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The Impact of Fertility on Mothers' Labour Supply in Australia: Evidence from Exogenous Variation in Family Size

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Exogenous Variation in Family Size*

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Abstract

This paper estimates the impact of fertility on mothers' labour supply in Australia, using exogenous variation in family size generated by twin births and the gender mix of siblings. Results show that having more than one child decreases labour market participation by 15.5 percentage points and hours worked by around 6 hours per week. Having more than two children reduces labour market participation by between 12 and 20 percentage points and hours worked by between 3 and 8 hours a week, depending on the instrument used. Interestingly, fathers also reduce both their labour market participation (by 10 percentage points) and their number of hours worked per week (by 4 hours) when having more than one child. Compared with the results obtained with the same methodology for other countries, the effects for Australia are large, which partly reflects the constraints on public childcare and the lack of a national paid parental leave scheme prior to 2011.

1 Introduction

Developed countries have experienced a dramatic increase in women's labour force participation rate since the 1970's[1]. Although the gap between men and women's respective contributions has narrowed in many countries, women are still participating less in the labour force than men, and their labour supply remains negatively correlated with the number of their children, and the presence of young children (Aliaga, 2005). The magnitude of the link between the number and age of children and mothers' labour supply is also extremely varied across countries (Thévenon, 2009). This paper addresses the question of whether having more children leads some mothers to exit the labour market, i.e. does fertility have a negative impact on mothers' labour force participation, in Australia? This causal effect is identified by using siblings' gender mix and twin births as random shocks to fertility.

This paper is motivated by the growing literature using the same methodology but finding varying estimates across countries of the impact of fertility on mothers' labour supply. Results show that the number of children in families has no significant impact on mothers' labour supply in Sweden (Hirvonen, 2008), Great-Britain (Iacovou, 2001) and Chile (Lopez de Lerida, 2005), whereas the effect is negative in the United States (Angrist and Evans, 1998), Argentina and Mexico (Cruces and Galiani, 2007), France (Moschion, 2009) and Canada (Frenette, 2010). Institutional differences could potentially account for these mixed international results. Moschion (2011) indeed finds that different paid parental leave schemes lead to different estimates within France. This paper builds on this literature and represents the first such study for Australia. Interestingly, estimates for Australia are likely to be less dependent on institutions, due to the absence of a nationwide paid parental leave prior to January 2011.

Another contribution of this paper is to compare results for Australia with earlier results for other countries in the light of differences in national family policies. A better understanding of the effects of such policies is essential when one of the priorities in developed countries is to help mothers better reconcile work and family life, i.e. to reduce the potential constraints relating to women's fertility and labour supply decisions. If having more children is one of the reasons why mothers' employment rates are lower than those of fathers', policy makers might want to reduce this negative link so as to enhance fertility without reducing mothers' labour market participation. A strand of the economic literature indeed interprets the relationship between fertility and mothers' labour market participation as an indicator of the success of family policies in reconciling such difficulties. Specifically, Bernhardt (1993) and more recently Del Boca et al. (2005) argue that the negative correlation between fertility

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[1] For example, in Australia, the labour force participation rate of 15-64 year old women rose from 45% in 1970 to 70% in 2009, whereas men's labour force participation rate decreased from 91% to 83% during the same time period (OECD).

and mothers' labour supply may not be a direct consequence of childbearing, but rather of the process of caring for and raising children. Thus, "the negative association between fertility and labour force participation can be expected to diminish as the conflict between work and family responsibilities is reduced - whether by a change in the nature of work life, shifts in the social organization of childcare, or a combination of the two" (Brewster and Rindfuss, 1996). In other words, the size of the correlation between fertility and mothers' labour supply gives an idea of the trade-off that women have to make between having children and working. In line with this literature, I compare the estimates of the impact of fertility on mothers' labour supply obtained in previous studies using the same methodology for different countries. I then discuss these estimates in the context of different national family policies. The objective is to determine whether some sets of family policies help mothers reconcile work and family life by systematically reducing the negative impact of fertility on their labour supply.

The results show that relative to having one child, having additional children decreases mothers' labour market participation by 15.5 percentage points in 2006 in Australia. Also, hours worked are reduced by around 6 hours per week. Relative to having two children, having more than two reduces labour market participation by between 12 and 20 percentage points depending on the instrument used. In this case, hours worked are reduced by between 3 and 8 hours a week. Compared with other countries, having children has large labour supply effects in Australia. Unlike their counterparts elsewhere, fathers reduce both their labour market participation (by 10 percentage points) and their number of hours worked per week (by 4 hours) when having more than one child.

The paper is organised as follows. The next section provides a discussion of related literature, and Section 3 describes the data. Section 4 presents the identification strategy and discusses the validity of the instrumental variables. Section 5 presents the results. Section 6 provides a comparison with previous results in the literature. The last section concludes.

2 Related literature

The question of the impact of fertility on mothers' labour supply raises a major methodological issue, since fertility decisions are endogenous: they may affect mothers' labour supply, but labour supply may also affect fertility (reverse causality), and other observable or unobservable characteristics may affect both fertility and mothers' labour supply. For these reasons, standard ordinary least square estimates may be biased and cannot be interpreted as causal effects.

In an influential contribution, Angrist and Evans (1998) use the gender mix of the two eldest siblings as a random shock (instrumental variable) to fertility to estimate the causal impact of having more than

two children on mothers' participation in the labour market. American parents with same-sex siblings have a higher probability of having a third child, and in that case, mothers' participation in the labour market is reduced. Their strategy relies on the argument that the children's sex mix is randomly assigned and that it has an effect on participation only through its impact on the probability of having a third child.

Another widely used instrument in the literature is multiple births (Rosenzweig and Wolpin, 1980), which consists of the arrival of an "unexpected" child. These identification strategies have since been used in a range of countries: Great-Britain (Iacovou, 2001), Chile (Lopez de Lerida, 2005), Argentina and Mexico (Cruces and Galiani, 2007), Sweden (Hirvonen, 2008), France (Moschion, 2009) and Canada (Frenette, 2010). Overall, fertility has no significant impact on mothers' labour supply in Sweden, Great-Britain and Chile, whereas the effect is negative in the United States, Argentina, Mexico, France and Canada. However, even when a negative effect is found, its magnitude is highly heterogeneous: in the 1990's, the effect of having more than two children amounts to nearly -20 percentage points in France, whereas it is around -10 percentage points in United States and Canada and about -7 percentage points in Latin America. Additional evidence for other countries is thus needed to further investigate the impact of fertility on mothers' labour supply and its variation across countries.

There is Australian evidence of mixed gender preference, with parents of same-sex siblings more likely to have an additional child (Gray and Evans, 2006). Leigh (2009) also finds that they are less likely to get married. Dockery et al. (2007) use the gender mix as an exogenous variation in family size to assess the impact of public housing subsidies on labour supply (provided that larger families get higher public housing subsidies). However, this source of exogenous variation in fertility has not been used in Australia to estimate the impact of fertility on mothers' labour supply[2]. Investigating this issue for Australia contributes to the international literature by providing an interesting institutional environment in which no national paid parental leave scheme existed before 2011. Exploiting the 1994 reform of the French paid parental leave to estimate the impact of fertility on mothers' labour market participation (with gender mix and twin births instruments) before and after the reform, Moschion (2011) shows that such policies influence the trade-off between fertility and labour supply. Australian results thus supplement the literature with estimates unaffected by this specific type of family policy.

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[2]   In this matter, the Australian literature shows that, as in other countries, fertility and mothers' labour supply are negatively linked but it does not address directly the issue of fertility endogeneity: Vella (1993), Chapman et al. (2001) and Breusch and Gray (2004) report negative correlations between the presence of children and mothers' labour supply and earnings. In a macroeconomic framework, Narayan and Smith (2006) provide some evidence of a causal relationship running from fertility rate to labour force participation rate, in the short as well as in the long run (using Granger causality tests).

More generally, the variety of results obtained with the exact same methodology suggests that family policies may contribute to cross-country differences, but none of the other studies mentioned above explicitly consider this issue. A related literature links the evolution of the relationship between fertility and women's labour supply at the macroeconomic level with the development of specific family policies. This literature tries to determine whether the reversal of the correlation between fertility rates and women's labour market participation rates from negative to positive in the middle of the 1980's[3] (i.e. Bernhardt (1993); Brewster and Rindfuss (1996)) could be attributed to the success of specific family policies. Synthesising European and American research, Brewster and Rindfuss (2000) argue that in countries where both fertility and women's labour market participation rates are high, women have succeeded in combining family and professional responsibilities, while in others they have not. This is also the interpretation of the OECD: "In 2009, apart from the general increase in female employment, OECD countries with higher rates of female employment also had relatively high fertility rates... Clearly, the degree of incompatibility between paid work and having children has diminished, but there are substantial cross-country differences: combining childrearing and being in employment is most difficult in the Eastern European and Mediterranean countries, as well as in Japan, Korea and Mexico, and seems most compatible in Nordic countries, New Zealand and the United States"[4]. At the microeconomic level, however, the relationship between fertility and labour supply remains negative: in every country, mothers with more children are less likely to be employed. But there is some evidence that the magnitude of the negative correlation between fertility and labour force participation varies with the institutional context (Kögel, 2004). In particular, it was reduced after 1985 in some European countries, precisely at the time when reconciling policies were implemented. Thévenon (2009) confirms that the correlation between women's labour market participation and the number of children varies with family policies.

However, these studies fail to identify the causal effect of family policies on the way mothers reconcile work and family life. Firstly, using cross-country analysis, it is difficult to attribute all observed differences between countries to diverse family policies. Historical and cultural differences between countries may explain why different policies are implemented, and these may also contribute to observed differences in terms of fertility and labour supply. It might also be that differences in fertility and labour supply behaviours led to the development of different family policies. Secondly, using total fertility rates and labour force participation rates, macroeconomic studies are unable to determine to which degree choices and constraints contribute to, and impact on, the relationship between fertility and women's labour market participation. Also, microeconomic studies (Kögel, 2004, Thévenon, 2009) focus on the correlation between fertility and mothers' labour supply rather

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[3]   Until the mid-1980's, countries with higher levels of fertility had lower levels of women's labour market participation. This correlation reversed and became positive in the late 1980's (Appendix 1).

[4]   Source: http://www.oecd.org/document/4/0,3746,en_2649_34819_37836996_1_1_1_1,00.html, then under "SF2.1 Fertility rates", pdf document.

than on a causal effect. Consequently, results are difficult to interpret: everywhere, mothers with more children are the ones who have a lower labour force participation rate. But is this because they have a hard time reconciling work and family life (i.e. constraints) or are these two behaviours explained by common determinants (choice)?

In this paper, I compare the results of studies using the exact same methodology to identify the causal impact of fertility on mothers' labour supply. The objective is to identify regularities in the link between family policies and the impact of fertility on mothers' labour supply. Solving the issue associated with the endogeneity of fertility improves the understanding of how family policies might be contributing to the constraints weighing on mothers' labour supply decisions.

3 Data description and samples

The analysis is conducted using the 2006 Census 5% sample, provided by the Australian Bureau of Statistics (ABS). The Census contains detailed information including age, sex, family situation, country of birth, ancestry, statistical region of usual residence, religious affiliation, educational level, participation in the labour market and the number of hours spent weekly in paid work and in unpaid domestic work for each respondent. It also documents the number, sex and age of each child living in the household. Other databases such as the Household, Income and Labour Dynamics in Australia (HILDA) Survey also provide this information. However, the Census has the advantage of containing a larger number of observations, which is a necessary condition to obtaining precise instrumental variable estimates.

