocational or basic vocational qualification, and zero otherwise. Respondents who reported having a post-secondary qualification but who

"inadequately described" the qualification are coded as having a vocational qualification. Estimates of the model including "inadequately described" as a separate qualification revealed that there was no difference in the estimated effects of having a vocational and an "inadequately described" qualification meaning that they can legitimately be combined.

No post-secondary qualification and left school aged 17 years or older is set to one if the respondent has no post-secondary qualification and left school aged 17 years or older, and zero otherwise.

No post-secondary qualification and left school aged 15 or 16 years is set to one if the respondent has no post-secondary qualification and left school aged 15 or 16 years of age, and zero otherwise.

No post-secondary qualification and left school aged 14 years or less is set to one if the respondent has no post-secondary qualification and left school aged 14 years or less or never attended school, and zero otherwise.

Capital city is set to one if the respondent lived in a capital city, and zero otherwise. The only exception is that Tasmania, Northern Territory and Australia Capital Territory are coded as being capital cities. It is necessary to do this since the public release data set includes these States and Territories as single areas.

Speak English only is set to one if the respondent does not speak a language other than English at home, and zero otherwise.

Good spoken English is set to one if the respondent speaks a language other than English at home and speaks English very well or well, and zero otherwise.

Poor spoken English is set to one if the respondent speaks a language other than English at home and speaks English not well or not at all, and zero otherwise.

Partner's income is the partner's weekly pre-tax income from all sources. In the census, income data is collected using income brackets. A continuous income variable is constructed using the mid-point of the income bracket. The value assigned to the highest income category is 1.5 times the lower bound of this category. For a small number of couple mothers, their partner's income was negative and coded as zero in the analysis. Also, there were a few couple mothers (3.1 per cent or 556 couple mothers) whose partners were temporarily absent at the census night.

Appendix B. Descriptive statistics

Table B1: Description of variables entered in the logistic models				
	Couple mothers		**Lone mothers**	
Employed	0.59	(0.49)	0.46	(0.50)
Age of youngest child 0–4 years	0.42	(0.49)	0.35	(0.48)
Age of youngest child 5–11 years	0.32	(0.47)	0.36	(0.48)
Age of youngest child 12–15 years	0.16	(0.37)	0.18	(0.39)
Age of youngest child 16–24 years	0.10	(0.30)	0.11	(0.31)
Having 2 or more children aged 0–4 years	0.13	(0.34)	0.07	(0.26)
Having 2 or more children aged 5–11 years	0.21	(0.41)	0.16	(0.37)
Have 4 or more children	0.13	(0.34)	0.13	(0.34)
Age of mothers	37.64	(7.64)	36.39	(8.83)
Diploma or higher degree	0.24	(0.43)	0.17	(0.37)
Vocational qualification	0.11	(0.31)	0.09	(0.29)
No post-secondary qualification and left school at 17 years or older	0.21	(0.41)	0.21	(0.40)
No post-secondary qualification and left school at 15 or 16 years	0.39	(0.49)	0.45	(0.50)
No post-secondary qualification and left school at 14 years or younger	0.06	(0.23)	0.09	(0.28)
Speak English only	0.83	(0.37)	0.89	(0.32)
Good spoken English	0.13	(0.34)	0.08	(0.28)
Poor spoken English	0.03	(0.18)	0.03	(0.17)
Aboriginal or Torres Strait Islander origin	0.01	(0.11)	0.04	(0.21)
Residential location				
Major urban	0.61	(0.49)	0.59	(0.49)
Year of arrival at Australia				
Born in Australia	0.72	(0.45)	0.77	(0.42)
Arrived in Australia before 1981	0.15	(0.36)	0.13	(0.34)
Arrived in Australia between 1981-1990	0.09	(0.28)	0.06	(0.24)
Arrived in Australia between 1991-1996	0.04	(0.19)	0.03	(0.18)
Fully own house	0.32	(0.47)	0.17	(0.37)
Purchasing house	0.47	(0.50)	0.23	(0.42)
Renting house	0.21	(0.41)	0.60	(0.49)
Partner's weekly income (dollars)	709.47	(513.20)		
Number of observations	14,732		3,196	

Note: Standard deviations are shown in brackets. Excludes contributing family workers.
Source: 1996 Census one per cent sample file.

