The Contribution of Recent Increases in Family Benefits to Australia's Early 21st Century Fertility Increase: An Empirical Analysis

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Paper prepared for the European Population Conference to be held in Vienna, Austria, 1-4 September 2010

Abstract
As in many European countries, in the first decade of the 21st century low fertility become a concern for Australia's government. However, following forty years of almost continual decrease, between 2001 and 2008 Australia's TFR increased from 1.73 to 1.97. This increase overlapped with a series of changes to family-related benefits which were designed primarily to provide financial assistance to families, but for which pronatalist intent was also apparent. Of the changes, the more significant were the introduction of a universal, flat-rate payment to parents of new-born children and an increased subsidisation of child care. This paper analyses recent individual-level fertility patterns in Australia, using data from a large-scale longitudinal household survey and focusing on the effects of changes to family benefits. The effects of State or Territory level macroeconomic variables, variables measuring entitlement to family-friendly working conditions, and a wide range of individual-level control variables also are considered. The results show the effects of the 'Baby Bonus' and the Child Care Rebate on fertility have been slight. Age, parity, a woman's education, income, and occupation are significant factors affecting individual fertility.

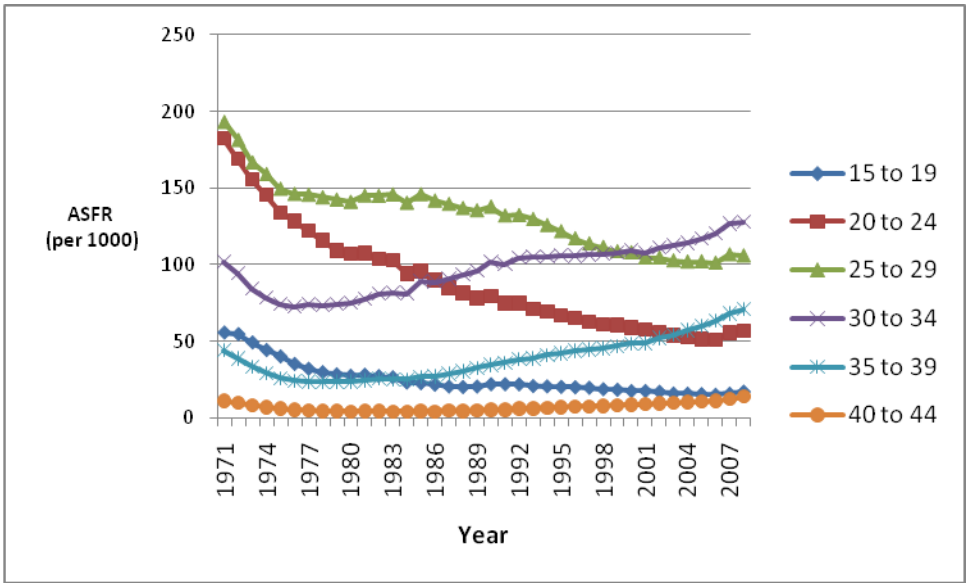
KEYWORDS: Fertility, Australia, family policy, pronatalist policy, family allowances, maternity benefits, economic conditions, education, family size, maternal age.

WORK IN PROGRESS

Introduction

Between 2001 and 2008 Australia's total fertility increased from 1.73 to 1.97, following forty years of almost continual fertility decrease (ABS 2008a, 2009)[1]. Whilst a fertility increase is unique in Australia's recent history, it is by no means so in the context of the Western Industrialised Countries. Australia's increase in total fertility has coincided with broadly similar patterns in the United Kingdom, Ireland and New Zealand. Over the same period in France a somewhat longer established increase in total fertility continued, whilst previously undulating total fertility levels in the Scandinavian countries entered upswings. There have also been increases from much lower minimum values across much of Southern, Central and Eastern Europe (Eurostat 2007; Frejka and Sobotka 2008; Goldstein et al. 2009, ONS 2009, Statistics NZ 2009).

Figure 1: Age-Specific Fertility Rates: Australia 1971-2008



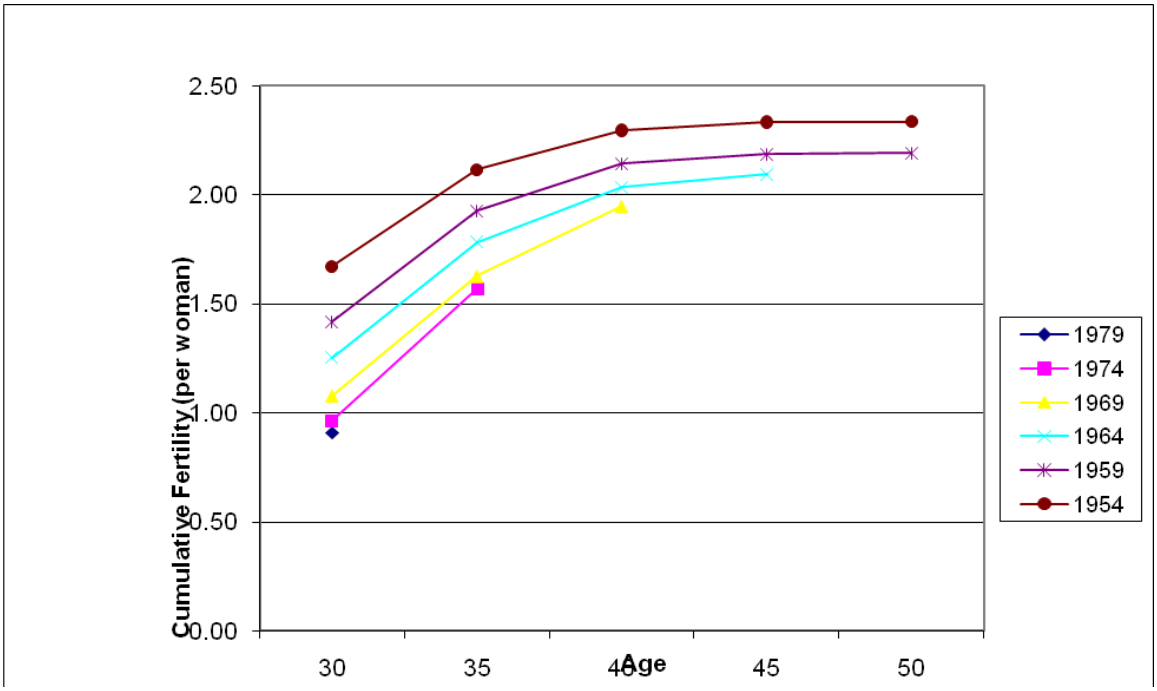
The reversal of the direction of the trend in Australia's total fertility after 2001 can be accounted for by an acceleration of an increase in age-specific fertility rates of