The study focuses on women, aged 21 to 40, with at least one child. Similar to Angrist and Evans (1998), I restrict the sample to fairly young mothers because I have information only on children living in the household. This prevents us from underestimating the total number of children at the time of the survey and from introducing errors to the ranking of siblings. Women who are more than 40 years old have a higher probability of having adult children who live outside of the parental home, and who thus remain unobserved in the survey. To assess whether this population restriction biases the results, I check that results for mothers aged 21 to 35, and 21 to 45, are consistent.

The Census also provides information on whether each child in the household is biological or adopted, or a step-child of the male/female parent. Mothers having only step-children are dropped: out of 66,655 mothers, aged 21 to 40, with at least one child in the household, I am left with 65,760 (i.e. 98.66% of the initial sample) mothers, aged 21 to 40, with at least one child of their own (born or adopted) in the household.

As in Angrist and Evans (1998), I further restrict the sample to mothers whose oldest own child in the household is 18 or younger, to minimise errors on the rank of siblings (and thus the construction of our instrumental variables) as mothers with older children are more likely to have additional children outside of the parental home. A further 1070 observations are thus dropped[5]. For the same reason, the information on the total number of children born to a mother is used to withdraw those mothers with more offspring than the number of children she has currently living in the household (as these mothers obviously have children born or adopted outside the household). This reduces the sample by 6.77%, to 60,309 observations. Finally, I exclude mothers with missing labour market participation information, as this is the main outcome under study: 1.22% observations are, therefore, dropped.

Our final sample of mothers with at least one child of their own (born or adopted), that is, a child or children, aged 18 or less, and such that none have left the household, amounts to 59,573 observations. The sub-sample of these mothers who are parents to at least two children contains 40,962 observations. The above two samples will be used, respectively, to study the impact of having more than one / two child(ren), respectively, on mothers' outcomes.

The sample selection was made with consideration to the mothers' own children, as it seems unlikely that a woman with only step-children would adapt her labour market behaviour to her responsibilities toward step-children. However, for mothers with children of their own in the household, adding step-children might affect their behaviour. I thus take into account all children in the household (including step-children) to construct the familial unit I analyse: i.e., the number of children and the sex of the two eldest children. Another reason to analyse all children in the household is to have results comparable with previous studies. Since this choice could bias the results, I check that restricting the sample to include only mothers who are living with their own children does not alter the results. This is not surprising as only 1.42% of mothers in our sample are living with non-biological children.

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[5]   Excluding mothers from the study whose oldest step-child is older than 18, only represented an additional reduction of 110 observations (0.17%). Therefore, these were kept in the sample because, despite the possibility that she may have older step-children, there is no reason to believe this would be the case for her own children.

4 Empirical framework

4.1 Econometric model and identification strategy

The econometric model is a two-stage linear probability model identical to that used by Angrist and Evans (1998). Since fertility decisions are endogenous, ordinary least square estimates are biased. Instrumental variables are thus used to correct for this endogeneity[6]. Directly comparing the labour supply of mothers with more than n children, with that of mothers with only n children, might not give the impact of fertility on labour supply decisions, if mothers who choose to have more than n children have specific unobserved characteristics that explain both their fertility and labour supply decisions. Another source of potential bias comes from the fact that labour market behaviours may influence fertility decisions.

To provide unbiased estimates of the effect of fertility on mothers' labour supply, ideally one would compare the labour supply of each mother in two situations: the one in which they have n children, with the one in which they have more than n. The problem is that the counterfactual is not observed. The use of instruments, randomly assigned and affecting labour supply decisions only through fertility, is a solution to this issue. All the instruments considered in this paper are dummy variables so that our sample is implicitly divided into two groups: the first one has a higher "incentive" to have an additional child than the second one[7]. As a result, the proportion of mothers with an additional child is higher in the group with the higher incentive than in the other one. The causal effect of fertility on mothers' labour supply is negative if, on average, the group of mothers with the high incentive (who more frequently have another child on average) has a lower labour supply than the group with the low incentive. This method relies on the assumption that if mothers with a low incentive did have a high incentive, their fertility and labour supply decisions would be on average identical to those observed in the high incentive group.

In the model, the second-stage equation links outcomes to fertility variables. Three outcomes are studied: labour market participation, the number of weekly hours spent in paid work, and the number of weekly hours spent in unpaid domestic work. The variable for labour market participation is a

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[6]   When the endogenous explanatory variable (fertility) is a dummy, another solution to the endogeneity issue is the use of simultaneous equations with a probit regression in the first-stage (Heckman (1978)). But, when instrumental variables are available, "since the linear probability procedure is the simplest one to use, it is recommended" (Heckman, 1978). Other arguments in favour of linear probability models are that no assumptions on the residuals are necessary and its use is advised when the instrument, the endogenous variable and the dependent variable are dummies (Heckman and Macurdy, 1985). Angrist and Evans (1998) as well as Conley (2004) use a model of this type to estimate the impact of fertility on women's labour supply.

[7]   Mothers either have twins or not, and either have same-sex siblings or not. Mothers with twins or same-sex eldest siblings have a higher "incentive" to have an additional child.

dummy equal to one, if the mother is employed or unemployed, and zero if she is out of the labour force[8]. The preference given to labour force participation relies on the fact that the objective is to study the impact of fertility on the decision to work. An unemployed mother has *a priori* decided to work, which is not the case for a mother out of the labour force, even though the two situations are not clearly delineated.

Two dummy fertility variables are considered: among mothers with at least one child, the fertility variable is equal to 1 if they have more than one child, and 0 otherwise; among mothers with at least two children, the fertility variable is equal to 1 if they have more than two children, and 0 otherwise. The outcomes y_i are linked to fertility variables (x_i) and to other covariates w_i by the following equation:

$$y_i = \alpha'_0 \, w_i + \beta_1 x_i + \varepsilon_i \qquad (1)$$

The coefficient β_1 gives the impact of having more than one (two) child(ren) on the different outcomes.

The first-stage equation links the fertility variables to the instruments. The probability of having more than one child is instrumented by a dummy equal to 1, if the mother had twins at her first birth. The probability of having more than two children is instrumented either by a dummy equal to 1 if the mother had twins at her second birth, or by a dummy equal to 1 if her two eldest siblings are of the same sex. Two separate dummies for the eldest siblings being two boys or two girls are also tested. The first-stage regression connecting the fertility variable to one of the instrument above mentioned is:

$$x_i = \pi'_0 \, w_i + \gamma_1 I \, {}_i V + \eta_i \quad (2)$$

The coefficient γ_1 gives the effect of the instrumental variable on fertility.

Even though these instruments have been widely used in the literature and perform well on exogeneity checks[9], I add other covariates (w_i) to the regressions and test different specifications. Having boys or girls could have different effects on the probability of having more children if parents have a preference for gender. It could also have a direct effect on mothers' labour supply, for example if parents raise boys and girls differently; or if the sex of each child is correlated with other determinants of mothers' labour supply. I introduce the gender of the first and eventually the second child in regressions to control for specific effects of the siblings' sex.

Other covariates are: age of the mother (5-year dummies), educational level (dummy for completing year 12), region of residence (64 dummies) and country of birth (3 dummies indicating whether a mother was born in Australia, and, if not, if she arrived at least 10 years before 2006 or not). The

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[8]   I check that analysing employment instead of labour market participation does not significantly alter the results.

[9]   I provide evidence later that the instrumental variables meet standard requirements.

reason for introducing these controls is to mimic previous studies so as to have as comparable results as possible.

More complete specifications further include: age at first birth, age difference between the two first siblings (in years), marital status (dummy for being married), ancestry indicators, religious affiliation, whether all children in the household are the mother's own children. These additional controls were also considered in some of the previous studies and provide a robustness check. The age at first birth and the time interval between the first and second birth (only used for mothers with at least two children) are correlated with the probability of having more children (Breton and Prioux, 2005). An early first birth and a short time interval between the two first births may come from a desire to have a large family. Young mothers may have a particular profile in terms of background, education, family norms etc. The inclusion of these two variables captures some of the characteristics that may affect the probability of having additional children and participation in the labour market. Similarly, marital status may be correlated with the mothers' beliefs, in terms of adapting labour supply behaviour with the arrival of an additional child. Ancestry indicators are 7 dummy variables for the mothers' first and second ancestry: both Oceanian, both either European or American, both either African or Middle Eastern, both Asian, one Oceanian, other mix of ancestries, missing ancestries. Religious affiliation is grouped into three dummies: Christian, other religious denomination, no religion. Both these indicators reflect a mother's background. Finally, as discussed above, step-children might have specific effects on mothers' labour supply and I check that controlling for whether the children in the household are all the mother's own children, or not, does not alter the results.

4.2 Summary statistics

The three outcomes studied do not vary much across the two samples. The labour market participation rate of mothers with at least one child is 61% (Table 1), and that of mothers with at least two children is 60% (Table 2). Mothers with at least one (two) child(ren) work on average 14 hours per week in paid work, and 22 (23) hours per week in unpaid domestic work [10].

In terms of fertility, 69% of mothers with at least one child have two children or more, and 36% of mothers with at least two children have three or more. Around 50% of families with at least two children have same-sex eldest siblings, and a little more than 51% of first births are boys, which is consistent with national statistics. Consistently, the association boy-boy (27%) is more frequent than

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[10]   The variable for the number of weekly hours in paid work takes the value 0 for inactive and unemployed mothers, and those with less than 1 hour of paid work. It then takes the value 2.5 if the number of hours in paid work is between 1 and 5, the exact number of hours being between 6 and 59 hours per week, and 60 for 60 hours or more. The variable for the number of hours spent in unpaid domestic work takes the value 0 if nil hours are declared, 2.5 if it is less than 5 hours, 9.5 if it is 5 to 14 hours, 22 if it is 15 to 29 hours, 35 if it is 30 hours or more.

girl-girl (24%). Twin births at first and second birth represent respectively 1.7% and 1.5% of births, which is representative of the Australian twin birth rate (the ABS reports twin birth rates at around 1.5% in the 1990's and 2000's).

Mothers with at least one (two) child(ren) are on average 33 (34) years old and had their first child at 26 (25) years old (Appendices 2 and 3). 58% (55%) of the mothers with at least one (two) child(ren) completed Year 12. These characteristics are not independent of the research question and might be very specific to our sample of young mothers. To test whether our results depend on the fact that I include only young mothers, our results will be compared with those obtained for mothers aged 21 to 45. In these extended samples, the mothers were on average older, had their first child slightly later (27/26), but did not have more education (58%/55%).

Mothers with at least one (two) child(ren) were married in 70% (75%) of cases. They have diverse ancestries: 41% (42%) have at least one Oceanian ancestry; 41% (41%) have mixed ancestries, none of them being Oceanian; and 14% (14%) are from European or American descents. 73% (74%) of them were born in Australia, while 13% (14%) were born overseas and arrived in Australia more than 10 years prior to 2006, and 10% (9%) were born overseas and arrived in Australia less than 10 years prior to 2006. With regard to religion, 66% (68%) of mothers with at least one (two) child(ren) are Christians. Mothers with at least one child have slightly younger children: 44% of them have a youngest child between 0 and 2 years old, compared to 40% of mothers with at least two children. Respectively, 99% and 98% live only with their own children.