Appendix C. Estimation results

Table C1. Logit estimates of probability of employment, lone and couple mothers, 1996	Couple mothers		Lone mothers	
	Coefficient	T-stat	Coefficient	T-stat
Youngest dependent child aged 0–4 years	-1.2032	(12.95)	-1.4086	(7.45)
Youngest dependent child aged 5–11 years	-0.5366	(6.28)	-0.7979	(4.71)
Youngest dependent child aged 12–15 years	-0.1937	(2.33)	-0.5548	(3.34)
Has 2 or more children aged 0–4 years	-0.693	(11.36)	-1.06	(4.78)
Has 2 or more children aged 5–11 years	-0.2911	(5.58)	-0.2694	(2.26)
Has 4 or more children	-0.43	(7.45)	-0.553	(4.14)
Age	0.1992	(9.53)	0.1791	(4.91)
Age squared	-0.0026	(8.67)	-0.0022	(4.40)
Vocational qualification	-0.5969	(8.51)	-0.3418	(2.04)
No post-secondary qualification and left school at 17 or older	-0.8909	(15.26)	-0.766	(5.48)
No post-secondary qualification and left school at 15 or 16 years	-1.0926	(20.46)	-1.0662	(8.59)
No post-secondary qualification and left school at 14 or younger	-1.4265	(15.64)	-1.7269	(9.02)
Good spoken English	-0.268	(4.16)	-0.6652	(3.99)
Poor spoken English	-1.055	(8.56)	-2.0618	(5.64)
Indigenous	0.0082	(0.05)	0.1841	(0.90)
Major urban	0.1181	(2.94)	0.2003	(2.36)
Arrived in Australia prior to 1981	0.0367	(0.65)	0.1074	(0.86)
Arrived in Australia between 1981-1990	-0.0244	(0.32)	0.2535	(1.33)
Arrived in Australia between 1991-1996	-0.7646	(6.99)	-0.4987	(1.78)
Purchasing	0.3454	(7.81)	0.5114	(3.94)
Renting	-0.4125	(7.50)	-0.2821	(2.46)
Weekly income	0.0009	(9.00)		
Weekly income squared	-4.00E-07	(46.19)		
Constant	-1.9473	(4.81)	-1.6717	(2.37)
Pseudo R-squared	0.131		0.175	
Model chi-square	2622.083		771.286	
Number of observations	14,732		3,196	

Source: 1996 Census one per cent sample file.

Appendix D. Detailed description of

This Appendix presents mathematically the decompositions presented in Section 5 of the paper. Define the following probabilities:

$$\hat{E}^{LM} = X^{LM}\beta^{LM}$$

$$\hat{E}^{CM} = X^{CM}\beta^{CM}$$

$$\hat{E}_0^{\ LM} = X^{CM}\beta^{LM}$$

where β^{LM} is a vector of estimated coefficients for lone mothers, β^{CM} is a vector of estimated coefficients for couple mothers, X^{LM} is a vector of characteristics of lone mothers, X^{CM} is a vector of characteristics of couple mothers. $\hat{E}^{LM}$ is the average probability of employment for lone mothers, $\hat{E}^{CM}$ is the average probability of employment for couple mothers and $\hat{E}_0^{\ LM}$ is the average probability of employment for lone mothers if they had the same characteristics as couple mothers but the coefficients of lone mothers.

The difference in the predicted probabilities of lone and couple mothers can be separated into the component due to differences in coefficients for the two groups and the component due to differences in characteristics of the two groups. The following identity shows this decomposition:

$$\hat{E}^{LM} - \hat{E}^{CM} = \underbrace{(\hat{E}^{LM} - \hat{E}_0^{\ LM})}_{\text{Characteristics}} + \underbrace{(\hat{E}_0^{\ LM} - \hat{E}^{CM})}_{\text{Coefficients}}$$

The differences in employment rates due to differences in coefficients is given by difference in the predicted probability of employment for lone mothers and the predicted probability of employment using the lone mother coefficients and the couple mother characteristics. The part of the employment gap due to characteristics is given by difference between the predicted probability of employment using the lone mother coefficients and the couple mother characteristics and the predicted probability of employment obtained using couple mother coefficients and couple mother characteristics.

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The Australian Institute of Family Studies is an independent statutory authority which originated in the Australian Family Law Act (1975). The Institute was established by the Commonwealth Government in February 1980.

The Institute promotes the identification and understanding of factors affecting marital and family stability in Australia by:

- researching and evaluating the social, legal and economic wellbeing of all Australian families;

- informing government and the policy making process about Institute findings;

- communicating the results of Institute and other family research to organisations concerned with family wellbeing, and to the wider general community;

- promoting improved support for families, including measures which prevent family disruption and enhance marital and family stability.

The objectives of the Institute are essentially practical ones, concerned primarily with learning about real situations through research on Australian families.

For further information about the Institute and its work, write to Australian Institute of Family Studies, 300 Queen Street, Melbourne, Victoria 3000, Australia. Phone (03) 9214 7888. Fax (03) 9214 7839. Internet www.aifs.org.au/

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