4.3 Validity of the instrumental variables

A concern when using instrumental variables is their exogeneity. There is no direct test of the exogeneity assumption but indirect tests include checking if the instrumental variables are unexpectedly related to observable characteristics. Differences in average characteristics by gender mix and twin births are reported in Tables 1 and 2. Mothers with same-sex eldest siblings differ from mothers with different-sex siblings in terms of labour supply and fertility behaviour as expected: 39% of mothers with same-sex eldest siblings have more than two children which is the case of only 33% of mothers with different-sex eldest siblings [11]. However, they do not show significant differences in terms of age, education, ancestry, country of birth, age at first birth, marital status and religious affiliation (Appendix 3). Mothers with same-sex siblings are slightly less likely to live only with their own children (0.2 percentage points) and have a somewhat shorter age difference between their two first children (2 weeks), but differences are so small that the inclusion of these variables in the analysis

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[11] This is very close to previous statistics for Australia reported in Dockery et al. (2007) which are respectively 39% and 34%.

is unlikely to change the estimates. I also find that mothers with same-sex eldest siblings (who are more likely to have more children) have younger children on average than mothers with different-sex eldest siblings.

Mothers with twins display the traditional differences linked to the fact that the probability of having twins increases with age (Appendices 2 and 3): they are slightly older, have had their first child later, and in the case of Twins-2, are more often born in Australia and have a larger age difference between the two first children. They also show expected differences as mothers with Twins-1 have a 0 age difference between their two first children, and mothers with twins generally have older children. Other differences in terms of children's gender, mothers' ancestry and own children are fairly small.

As a consequence, gender mix and twin births are appropriate instruments for estimating the impact of fertility in the Australian context.

5 Results

5.1 The effect of gender mix and twins on fertility

Mothers with twins at first birth all have a second child, whereas only 68% of other mothers with at least one child have a second child (Table 1). As a result, the first stage estimates indicate that mothers with twins at first birth are 32 percentage points more likely to have at least a second child than other mothers with at least one child (Table 3). Similarly, having twins at second birth increases the probability of having more than two children by about 65 percentage points. Mothers with same-sex eldest siblings are 6.5 percentage points more likely to have more than two children than mothers with different-sex siblings, and no difference appears in the estimates when looking at having two boys or two girls separately. This suggests that in Australia, parents do not favour one gender over the other.

The Fisher statistics are far above the standard requirement of 10 (Bound, Jaeger and Baker 1995), and confirms that our instruments have sufficient explanatory power. Adding controls to the first-stage regression further tests the exogeneity of our instrumental variables. Overall, the two alternative specifications considered produce the same results as the model without controls. The coefficients for the gender mix of children are not significantly different when different sets of controls are added. Unsurprisingly, the estimates for the twin variables vary slightly with the different sets of controls. This is consistent with previous results, and the fact that the probability of having twins and the probability of having additional children, both increase with age.

5.2 The effect of fertility on mothers' outcomes

Conditional on observable characteristics, mothers with more children have a lower participation rate (Table 4). OLS estimates indicate that mothers with at least two children have participation rates that are 11 percentage points lower than their peers with only one child. And mothers with at least three children participate less than mothers with two children by 14 percentage points. With or without controls, instrumental variable estimates show that fertility has a negative impact on mothers' labour market participation. With controls (3rd column), having more than one child decreases labour market participation by 15.5 percentage points, and having more than two by between 12 and 20 percentage points, depending on the instrument used. The Same-Sex instrument and the Twins-2 instrument bring somewhat different estimates, but both are significantly negative. Consistent with previous studies, estimates using twin births as an instrument are smaller than estimates using gender mix. Comparing the different 2SLS specifications, adding control variables do not alter the results, which is consistent with the assumption that the instruments are exogenous. Also, the Hansen statistics show no significant difference between the 2 Boys and 2 Girls instruments. Even if OLS and 2SLS estimates seem fairly different in magnitude, these differences are not significant due to the small precision of the 2SLS estimates[12].

Across the board, additional children result in mothers spending less time in paid work (Table 5). Having more than one child reduces the number of hours worked by around 6 hours per week, and having more than two reduces them by 3 to 8 hours a week (3rd column). Results are consistent across specifications.

In contrast to participation and hours worked, the relationship between children and mothers' unpaid domestic work depends on the instrument considered (Table 6). With the Twins instrument, having additional children increases domestic work by about 4-5 hours per week (3rd column); but with the Same-Sex instrument, results suggest that additional children have no effect on time spent on domestic work. This suggests that the increase in domestic work could be very specific to the birth of twins, but not extendable to other types of additional births. Twins' lower birth weight and zero spacing between them may explain an additional domestic workload specific to twins. Black et alii. (2010) find the same type of difference using gender mix and twins as instruments to estimate the impact of family size on the IQ score of men in Norway. They explain differences in estimates by the fact that, while increases in family size resulting from gender mix are expected, those occurring because of twin births are unexpected. In our case, it could be that parents adapt differently to expected and unexpected

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[12]   For example, for Twins 1, the difference between the two coefficients is 0.155-0.112=0.043 with a standard error of $(0.052^2+0.004^2)^{0.5} = 0.052$.

births in terms of time use. Especially, the rise in domestic workload due to an additional child might be outsourced when the additional child is expected and done within the household when the child was unexpected.

Compared with previous results (Table 7), having more than two children substantially reduces mothers' labour market participation in Australia (12 to 20 percentage points). Estimates are higher than in the United States: Angrist and Evans (1998) estimate a drop in labour market participation of 8 to 12 percentage points when having more than 2 children. They are also higher than in Canada (-6 to -12 percentage points, Frenette, 2010[13]), Argentina (-6 percentage points, Cruces and Galiani, 2007), Mexico (-8 percentage points, Cruces and Galiani, 2007) and Sweden (insignificant effect, Hirvonen, 2008). Estimates are also more negative than in Great-Britain (Iacovou, 2001) and Chile (Lopez de Lerida, 2005) who both find insignificant impacts of having more than two children. However, these studies are hardly comparable with other studies, as the samples used are considerably smaller. The only country displaying higher negative consequences of having more than two children on mothers' labour market participation is France (Moschion, 2009: -20 percentage points when using simultaneously the gender mix and Twins-2 instruments). Regarding the impacts of third births on the number of hours worked per week, results are more homogenous across countries: the effect is between -3 to -5 hours for United States, -3 to -5 for Canada and -2 in France (but the estimation sample includes only employed mothers so that the effect could be underestimated). Frenette (2010) also studies a variety of outcomes for Canada including unpaid housework. As for Australia, he finds increases in unpaid domestic work of around 4 hours per week as the number of children increases. However, and unlike results for Australia, his estimates are significant also with the same-sex instrument suggesting that in Canada, this effect is not specific to unexpected births.

5.3 Heterogeneity by age of the youngest child and mothers' level of education

The consequences of additional children on mothers' outcomes may vary with the youngest child's age. Models that include interactions between the number of children and three categories for the age of the youngest child (Table 8) suggest that this is the case[14]. The negative impact of additional children on mothers' labour market participation is higher when the youngest child is under three (-28 percentage points when having more than one child), even though differences in estimates by age are not always significant. The impact of additional children on the number of hours worked varies in the

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[13]   Frenette uses employment as an outcome instead of labour market participation but comparison of these different outcomes for Argentina, Mexico and Australia suggests that in countries where the unemployment rate of mothers is low, using one or the other does not alter the results (even though they are slightly lower when considering employment).

[14]   Results for unpaid domestic work are not shown in the table but are available upon request.

opposite way: it is actually higher when the youngest child is aged 6 and above. This suggests that whereas additional children decrease mothers' participation in the labour market when young, they are more likely to increase part-time employment when older. These results are consistent with the fact that Australia does not provide universal child care facilities for children under 3 and that compulsory schooling starts from the age of 6. It might thus be hard to combine work and family life when children are under 3, and become easier when they start school. Ulker and Guven (2011) consistently find that in Australia, mothers facing difficulties in finding appropriate early child care take longer maternity leaves. This confirms trends already observed in France (Moschion, 2009) where withdrawals from the labour market are more important when the youngest child is less than 6 years old.

Previous studies also emphasised that according to their level of education, mothers adapt their labour supply differently when having additional children. Angrist and Evans (1998) and Moschion (2009) accordingly find that for mothers with an education above high school, having more than two children does not alter their labour market participation. Table 9 shows no evidence of this kind of heterogeneity in Australia[15]: OLS estimates show that, conditional on observable characteristics, the correlation between the number of children and mothers' labour supply is identical across education levels: whether mothers completed year 12 or not, the difference in labour supply between mothers with n and mothers with more than n children is the same. Additionally, no difference appears when looking at causal effects: whether mothers completed year 12 or not, they reduce their labour supply when having additional children. In Australia, highly-skilled mothers are more likely to have access to paid parental leaves from their employer than lower-skilled mothers which may enhance their withdrawals. Also, differences in culture, and especially in norms regarding mothers' withdrawals from the labour market to care for their children, (Cobb-Clark et al. 2000) could contribute to the results.

5.4 The effect of fertility on fathers' outcomes

The international literature suggests that fathers either do not adapt or increase their labour supply when having additional children. More precisely, positive effects on fathers' labour market participation are found by Angrist and Evans (1998) and Moschion (2011). These positive effects coincide with the highest negative effects for mothers (lower educated mothers in the American case and, in the French case, before the reform of the paid parental leave) as if fathers were compensating the wage loss resulting from mothers' leaving the labour market.

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[15]   Results for unpaid domestic work are not shown in the table but are available upon request.

Interestingly, for Australia results are quite different. When having more than two children, fathers do not significantly change their labour supply (Table 10) but even though estimates are insignificant, they are mostly of a negative sign, which is not the case in other countries. Moreover, with Twins-1, 2SLS estimates are significantly negative: when having more than one child, fathers reduce both their labour market participation (by 10 percentage points) and their number of hours worked per week (by 4 hours). Also, and as for mothers, having twins increases the time spent by fathers on unpaid domestic work (between 2-2.5 hours). Results are consistent with the different sets of controls (estimates with the complete list of controls is not shown but is available upon request).

In other countries, fathers' behaviour differs significantly from mothers' when the number of children increases, whereas in Australia, additional children have the same type of effects on mothers and fathers, even though effects for fathers are definitely smaller in magnitude[16]. The results suggest that European and American parents specialise, by gender, in different tasks as the number of children increases, whereas Australian parents share responsibilities.

5.5 Robustness checks

The validity of the results was tested for different outcomes, and set of control variables and samples. When studying employment as an outcome, estimates are somewhat smaller but never significantly different from those for labour market participation[17]. Also, when the additional set of control variables is added (age at first birth, age difference between the two first siblings, marital status, ancestry indicators, religious affiliation, whether all children in the household are the mother's own children), results are close to those with no controls and those with the basic set of controls (Appendix 4). This is consistent with the exogeneity assumption of the instruments. When the samples are restricted to mothers living only with their own children (Appendix 5), results are very similar to those obtained on the whole sample. More precisely, all significance levels are identical and conclusions are unchanged. Appendices 6 and 7 also show consistent results for the samples of mothers aged 21 to 45 and 21 to 35: estimates are negative for labour market participation and hours worked, and positive or insignificant for domestic work. As expected, estimates are less precise on the smaller sample of mothers aged 21-35[18].

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[16] Consistently, the Parental Leave in Australia Survey showed that 68% of eligible mothers with a child born between March 2003 and February 2004 took leave, while the corresponding percentage for fathers was 30%.

[17] This is not surprising as only 3.6% of mothers with at least one child are unemployed. Results are available upon request.

[18] Results for the different samples are also consistent with the additional set of control variables. Results are available upon request.

6 Comparison with previous results and discussion

The results obtained for Australia supplement the international findings on the impact of the number of children on mothers' labour supply. This section focuses on the heterogeneity of this effect across countries in the context of different national family policies. The objective of this comparison is to shed light on which family policies are associated with lower negative impacts of fertility on mothers' labour supply, suggesting that they help mothers to reconcile work and family life. This is the first study to do so using causal effect estimates based on the Rosenzweig-Wolpin and Angrist-Evans methodologies. Further, the addition of Australia to this comparison set increases the variation in policies, given the absence of a national paid parental leave scheme prior to 2011.

Eight papers study the causal effect of fertility on mothers' labour supply in nine countries (Table 7). The main results of these papers focus on the impact of having more than two children on mothers' labour market participation and show varying results: the highest negative impact is found for France and amounts to 20 percentage points (using simultaneously twin births and gender mix as instruments). Comparable results for Australia are comprised between 12 and 20 percentage points depending on the instrument used. Angrist and Evans (1998) estimate a negative impact of 8 to 12 percentage points for United States; Frenette (2010) estimates -6 to -12 percentage points for Canada; Cruces and Galiani (2007) -8 percentage points for Mexico and -6 percentage points for Argentina; and Hirvonen (2008) finds an insignificant (although precisely estimated) effect for Sweden. Iacovou (2001) and Lopez de Lerida (2005) also find insignificant impacts of having more than two children for Great-Britain and Chile, but results are hardly comparable as the samples used for these studies are relatively small (respectively 3,200 and 7,100)[19].

Comparing these results and the main family policies in each country (Table 11)[20], countries can be grouped in three main categories: first, those characterised by a very strong impact of fertility (France); second, those with medium impacts (Australia, United States, Canada, Argentina, Mexico); and third, those with no impact (Sweden). Were we to study total fertility rates and labour force participation rates instead of causal effects, the classification would have been different: with high levels of fertility and women's labour market participation, the United States and France would perform better, while Mexico would be downgraded for a very low level of women's employment.

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[19]   These studies will thus not be used further in the comparison. One reason for the results might be that what counts in these countries is not going from two to more than two children. For Great-Britain, going from zero to one and then two seems far more crucial: "among women with no children, almost 80% are engaged in full-time market work. The number in full-time work falls to 37% for women with one child, to 18% for women with two children" (Iacouvou, 2001). Concerning Chile, Lopez de Lerida's (2005) result indicates that going from one to more than one actually impacts negatively mothers' labour market participation.

[20]   Information and indicators relating to family policies come from the OECD Family database. For more information, please refer to Appendix 8 and Adema et al. (2009).

The United States and France have higher negative impacts of fertility on mothers' labour market participation than suggested by cross-country correlations, whereas the opposite is true for Mexico. This seeming contradiction could result from a polarisation of behaviours, with some women having high fertility rates and others having high labour market participation rates. Consequently, United States and France would perform well, on average, in terms of fertility and women labour market participation. But, as the number of children increases, mothers struggle to balance work and family life, explaining the large negative impacts of fertility on mothers' labour market participation in these countries. In terms of family policies, this grouping matches that proposed by Thévenon (2011). Using a large set of family policy indicators in a principal component analysis framework, he classifies 28 OECD countries in 5 clusters (comprising Nordic, Anglo-Saxon and continental European clusters).

In France, children lead to a large reduction in mothers' workforce participation, as family policies are characterised by a paid parental leave scheme which strongly encourages mothers with more than two children to quit the labour market, even though the provision of childcare is widespread and low cost. On the one hand, the French system is characterised by extensive child care: enrolment rates are high (43% of children aged 0-2 are enrolled in formal child care in full time equivalent and 100% of 3-5 years old are enrolled in early education), low cost (11% of family net income) and the use of informal child care is quite important. These characteristics should help mothers reconcile work and family life and lower the negative impact of the number of children on mothers' labour market participation. On the other hand, the French parental leave is paid, long (three years at most) and until 1994, eligible only for mothers with at least three children. This explains the very strong impact of third births on mothers' labour supply in the early 1990's (Moschion, 2011). In addition, the French income tax system tends to be relatively favourable to single-earner couples. Overall, the magnitude of the negative impact of fertility on mothers' labour market participation seems to be mainly driven by the paid parental leave scheme.

The second group of countries consists of the Anglo-Saxon and Latin American countries, which display medium negative impacts of fertility (ranging from 6 to 20 percentage points) and broadly similar family policies: with low levels of public childcare provisions, mothers quit the labour market when having more children, even without financial support. In these countries, maternal leave is relatively short and/or weakly remunerated and national paid parental leaves are either nonexistent or short (35 weeks for Canada). The supply of formal child care is low for children under the age of 6: for example, for children aged 0-2, enrolment rates in full time equivalent are 32% for the United States, 26% for Canada, 15% for Australia and 8% for Mexico[21]. For the United States and Canada, child care is also very expensive and represents respectively 19% and 22% of the family net income.

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[21]   A significant part of childcare provision is not accounted for in these statistics since it can be local, private or informal.

Public expenditures on child care support are also lower relative to other countries. On the whole, in these countries, mothers who leave the labour market as they have more children have no financial support. Yet, they do withdraw from the labour market, probably because without extensive and low cost child care, they are not able to reconcile work and family life. However, they do less than when there are explicit incentives to quit the labour market (i.e. France).

A closer look into this group shows that although the price of formal child care is relatively low in Australia compared with other Anglo-Saxon countries, a higher proportion of mothers quit the labour market when having more than two children. Other results in the paper also show a high negative impact when going from one to more than one child in Australia. This observation parallels previous findings, showing low elasticities of mothers' labour supply to child care costs in Australia (Doiron and Kalb, 2005). Insufficient supply of early childcare could explain this apparent contradiction: Wrohlich (2006) and Del Boca and Vuri (2007) show, for Germany and Italy respectively, that in the presence of rationing (in the number of places and/or hours of care[22]), mothers' labour supply is not responsive to changes in child care costs. The rationing hypothesis is consistent with the fact that mothers in Australia use unpaid leave more frequently than in other countries[23] as well as informal child care. For Australia, Breunig et al. (2011) find strong associations between mothers' labour supply and the subjective evaluation by neighbours of child care availability, quality and cost. Also, Cobb-Clark et al. (2000) argue that mothers' preferences and cultural norms concerning "child rearing and the ideal division of labour between husbands and wives ... keep some women with children out of the labour market". As a result, child care availability and cultural norms may contribute to this relatively large impact of fertility in Australia. In this context, the development of expanded child care with longer hours could have positive effects on mothers' work (Ferrera, 1996). Similar to the United States, work-in benefits targeting low-income households could also encourage mothers re-entering the labour market after a period of inactivity (Kalb and Thoresen, 2010).

Another interesting feature is that although Mexico has the weakest enrolment rate in early child care and public expenditures, fertility has a less negative impact on mothers' labour market participation than in the other countries of this group. A potential reason for this is the overall low participation of women in Mexico (Appendix 1): mothers either never enter the labour market or quit it before having more than two children.

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[22] On average, Australian children aged 0-2 attend childcare for 18 hours a week compared with around 30 hours a week in all other countries under study.

[23] In Australia, 73% of mothers with children under 2 took on average 34 weeks of leave (14% on paid leave only; 22% on unpaid leave only; and, 37% on both; Pregnancy and Employment Transitions Survey in 2005, OECD). In comparison, in Canada, in 2006 about 90% of mothers took leave upon the birth/adoption of a child, of which about 10% took some unpaid leave (Beaupré and Cloutier, 2007).

Sweden appears as an exception with fertility having no effect on mothers' labour market participation. As in France, enrolment rates in early child care are high (44% in full time equivalent) and low cost (6% of net family income), and enrolment rates in early schooling are high as well (86%). But the Swedish paid parental leave is very different from the French scheme: it is shorter (12 weeks of maternity leave and 72 weeks of parental leave), better compensated (respectively 80% and 73% of previous wage) and all parents are eligible (regardless of the number of children). Incentives to share family responsibilities with fathers are added to this scheme with for example a 12 weeks paternity leave. Moreover, the Swedish income tax-system explicitly favours dual-earner families and the proportion of employers providing flexitime is relatively high.

Overall, the provision of formal child care appears as a first condition to reduce the negative impact of fertility on mothers' labour market participation[24]. When it is rare and/or expensive, as in the United States, Canada, Australia and Mexico, mothers leave the labour market when they have more than two children, even if there is no financial incentive to do so through the paid parental leave or the income tax system. It is, however, insufficient and where the provision of child care is extended, mothers' labour supply behaviour seems to be driven by other devices and especially by paid parental leave: comparing France and Sweden suggests that parental leave limited in duration, available for all parents with incentives for fathers and tax systems favouring dual-earner couples can reduce the negative impact of fertility on mothers' labour supply and thus help mothers reconcile work and family life.

7 Conclusion

This paper provides a first assessment for Australia of the impact of fertility on mothers' labour market participation, number of hours spent in paid work and unpaid domestic work per week. Using twin births and gender mix as instruments, two stage least square estimates show that having more than one child decreases labour market participation by 15.5 percentage points and hours worked by around 6 hours per week. Having more than two children reduces labour market participation by between 12 and 20 percentage points depending on the instrument used and hours worked by between 3 and 8 hours a week. Robustness checks show consistent results for the samples of mothers aged 21 to 45, and 21 to 35, the employment outcome and the subsample of mothers living only with their own children. The negative impact of additional children on mothers' labour market participation is higher when the youngest child is under three years of age. In contrast, the impact of fertility on the number of hours worked is higher when the youngest child is aged 6 and above. This suggests that whereas

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[24]   This is in line with previous studies emphasizing the key role played by child care accessibility in determining mothers' labour supply (Del Boca, 2002; Cascio, 2006; Herbst and Barnow, 2008; Ulker and Guven, 2011).

additional children decrease mothers' participation in the labour market when they are young, mothers will more likely turn to part-time employment as their children age.

In other countries, fathers either do not adapt or even increase their labour supply when having additional children, but the same is not the case in Australia. When having more than one child, fathers reduce both their labour market participation (by 10 percentage points) and their number of hours worked per week (by 4 hours). This suggests different preferences in Australia than in other countries.

Comparing and discussing results obtained with the same methodology for different countries, I analyse how the impact of fertility on mothers' labour supply varies with the different institutional contexts. It appears that mothers quit the labour market as the number of children increases, especially when public child care provision is low and/or expensive (Anglo-Saxon and Latin American countries). This happens even without financial incentives to do so (through paid parental leave for example). Where the provision of child care is extended, mothers' labour supply behaviour seems to be driven by financial incentives such as paid parental leave: comparing France and Sweden suggests that parental leave for all parents, reasonable in length and with incentives for fathers can reduce the negative impact of fertility on mothers' labour supply and thus help mothers reconcile work and family life.

The introduction of paid parental leave in Australia in January 2011 provides an interesting setting to further study how the impact of fertility on mothers' outcomes varies with family policies. As mentioned earlier, institutional characteristics might not account for the whole difference in impacts of fertility on mothers' labour market participation and future research on other potential sources, such as cultural differences or other institutional features, would contribute to the literature[25].

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[25]   For example, the use of private and informal childcare, out-of-school hours care services, legislation on family-related working time schemes (part-time, working time flexibility and arrangements).

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TABLE 1 - *Descriptive statistics, mothers aged 21-40 with at least one child*

Variable	All	Twins1	Not Twins1	Difference
Labour market part.	61.42	58.31	61.48	-3.17**
	-48.68	(49.33)	(48.67)	(1.58)
Domestic work (nb hrs)	21.57	23.22	21.54	1.68***
	(12.60)	(12.19)	(12.60)	(0.39)
Paid work (nb hrs)	14.37	12.96	14.39	-1.43***
	(16.72)	(16.11)	(16.73)	(0.52)
More than 1 child	68.76	100.00	68.23	31.77***
	(46.35)	(0.00)	(46.56)	(0.19)
Child 1 is a boy	51.37	54.38	51.31	3.07*
	(49.98)	(49.83)	(49.98)	(1.59)
Child 2 is a boy	51.70	50.45	51.73	-1.28
	(49.97)	(50.02)	(49.97)	(1.61)
Twins 1	1.67	100.00	0.00	100.00***
	(12.80)	(0.00)	(0.00)	(0.00)
N	59573	993	58580	59573

Sample: mothers with at least one child of their own aged 18 or less (born or adopted) and such that none have left the household.

SOURCE: Census 2006 (5%), ABS.

TABLE 2 - *Descriptive statistics, mothers aged 21-40 with at least two children*

Variable	All	Same sex	Not same sex	Difference	Twins2	Not Twins2	Difference
Labour market part.	59.78	59.00	60.57	-1.57***	53.24	59.88	-6.64***
	(49.03)	(49.18)	(48.87)	(0.48)	(49.94)	(49.01)	(2.02)
Domestic work (nb hrs)	22.75	22.78	22.73	0.05	25.37	22.71	2.66***
	(12.47)	(12.48)	(12.46)	(0.12)	(11.73)	(12.48)	(0.48)
Paid work (nb hrs)	13.86	13.56	14.16	-0.60***	12.40	13.88	-1.48**
	(16.44)	(16.32)	(16.56)	(0.16)	(16.40)	(16.44)	(0.67)
More than 2 children	36.28	39.49	32.98	6.50***	100.00	35.30	64.70***
	(48.08)	(48.88)	(47.02)	(0.47)	(0.00)	(47.79)	(0.24)
Same sex	50.63	100.00	0.00	100.00***	48.54	50.66	-2.12
	(50.00)	(0.00)	(0.00)	(0.00)	(50.02)	(50.00)	(2.03)
Boy-boy	26.92	53.16	0.00	53.16***	29.29	26.88	2.41
	(44.35)	(49.90)	(0.00)	(0.35)	(45.55)	(44.33)	(1.84)
Girl-girl	23.71	46.84	0.00	46.84***	19.26	23.78	-4.53***
	(42.53)	(49.90)	(0.00)	(0.35)	(39.46)	(42.58)	(1.60)
Twins 2	1.51	1.45	1.57	-0.13	100.00	0.00	-
	(12.19)	(11.94)	(12.44)	(0.12)	(0.00)	(0.00)	
N	40962	20739	20223	40962	618	40344	40962

Sample: mothers with at least two children, among which at least one is their own aged 18 or less (born or adopted) and such that none of theirs have left the household.

SOURCE: Census 2006 (5%), ABS.

TABLE 3 - *Effect of having twins or same sex eldest siblings on the probability of having more than one (two) child(ren)*

	No controls	Controls 1	Controls 2
Twins 1	0.318***	0.297***	0.337***
	(0.002)	(0.005)	(0.007)
F	462		
R^2	0.0077	0.1057	0.2692
N	59573	59573	59573
Same sex	0.065***	0.066***	0.063***
	(0.005)	(0.005)	(0.004)
F	188.4		
R^2	0.0045	0.0317	0.1810
Boy-boy	0.065***	0.066***	0.065***
	(0.006)	(0.007)	(0.006)
Girl-girl	0.065***	0.065***	0.062***
	(0.006)	(0.007)	(0.006)
F	94.2		
R^2	0.0045	0.0317	0.1810
Twins 2	0.647***	0.640***	0.672***
	(0.002)	(0.004)	(0.009)
F	1133		
R^2	0.0269	0.0534	0.2057
N	40962	40962	40962

Levels of significance: *: 10%   **: 5%   ***: 1%

SAMPLE: Mothers with at least one child of their own aged 18 or less (born or adopted) and such that none have left the household (N=59,573). In the second part of the table, the sample is restricted to mothers with at least two children in the household (N=40,962).

NOTE: Robust standard errors are reported in parentheses. Controls 1 include age, level of education, region of residence, interaction variable between country of birth and age of arrival in Australia, sex of the first and, eventually, the second child. Controls 2 further includes age at first birth, age difference between the two first siblings, marital status, ancestry, religion and whether all children in the household are the mother's.

SOURCE: Census 2006 (5%), ABS.

TABLE 4 - *Effect of having more than one (two) child(ren) on mothers' labour market participation*

	OLS Controls 1	IV No controls	IV Controls 1
More than 1 child	-0.112***	-0.100**	-0.155***
(Twins 1)	(0.004)	(0.050)	(0.052)
N	59573	59573	59573
More than 2 children	-0.142***	-0.241***	-0.195***
(Same sex)	(0.005)	(0.074)	(0.071)
More than 2 children	-0.142***	-0.241***	-0.197***
(Boy-boy & girl-girl)	(0.005)	(0.074)	(0.071)
Hansen stat	-	3.0582	0.5573
Hansen P-value	-	0.0803	0.4553
More than 2 children	-0.142***	-0.103***	-0.119***
(Twins 2)	(0.005)	(0.031)	(0.031)
N	40962	40962	40962

Levels of significance: *: 10%   **: 5%   ***: 1%

SAMPLE: Mothers with at least one child of their own aged 18 or less (born or adopted) and such that none have left the household (N=59,573). In the second part of the table, the sample is restricted to mothers with at least two children in the household (N=40,962).

NOTE: Robust standard errors are reported in parentheses. Controls 1 include age, level of education, region of residence, interaction variable between country of birth and age of arrival in Australia, sex of the first and, eventually, the second child.

SOURCE: Census 2006 (5%), ABS.

TABLE 5 - *Effect of having more than one (two) child(ren) on mothers' number of hours worked per week*

	OLS Controls 1	IV No controls	IV Controls 1
More than 1 child	-3.657***	-4.504***	-6.353***
(Twins 1)	(0.155)	(1.637)	(1.730)
N	58827	58827	58827
More than 2 children	-4.345***	-9.249***	-7.706***
(Same sex)	(0.164)	(2.537)	(2.425)
More than 2 children	-4.344***	-9.256***	-7.661***
(Boy-boy & girl-girl)	(0.164)	(2.537)	(2.422)
Hansen stat	-	0.8750	0.2142
Hansen P-value	-	0.3496	0.6435
More than 2 children	-4.345***	-2.287**	-2.826***
(Twins 2)	(0.164)	(1.031)	(1.009)
N	40439	40439	40439

Levels of significance: *: 10%   **: 5%   ***: 1%

SAMPLE: Mothers with at least one child of their own aged 18 or less (born or adopted) and such that none have left the household (N=58,827). In the second part of the table, the sample is restricted to mothers with at least two children in the household (N=40,439).

NOTE: Robust standard errors are reported in parentheses. Controls 1 include age, level of education, region of residence, interaction variable between country of birth and age of arrival in Australia, sex of the first and, eventually, the second child.

SOURCE: Census 2006 (5%), ABS.

TABLE 6 - *Effect of having more than one (two) child(ren) on mothers' number of hours in unpaid domestic work per week*

	OLS Controls 1	IV No controls	IV Controls 1
More than 1 child	3.953***	5.283***	5.216***
(Twins 1)	(0.116)	(1.239)	(1.313)
N	58356	58356	58356
More than 2 children	2.670***	0.744	0.957
(Same sex)	(0.129)	(1.887)	(1.842)
More than 2 children	2.670***	0.742	0.906
(Boy-boy & girl-girl)	(0.129)	(1.887)	(1.840)
Hansen stat	-	0.3096	0.5928
Hansen P-value	-	0.5779	0.4413
More than 2 children	2.670***	4.091***	4.026***
(Twins 2)	(0.129)	(0.741)	(0.739)
N	40072	40072	40072

Levels of significance: *: 10%   **: 5%   ***: 1%

SAMPLE: Mothers with at least one child of their own aged 18 or less (born or adopted) and such that none have left the household (N=59,573). In the second part of the table, the sample is restricted to mothers with at least two children in the household (N=40,962).

NOTE: Robust standard errors are reported in parentheses. Controls 1 include age, level of education, region of residence, interaction variable between country of birth and age of arrival in Australia, sex of the first and, eventually, the second child.

SOURCE: Census 2006 (5%), ABS.

TABLE 7 – *Main results of the literature on the impact of fertility on mothers' labour supply*

Authors	Country	Data	Sample	Main results (2SLS) (including controls)	Other population studied
Moschion, 2009	France	Labour Force Surveys (1990-2002)	Mothers aged 21-35 (N = 71,542)	LMP: - SS+T2: -0.188***(0.024) Hours/week, employed only: - SS+T2: -2.27**(0.90)	- Fathers: NS - Age of youngest child: -0.20*** when <6 yo / -0.09** when >=6 yo - Mothers' education: -0.22*** when <= HSG / NS when > HSG
Moschion, 2011	France	Labour Force Surveys (1990-1998)	Mothers aged 21-35 with at least one child (N = 37,217) / two children (N = 23,407) and at least one child aged less than three at the time of the survey	LMP (before/after PPL reform) - SS: -0.518***(0.245)/NS - T2: -0.319***(0.046)/NS - T1: -0.271***(0.049)/-0.399***(0.070)	- Fathers (SS): 0.131* (0.071)/NS
Angrist and Evans, 1998	US	1980 Census Public Use Micro Samples (PUMS)	Mothers aged 21-35 (N=394,835)	LMP: - SS: -0.120***(0.025) - T2: -0.079***(0.013) Hours/week, whole sample: - SS: -4.59***(0.95) - T2: -3.33***(0.51)	- Husbands (SS): all NS but LMP in 1990: 0.017*(0.009) - Mothers' education (SS): lower for >HSG

Study	Country	Data source	Sample	Results
Frenette, 2010	Canada	Census (2006)	Couples (N = 326,184)	Employment: -SS: -0.118***(0.057) -T2: -0.062***(0.022) Hours/week, whole sample: - SS: -5.48***(1.05) - T2: -3.09***(0.27) Unpaid housework: - SS: 4.45***(1.02) - T2: 3.68***(0.28) Fathers: Hours/week, whole sample: -SS: NS -T2: NS Unpaid housework: -SS: NS -T2: 0.96***(0.21)
Cruces and Galiani, 2007	Argentina and Mexico	Censuses: Mexico (2000), Argentina (1991)	Mothers aged 21-35 (N=599,941 for A and 458,849 for M)	Employment (A/M): - SS: -0.082**(0.032)/ - 0.063*(0.037)
Hirvonen, 2008	Sweden	Swedish population registers (1990)	Mothers aged 23-35 (N = 84,376)	LMP: - SS: NS - Fathers: NS
Iacovou, 2001	Great-Britain	National Child Development Study 1991 + the British Household Panel Study 1992	Mothers aged 33 (N=3,188) / Mothers aged 21-49 (N=1,374)	LMP (NCDS/BHPS): - BB+GG+T2: NS/NS Hours/week (NCDS), employed only: - BB+GG+T2: NS
Lopez de Lerida, 2005	Chile	National Survey of Socioeconomic Characterisation (1990-2000)	Mothers aged 24-45, with at least one child (N = 24,974) / 2 children (N = 7,150), and oldest aged less than six	LMP - SS: NS - T2: NS - T1: -0.110**(0.053)

Note: This is a summary of the aforementioned paper, it is therefore not extensive.

TABLE 8 - *Effect of having more than one (two) child(ren) on mothers' outcomes (labour market participation, number of hours in paid work) by age of the youngest child*

Labour market part.	OLS - Controls 1	IV - Controls 1
More than 1 child (Twins 1)		
0 - 2 years old	-0.139***	-0.277***
	(0.006)	(0.068)
3 - 5 years old	-0.114***	-0.119
	(0.009)	(0.118)
6 + years old	-0.051***	-0.124
	(0.007)	(0.086)
N	59573	59573
More than 2 children (Same sex)		
0 - 2 years old	-0.145***	-0.186
	(0.008)	(0.196)
3 - 5 years old	-0.128***	0.050
	(0.009)	(0.148)
6 + years old	-0.077***	-0.136*
	(0.008)	(0.077)
More than 2 children (Twins 2)		
0 - 2 years old	-0.145***	-0.132***
	(0.008)	(0.050)
3 - 5 years old	-0.128***	-0.123**
	(0.009)	(0.063)
6 + years old	-0.077***	-0.115***
	(0.008)	(0.045)
N	40962	40962
Paid work (nb hrs)	OLS - Controls 1	IV - Controls 1
More than 1 child (Twins 1)		
0 - 2 years old	-3.494***	-7.415***
	(0.193)	(1.963)
3 - 5 years old	-4.429***	-4.056
	(0.324)	(3.964)
6 + years old	-2.810***	-11.055***
	(0.303)	(3.270)
N	58827	58827
More than 2 children (Same sex)		
0 - 2 years old	-3.119***	1.470
	(0.221)	(5.822)
3 - 5 years old	-4.150***	-2.554
	(0.310)	(4.855)
6 + years old	-3.217***	-7.605**
	(0.313)	(3.133)

More than 2 children (Twins 2)		
0 - 2 years old	-3.119***	-1.727
	(0.221)	(1.436)
3 - 5 years old	-4.150***	-3.316
	(0.310)	(2.074)
6 + years old	-3.217***	-3.967**
	(0.313)	(1.656)
N	40439	40439

Levels of significance: *: 10%   **: 5%   ***: 1%

SAMPLE: Mothers with at least one child of their own aged 18 or less (born or adopted) and such that none have left the household (N=59,573). In the second part of the table, the sample is restricted to mothers with at least two children in the household (N=40,962).

NOTE: Robust standard errors are reported in parentheses. Controls 1 include age, level of education, region of residence, interaction variable between country of birth and age of arrival in Australia, sex of the first and, eventually, the second child.

SOURCE: Census 2006 (5%), ABS.

TABLE 9 - *Effect of having more than one (two) child(ren) on mothers' outcomes (labour market participation, number of hours in paid work) by level of education*

Labour market part.	OLS - Controls 1	IV - Controls 1
More than 1 child (Twins 1)		
Not year 12	-0.113***	-0.175*
	(0.007)	(0.093)
Year 12 and above	-0.111***	-0.143**
	(0.005)	(0.058)
N	59573	59573
More than 2 children (Same sex)		
Not year 12	-0.146***	-0.146*
	(0.007)	(0.084)
Year 12 and above	-0.138***	-0.262**
	(0.007)	(0.126)
More than 2 children (Twins 2)		
Not year 12	-0.146***	-0.112**
	(0.007)	(0.049)
Year 12 and above	-0.138***	-0.124***
	(0.007)	(0.039)
N	40962	40962
Paid work (nb hrs)	OLS - Controls 1	IV - Controls 1
More than 1 child (Twins 1)		
Not year 12	-3.472***	-7.706***
	(0.242)	(2.831)
Year 12 and above	-3.766***	-5.607***
	(0.195)	(2.080)
N	58827	58827
More than 2 children (Same sex)		
Not year 12	-4.470***	-6.923**
	(0.231)	(2.762)
Year 12 and above	-4.228***	-8.797**
	(0.231)	(4.457)
More than 2 children (Twins 2)		
Not year 12	-4.470***	-4.127***
	(0.231)	(1.485)
Year 12 and above	-4.228***	-1.862
	(0.231)	(1.357)
N	40439	40439

Levels of significance: *: 10%   **: 5%   ***: 1%

SAMPLE: Mothers with at least one child of their own aged 18 or less (born or adopted) and such that none have left the household (N=59,573). In the second part of the table, the sample is restricted to mothers with at least two children in the household (N=40,962).

NOTE: Robust standard errors are reported in parentheses. Controls 1 include age, level of education, region of residence, interaction variable between country of birth and age of arrival in Australia, sex of the first and, eventually, the second child.

SOURCE: Census 2006 (5%), ABS.

TABLE 10 - *Effect of having more than one (two) child(ren) on fathers' outcomes (labour market participation, number of hours in paid work and unpaid domestic work per week)*

Labour market part.	OLS Controls 1	IV No controls	IV Controls 1
More than 1 child	0.001	-0.096***	-0.102***
(Twins 1)	(0.003)	(0.034)	(0.035)
N	40302	40302	40302
More than 2 children	-0.022***	-0.037	-0.028
(Same sex)	(0.003)	(0.046)	(0.044)
More than 2 children	-0.022***	0.002	0.002
(Twins 2)	(0.003)	(0.016)	(0.016)
N	27358	27358	27358

Paid work (nb hrs)	OLS Controls 1	IV No controls	IV Controls 1
More than 1 child	0.754***	-3.685*	-4.369*
(Twins 1)	(0.191)	(2.227)	(2.278)
N	39046	39046	39046
More than 2 children	-1.689***	-3.528	-2.429
(Same sex)	(0.224)	(3.516)	(3.341)
More than 2 children	-1.689***	-0.413	-0.487
(Twins 2)	(0.224)	(1.341)	(1.287)
N	26442	26442	26442

Domestic work (nb hrs)	OLS Controls 1	IV No controls	IV Controls 1
More than 1 child	0.377***	2.527**	2.562**
(Twins 1)	(0.377)	(2.527)	(2.562)
N	39355	39355	39355
More than 2 children	0.313***	1.227	1.631
(Same sex)	(0.119)	(1.896)	(1.843)
More than 2 children	0.313***	2.068***	2.072***
(Twins 2)	(0.119)	(0.761)	(0.772)
N	26702	26702	26702

Levels of significance: *: 10% **: 5% ***: 1%

SAMPLE: Fathers with at least one child of their own aged 18 or less (born or adopted) and such that none have left the household (N=40,302). In the second part of the table, the sample is restricted to fathers with at least two children in the household (N=27,358).

NOTE: Robust standard errors are reported in parentheses. Controls 1 include age, level of education, region of residence, interaction variable between country of birth and age of arrival in Australia, sex of the first and, eventually, the second child.

SOURCE: Census 2006 (5%), ABS.

TABLE 11 – *Maternal employment rates and main family policies in US, Mexico, Sweden, France, Canada, Australia*

| Country	Maternal employment rates (by number of children)				Parental leave Number of weeks (% rate of allowance)			Childcare for 0-2 years old children				Childcare for 3-5 years old children				Establishments providing flexi-time (in %)	Tax system, Difference in net transfers to government Single (133/0) vs. equal dual-earner couples (67/67)
	Child under 3	1	2	3+	Maternity	Paternity	Parental	Enrolment rates (formal care, FTE=30h)	Net costs (% of family net income)	Expenditure per child in US$ (PPP converted)	Informal care (% of child.)	Enrolment rates (early education)	Expenditure per child in US$ (PPP converted)	Informal care (% of child.)	Private care		
FRA	57.4	78.9	75.4	56.9	16 (100.0)	2 (100.0)	156 (19.9)	43.4	11.3	2858.2	17.7	100.2	4679.1	19.6		25	-1.7
AUS	48.3	63.3	58.1		6 (0.0)		46 (0.0)	15.0	9.7	1725.8	24.2	59.4	5708.7	21.4	prominent	41	28.5
US	54.2				12 (0.0)	12 (0.0)		32.0	19.4	794.1	33.1	58.4	4659.6	20.9	prominent	37	0
CAN	58.7	70.1	73.2	66.3	15 (55.3)		35 (55.1)	26.0	22.0			56.8	4052.3		prominent	56	24
MEX					12 (100.0)			8.0		23.2		70.1	1683.9				112.9
SWE	71.9	80.6	84.7	75.6	12 (80.0)	12 (80.0)	72 (73.3)	43.9	6.2	5928.1	1.5	85.6	3627.1	0.5		46	33.3

Source: OECD Family database, for more information see Appendix 8 or Adema et alii: (2009).

APPENDIX 1 – *Cross-country relationship between female employment rates and total fertility rates*
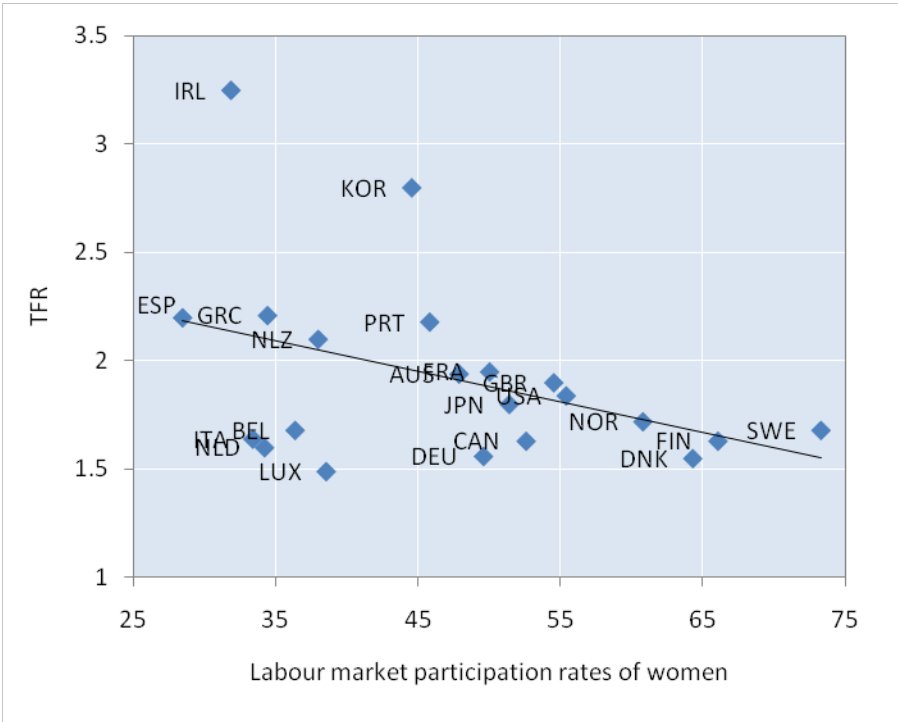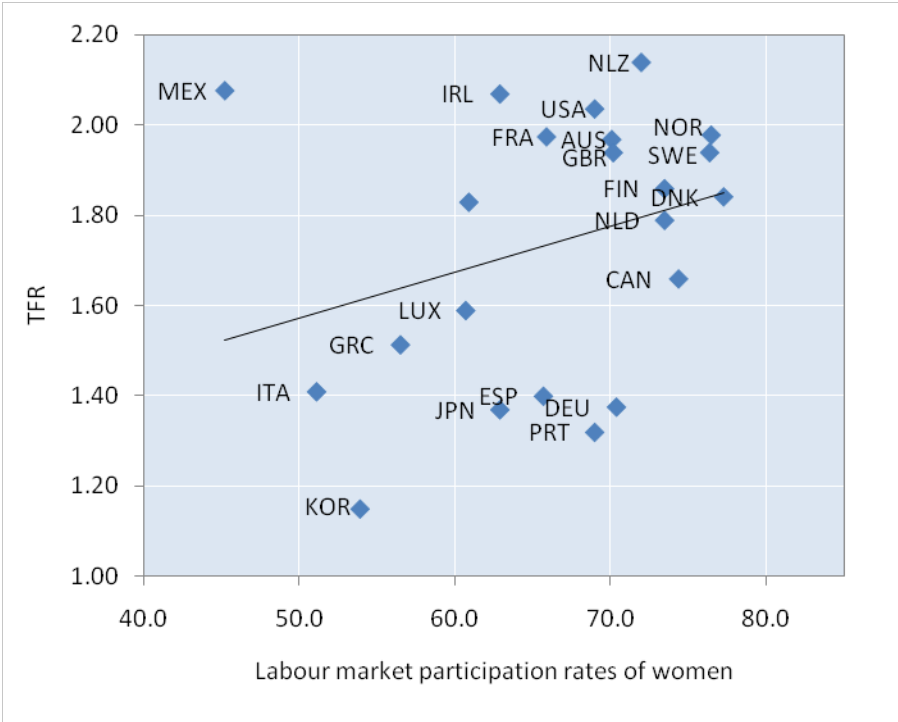
APPENDIX 2 – *Supplementary descriptive statistics, mothers aged 21-40 with at least one child*

Variable	All	Twins1	Not Twins1	Difference
Age	33.32	34.15	33.30	0.85***
	(4.72)	(4.51)	(4.72)	(0.14)
Year 12	58.37	56.80	58.40	-1.60
	(49.29)	(49.56)	(49.29)	(1.59)
Ancestry:	0.56	0.70	0.56	0.14
Oceania	(7.49)	(8.37)	(7.47)	(0.27)
Europe/America	13.93	13.49	13.94	-0.45
	(34.63)	(34.18)	(34.64)	(1.09)
Africa/Middle-East	0.08	0.10	0.08	0.03
	(2.75)	(3.17)	(2.74)	(0.10)
Asia	0.27	0.20	0.27	-0.07
	(5.21)	(4.49)	(5.22)	(0.14)
Oceania/other	41.16	41.49	41.15	0.34
	(49.21)	(49.30)	(49.21)	(1.58)
Mixed not Oceania	40.94	40.58	40.95	-0.36
	(49.17)	(49.13)	(49.17)	(1.57)
Country of Birth:	73.47	75.33	73.44	1.89
Australia	(44.15)	(43.13)	(44.17)	(1.38)
Abroad & arrived	12.90	12.29	12.91	-0.62
before 1996	(33.52)	(32.84)	(33.53)	(1.05)
Abroad & arrived	10.46	9.06	10.49	-1.42
in 1996 or after	(30.61)	(28.72)	(30.64)	(0.92)
Age at 1st birth	26.03	27.36	26.01	1.35***
	(4.94)	(5.20)	(4.93)	(0.17)
Married	69.84	71.50	69.81	1.69
	(45.89)	(45.16)	(45.91)	(1.45)
Religion:	65.71	66.16	65.71	0.46
Christian	(47.47)	(47.34)	(47.47)	(1.51)
Other religion	14.30	13.09	14.32	-1.22
	(35.00)	(33.75)	(35.02)	(1.08)
No religion	19.99	20.75	19.98	0.77
	(39.99)	(40.57)	(39.98)	(1.30)
Age difference	3.01	0.00	3.09	-3.09***
	(2.07)	(0.00)	(2.04)	(0.01)
Age of youngest child:	44.36	36.56	44.49	-7.94***
0-2	(49.68)	(48.18)	(49.70)	(1.54)
3-5	24.77	25.58	24.76	0.82
	(43.17)	(43.65)	(43.16)	(1.40)
6+	30.86	37.87	30.74	7.12***
	(46.19)	(48.53)	(46.14)	(1.55)

Only own children	98.61	99.19	98.60	0.60**
	(11.71)	(8.94)	(11.76)	(0.29)
N	59573	993	58580	59573

Sample: mothers with at least one child of their own aged 18 or less (born or adopted) and such that none have left the household.

APPENDIX 3 – *Supplementary descriptive statistics, mothers aged 21-40 with at least two children*

Variable	All	Same sex	Not same sex	Difference	Twins2	Not Twins2	Difference
Age	34.19	34.16	34.22	-0.06	34.50	34.18	0.32*
	(4.27)	(4.28)	(4.25)	(0.04)	(4.24)	(4.27)	(0.17)
Year 12	54.97	54.59	55.37	-0.78	53.24	55.00	-1.76
	(49.75)	(49.79)	(49.71)	(0.49)	(49.94)	(49.75)	(2.02)
Ancestry:	0.52	0.50	0.55	-0.05	0.97	0.52	0.46
Oceania	(7.21)	(7.03)	(7.39)	(0.07)	(9.81)	(7.16)	(0.40)
Europe/America	13.71	13.72	13.70	0.02	14.56	13.70	0.86
	(34.40)	(34.41)	(34.39)	(0.34)	(35.30)	(34.38)	(1.43)
Africa/Middle-East	0.10	0.11	0.08	0.03	0.16	0.09	0.07
	(3.08)	(3.33)	(2.81)	(0.03)	(4.02)	(3.07)	(0.16)
Asia	0.25	0.26	0.24	0.02	0.00	0.25	-0.25***
	(4.98)	(5.10)	(4.87)	(0.05)	(0.00)	(5.02)	(0.03)
Oceania/other	41.55	41.40	41.70	-0.30	41.59	41.55	0.04
	(49.28)	(49.26)	(49.31)	(0.49)	(49.33)	(49.28)	(2.00)
Mixed not Oceania	40.60	40.56	40.65	-0.09	40.13	40.61	-0.48
	(49.11)	(49.10)	(49.12)	(0.49)	(49.06)	(49.11)	(1.99)
Country of Birth:	73.98	73.94	74.01	-0.08	77.99	73.91	4.08**
Australia	(43.88)	(43.90)	(43.86)	(0.43)	(41.46)	(43.91)	(1.68)
Abroad & arrived	13.66	13.74	13.57	0.17	12.78	13.67	-0.89
before 1996	(34.34)	(34.43)	(34.25)	(0.34)	(33.42)	(34.35)	(1.35)
Abroad & arrived	9.09	9.05	9.13	-0.08	6.47	9.13	-2.65***
in 1996 or after	(28.74)	(28.68)	(28.80)	(0.28)	(24.62)	(28.80)	(1.00)
Age at 1st birth	25.28	25.26	25.30	-0.04	25.80	25.27	0.53***
	(4.67)	(4.70)	(4.64)	(0.05)	(4.82)	(4.67)	(0.20)
Married	74.58	74.51	74.66	-0.15	75.08	74.58	0.50
	(43.54)	(43.58)	(43.50)	(0.43)	(43.29)	(43.54)	(1.75)
Religion:	67.70	67.54	67.86	-0.32	69.74	67.67	2.07
Christian	(46.76)	(46.82)	(46.70)	(0.46)	(45.98)	(46.77)	(1.86)
Other religion	13.69	13.83	13.53	0.30	12.94	13.70	-0.75
	(34.37)	(34.53)	(34.21)	(0.34)	(33.60)	(34.38)	(1.36)
No religion	18.61	18.63	18.60	0.02	17.31	18.63	-1.32
	(38.92)	(38.93)	(38.91)	(0.38)	(37.87)	(38.94)	(1.53)
Age difference	3.01	2.99	3.03	-0.04*	3.19	3.01	0.18**
	(2.07)	(2.08)	(2.06)	(0.02)	(2.29)	(2.07)	(0.09)
Age of youngest child:	39.95	41.17	38.70	2.48***	37.54	39.99	-2.45
0-2	(48.98)	(49.22)	(48.71)	(0.48)	(48.46)	(48.99)	(1.96)
3-5	26.86	27.02	26.70	0.32	26.21	26.87	-0.66
	(44.33)	(44.41)	(44.24)	(0.44)	(44.02)	(44.33)	(1.78)
6+	33.18	31.80	34.60	-2.79***	36.25	33.14	3.11
	(47.09)	(46.57)	(47.57)	(0.47)	(48.11)	(47.07)	(1.95)

Only own children	97.98	97.86	98.10	-0.24*	98.22	97.97	0.25
	(14.08)	(14.47)	(13.67)	(0.14)	(13.23)	(14.09)	(0.54)
N	40962	20739	20223	40962	618	40344	40962

Sample: mothers with at least two children, among which at least one is their own aged 18 or less (born or adopted) and such that none of theirs have left the household.

SOURCE: Census 2006 (5%), ABS.

APPENDIX 4 - *Effect of having more than one (two) child(ren) on mothers' outcomes (labour market participation, number of hours in paid work and unpaid domestic work per week): IV estimates with additional controls*

	Labour market part.	Paid work (nb hrs)	Domestic work (nb hrs)
More than 1 child	-0.120***	-4.330***	3.799***
(Twins 1)	(0.045)	(1.498)	(1.135)
N	59573	58827	58356
More than 2 children	-0.197***	-7.752***	0.988
(Same sex)	(0.072)	(2.438)	(1.865)
More than 2 children	-0.200***	-7.690***	0.911
(Boy-boy & girl-girl)	(0.072)	(2.434)	(1.863)
Hansen stat	0.5835	0.2142	0.7278
Hansen P-value	0.4450	0.6435	0.3936
More than 2 children	-0.106***	-2.242**	3.522***
(Twins 2)	(0.029)	(0.946)	(0.698)
N	40962	40439	40072

Levels of significance: *: 10%   **: 5%   ***: 1%

SAMPLE: Mothers with at least one child of their own aged 18 or less (born or adopted) and such that none have left the household (N=59,573). In the second part of the table, the sample is restricted to mothers with at least two children in the household (N=40,962).

NOTE: Robust standard errors are reported in parentheses. As before, controls include age, level of education, region of residence, interaction variable between country of birth and age of arrival in Australia, sex of the first and, eventually, the second child. Additional controls further include age at first birth, age difference between the two first siblings, marital status, ancestry, religion and whether all children in the household are the mother's.

SOURCE: Census 2006 (5%), ABS.

APPENDIX 5 - *Effect of having an own additional child on mothers' outcomes (labour market participation, number of hours in paid work and unpaid domestic work per week)*

Labour market part.	OLS Controls 1	IV No controls	IV Controls 1
More than 1 child	-0.113***	-0.097**	-0.153***
(Twins 1)	(0.004)	(0.049)	(0.051)
N	58744	58744	58744
More than 2 children	-0.145***	-0.241***	-0.195***
(Same sex)	(0.005)	(0.075)	(0.071)
More than 2 children	-0.145***	-0.105***	-0.118***
(Twins 2)	(0.005)	(0.031)	(0.031)
N	40133	40133	40133

Paid work (nb hrs)	OLS Controls 1	IV No controls	IV Controls 1
More than 1 child	-3.697***	-4.437***	-6.325***
(Twins 1)	(0.155)	(1.618)	(1.716)
N	58008	58008	58008
More than 2 children	-4.474***	-9.001***	-7.471***
(Same sex)	(0.166)	(2.534)	(2.423)
More than 2 children	-4.474***	-2.399**	-2.847***
(Twins 2)	(0.166)	(1.026)	(1.005)
N	39620	39620	39620

Domestic work (nb hrs)	OLS Controls 1	IV No controls	IV Controls 1
More than 1 child	3.990***	5.388***	5.349***
(Twins 1)	(3.990)	(5.388)	(5.349)
N	57549	57549	57549
More than 2 children	2.734***	0.964	1.145
(Same sex)	(0.130)	(1.892)	(1.846)
More than 2 children	2.734***	4.019***	3.947***
(Twins 2)	(0.130)	(0.741)	(0.739)
N	39265	39265	39265

Levels of significance: *: 10%   **: 5%   ***: 1%

SAMPLE: Mothers living only with their own children. With at least one child aged 18 or less (born or adopted) and such that none have left the household (N=58,744). In the second part of the table, the sample is restricted to mothers with at least two children in the household (N=40,133).

NOTE: Robust standard errors are reported in parentheses. Controls 1 include age, level of education, region of residence, interaction variable between country of birth and age of arrival in Australia, sex of the first and, eventually, the second child. Controls 2 further includes age at first birth, age difference between the two first siblings, marital status, ancestry, religion and whether all children in the household are the mother's.

SOURCE: Census 2006 (5%), ABS.

APPENDIX 6 - *Effect of having more than one (two) child(ren) on mothers' outcomes for mothers aged 21-45*

Labour market part.	OLS Controls 1	IV No controls	IV Controls 1
More than 1 child	-0.093***	-0.049	-0.118**
(Twins 1)	(0.004)	(0.045)	(0.047)
N	76574	76574	76574
More than 2 children	-0.129***	-0.173***	-0.125**
(Same sex)	(0.004)	(0.057)	(0.054)
More than 2 children	-0.129***	-0.082***	-0.104***
(Twins 2)	(0.004)	(0.026)	(0.025)
N	54584	54584	54584

Paid work (nb hrs)	OLS Controls 1	IV No controls	IV Controls 1
More than 1 child	-3.271***	-2.302	-4.760***
(Twins 1)	(0.141)	(1.599)	(1.649)
N	75588	75588	75588
More than 2 children	-4.195***	-7.752***	-6.060***
(Same sex)	(0.144)	(2.024)	(1.940)
More than 2 children	-4.195***	-2.540***	-3.233***
(Twins 2)	(0.144)	(0.895)	(0.871)
N	53868	53868	53868

Domestic work (nb hrs)	OLS Controls 1	IV No controls	IV Controls 1
More than 1 child	3.888***	4.215***	4.262***
(Twins 1)	(3.888)	(4.215)	(4.262)
N	75033	75033	75033
More than 2 children	2.698***	0.307	0.394
(Same sex)	(0.110)	(1.460)	(1.442)
More than 2 children	2.698***	3.711***	3.609***
(Twins 2)	(0.110)	(0.630)	(0.625)
N	53439	53439	53439

Levels of significance: *: 10%   **: 5%   ***: 1%

SAMPLE: Mothers with at least one child of their own aged 18 or less (born or adopted) and such that none have left the household (N=76,574). In the second part of the table, the sample is restricted to mothers with at least two children in the household (N=54,584).

NOTE: Robust standard errors are reported in parentheses. Controls 1 include age, level of education, region of residence, interaction variable between country of birth and age of arrival in Australia, sex of the first and, eventually, the second child. Controls 2 further includes age at first birth, age difference between the two first siblings, marital status, ancestry, religion and whether all children in the household are the mother's.

SOURCE: Census 2006 (5%), ABS.

APPENDIX 7 - *Effect of having more than one (two) child(ren) on mothers' outcomes for mothers aged 21-35*

Labour market part.	OLS Controls 1	IV No controls	IV Controls 1
More than 1 child	-0.131***	-0.092*	-0.114**
(Twins 1)	(0.005)	(0.056)	(0.056)
N	36904	36904	36904
More than 2 children	-0.160***	-0.258**	-0.195*
(Same sex)	(0.007)	(0.117)	(0.114)
More than 2 children	-0.160***	-0.099**	-0.118***
(Twins 2)	(0.007)	(0.042)	(0.041)
N	22819	22819	22819

Paid work (nb hrs)	OLS Controls 1	IV No controls	IV Controls 1
More than 1 child	-3.903***	-3.123*	-3.808**
(Twins 1)	(0.181)	(1.768)	(1.806)
N	36467	36467	36467
More than 2 children	-4.225***	-5.693	-4.038
(Same sex)	(0.212)	(3.659)	(3.604)
More than 2 children	-4.225***	-1.870	-2.335*
(Twins 2)	(0.212)	(1.292)	(1.253)
N	22548	22548	22548

Domestic work (nb hrs)	OLS Controls 1	IV No controls	IV Controls 1
More than 1 child	4.138***	4.895***	4.550***
(Twins 1)	(4.138)	(4.895)	(4.550)
N	36136	36136	36136
More than 2 children	2.298***	0.105	0.360
(Same sex)	(0.179)	(3.013)	(2.975)
More than 2 children	2.298***	2.670***	2.312**
(Twins 2)	(0.179)	(1.036)	(0.997)
N	22295	22295	22295

Levels of significance: *: 10%   **: 5%   ***: 1%

SAMPLE: Mothers with at least one child of their own aged 18 or less (born or adopted) and such that none have left the household (N=36,904). In the second part of the table, the sample is restricted to mothers with at least two children in the household (N=22,819).

NOTE: Robust standard errors are reported in parentheses. Controls 1 include age, level of education, region of residence, interaction variable between country of birth and age of arrival in Australia, sex of the first and, eventually, the second child. Controls 2 further includes age at first birth, age difference between the two first siblings, marital status, ancestry, religion and whether all children in the household are the mother's.

SOURCE: Census 2006 (5%), ABS.

Maternal employment rates

Sources:

France and Sweden, European Labour Force Surveys (2006); Mexico, Encuesta Nacional de la Dinamica Demografica (2006); Australia, Australian Bureau of Statistics (2005); United States, US Current population survey (2005); Canada, Statistics Canada (2001).

Notes:

Employment rates refer here to annual averages.

For Australia, the first column refers to mothers with a youngest child aged less than 5. The third column refers to 2 or more children.

In line with the ILO definition of employment, the "employed" comprise all persons above a specific age who during a specified brief period, either one week or one day, were in the following categories:

(a) "Paid employment": (i) "at work": persons who during the reference period performed "some work" for wage or salary, in cash or in kind; (ii) "with a job but not at work": persons who, having already worked in their present job, were temporarily not at work during the reference period and had a formal attachment to their job.

(b) "Self-employment": (i) "at work": persons who during the reference period performed some work for profit or family gain, in cash or in kind; (ii) "with an enterprise but not at work": persons with an enterprise, which may be a business enterprise, a farm or a service undertaking, who were temporarily not at work during the reference period for any specific reason.

In principle, all women on maternity or on statutory paid parental leave (legal or contractual) are counted as employed. However, national treatment of long or unpaid parental leave varies widely.

Parental leave

Sources:

Moss, P. and M. Korintus (2008), International Review of leave Policies and related research, DTI Employment Relations Research Series, No. 100; Missoc tables: Social Protection in EU Member States;

OECD Babies and Bosses (various issues) or information provided by National authorities in non EU countries.

Notes:

Maternity leave (or pregnancy leave) refers to employment-protected leave of absence for employed women at around the time of childbirth, or adoption in some countries.

Paternity leave refers to employment-protected leave of absence for employed fathers at the time of childbirth. Paternity leave is not stipulated by international convention. Includes part of PPL reserved for fathers (Sweden).

In US, the Family and medical leave gives 12 weeks for each parent, with a maximum of 4 continuous weeks to be taken in any one calendar year. It is unpaid but local variations and employers can provide payment compensation. It covers maternity, adoption, care for spouse, child, parents with serious health condition.

Parental leave refers to employment-protected leave of absence for employed parents, which is often supplementary to specific maternity and paternity leave periods (as above), and usually, but not in all countries, follow the period of maternity leave.

The "rate of allowance" is defined as the ratio between the full-time equivalent payment and the corresponding entitlement in number of weeks. In some countries, parents on unpaid parental leave can receive a payment, such as child/home care allowance which is not related to parental leave regulations. Such payments (and the corresponding period) are accounted for when estimate overall parental leave payment rates. Local governments can provide additional financial support for parents on leave, as for example, in the States of California and New York in the US. Such payments are not included here, nor are municipally-financed home-care payments that are additional to national home-care payments. In Australia, there was no general payment until 2011, but paid leave is available in some awards or workplace agreements and/or company policies. Employer-provided top-up payments (over and above

the statutory minimum) are not accounted for. Practices differ across firms, sectors and countries, but in many OECD countries these payments are significant, so that the indicators above often underestimate what parents on leave receive in terms of gross benefit income.

Formal child care

Sources:

For children 0-2: Australia, ABS Childcare service (2005); Canada, National Longitudinal Survey of Children and Youth (2006); the US, Early Childhood Program Participation Survey (2005); European countries, EU-SILC (2006) ; Nordic countries: NOSOSCO (2006); Mexico: National Authorities (2009).

For children 3-5: OECD Education database (2006); Canada, National Longitudinal Survey of Children and Youth (2006).

Notes:

Formal care for children 0-2 refers to group care in childcare centres, registered childminders based in their own homes looking after one or more children, and care provided by a carer at the home of the child.

Early education refers to formal pre-school services, and in some countries 4 and 5 year olds in primary schools.

Informal child care

Sources:

Australia, Childhood Education and Care Survey (2008); France, EU- SILC (2007); USA, National Household Education Surveys Program (2005).

Notes:

Informal care is generally defined as care arranged by the child's parent either in the child's home or elsewhere, provided by relatives, friends, neighbours, babysitters or nannies. This indicator presents data from surveys with different definitions and groupings of childcare providers. For Europe, it includes all informal childcare providers (relatives and non-relatives) who do not receive payment for this activity (EU-SILC). For United States and Australia, it includes grandparents only.

Public expenditure on pre-school per child, 2005

Sources:

Social Expenditure database (2005); OECD Education database (2005); US Department of Health and Human Services (2005).

Notes:

Public expenditure on childcare and early educational services is all public financial support (in cash, in-kind or through the tax system) for families with children participating in formal day-care services (e.g. crèches, day care centres and family day care for children under 3). and pre-school institutions (including kindergartens and day-care centres which usually provide an educational content as well as traditional care for children aged from 3 to 5, inclusive).

Public spending on childcare support per child relates to the expenditure on childcare divided by the number of children in that country aged under three.

Public spending on pre-school care and education per child is calculated by dividing public spending on educational institutions by the number of children enrolled in those programs.

Net childcare costs for full-time arrangements

Sources:

OECD (2007), data on "typical" fees charged by accredited childcare centres for children aged two and three.

Notes:

Net childcare costs, as defined here, include fees minus cash benefits, rebates and tax concessions: i.e. the "out-of-pocket" expenses resulting from the use of a formal childcare facility. The results presented below do account for tax reductions, childcare benefits and "other benefits", which are not primarily childcare-related (e.g. family or housing benefits) but nonetheless, influence household income

position. Numbers given in the table are for a dual earner family earning 167% (100%+67%) of the average wage. Calculations for dual-earner families with household earnings equivalent to 133 and 200% of average wages, generate results similar to those presented here. In a number of countries, available fee information relates to a particular region or municipality: Canada (Ontario) and the United States (Michigan).

Family-Friendly Workplace Practices

<u>Sources:</u>

France and Sweden, Establishment Survey on Working Time, 2004-2005 (management interviews), in Riedmann A., Bielenski H., Szczurowska T., Wagner A. (2006), Working time and work-life balance in European companies, European Foundation for the Improvement of Living and Working Conditions. Australia, Australian Government (2006); Canada, Workplace and Employee Survey (1999-2002); United States, Galinsky et al. (2008).

<u>Notes:</u>

For France and Sweden, proportion of establishment allowing employees to either use accumulated hours for full days off or for longer period of leave.

For Australia, percentage of Australian Workplace Agreements (AWAs) among working parents facilitating flexible working hours.

For Canada, percentage of workers working in a company with availability of flexitime.

For the United States, percentage of employers with at least 50 employees who allow their employees to sometimes vary the start and end of work periodically.

Tax system

<u>Sources:</u>

2008

<u>Notes:</u>

The numbers in the table are based on average payments to government in percentage of gross household earnings, for couples with two children age 6 and 11, with income equal to 133% (67%+67%) of average worker earnings (2008).

The table gives the difference in net transfers by single and equal-dual earner couples as a percentage of net transfers to government by single earner couples.: SE (1-x) = DE.

For example, net transfers for an Australian single-earner family amounted to almost 18% of gross earnings, while this was 5 percentage points lower for couples in which both partners had the same level of earnings. In other words, for a given level of household income, the Australian tax/benefit system favours dual-earner couples over single-earner families.

These results vary with income level and will also vary with the age of children. This is especially true when very young children are present in households, involving receipt of parental leave benefits or similar cash payments to support families with very young children.