[1] Data are based on the year of time of registration of the birth.

women aged 30 to 39[2], whilst the decline in age-specific fertility for women aged 25 to 29 slowed and the decrease in age-specific fertility below age 25 continued at a similar pace to that of the late 1990s[3] (ABS 2009; Figure 1). Cohort fertility has continued to decrease; however the rate of reduction in cohort fertility has slowed (Kippen 2006; ABS 2008a, 2009; Figure 2). These patterns indicate the past reductions in total fertility and its recent recovery have been influenced by 'tempo effects' and 'fertility aging effects': some births have been shifted to later ages and some of the reduction in births at younger ages has not subsequently been recuperated (Bongaarts and Feeney 1998; Kohler and Ortega 2002)[4].

[2] Age-specific fertility rates for women aged 30 to 39 have been increasing since 1978 (ABS 2008a).
[3] Age-specific fertility rates for women aged 15 to 19, 20 to 24 and 25 to 29 increased between 2006 and 2008. However the introduction of a requirement, with effect from 1 July 2007, for evidence of the registration of a birth to be presented before a government benefit payable to the parents of new born children (known as the 'Maternity Payment/Baby Bonus') may have affected the comparability of data between these years by reducing the late registration and the non-registration of births (ABS 2009).
[4] Bongaarts and Feeney (1998) and Kohler and Ortega (2002) have proposed methods for adjusting total fertility rates to removing the distorting effects of tempo change. With the absence of nationally accurate and consistent birth order statistics, it is not feasible to use these methods to analyse Australian fertility trends (Corr and Kippen 2006).

Figure 2: Cumulative Fertility to Ages 30, 35, 40, 45 and 50: Australia 2008 for Selected Cohorts Born 1 January 1954-79



Proximate Determinants of Australia's Fertility Increase

The increase in total fertility in Australia since 2001 has taken place despite a continuing decline in the prevalence of marriage in the reproductive age groups and slight improvements in the availability and use of contraceptive methods (Parr and Siedlecky 2007; Heard 2008). The decline in the percentages of women in the reproductive age groups in registered marriages between 2001 and 2006 was considerably less than the intercensal declines before 2001 (Birrell et al. 2004; Heard 2008). Interestingly, the move away from marriage post 2001 appears to have been more marked among the less educated (Heard 2008). The effect of the decrease in marriage on rates of partnership was partially offset by increases in the percentages of females in unmarried cohabitation. The

increase in the proportion of children born outside registered marriages, a trend which has been evident for at least 30 years, continued (ABS 2009).

The most widely used methods of contraception are the pill and condom (used either singly or combined) (Parr and Siedlecky 2007). Sterilisation also provides protection against pregnancy to significant proportions of older couples (gray and McDonald 2010). The period considered saw some improvements to the range of longer acting reversible methods available and post-coital contraception (the 'morning after' pill) becoming available in Australia without prescription (Parr and Siedlecky 2007; Yusuf and Siedlecky 2007). However between 2004 and 2007 the changes to both the prevalence of contraceptive use and the type of methods used were slight. Australia's rate of induced abortion is broadly similar to the rates for other English-speaking countries (Chan and Sage 2005). Since 1995 there has been a slight decrease in the abortion rate some of which is due to improved access to post-coital contraception.

Murphy (1993) challenges the primacy of empirically-based economic explanations of fertility change, preferring instead a proximate determinants approach. According to Murphy, it was spread of use of more effective contraceptive methods, particularly the contraceptive pill, which was primarily responsible for the reduction in fertility in Britain after 1963. However since changes to contraceptive use in Australia over the period considered were slight (and if anything conducive to reduction as opposed to increase) such an explanation cannot be sustained for the fertility trend in early 21st century Australia.

The Socioeconomic and Family Policy Contexts of Australia's Fertility Increase

Australia's early 21st century increase in total fertility has coincided with a period of strong economic growth. This may have been important because fertility can be pro-cyclical. That is, upswings in the business cycle can boost fertility and recessions reduce fertility (Gauthier and Hatzius 1997; Jones and Schoonbroodt 2007; Orsal and Goldstein 2010). In particular the employment-generating effect of upswings in the business cycle may boost fertility. Australia's female labour force participation and the ratio of women's incomes to men's are slightly above the average for Western Industrialised Countries (UNSD 2008). The former pattern is partly attributable to the relatively high percentage of Australian women who work on a part-time basis, a percentage which continued to grow over the period from 2001 to 2008 (ABS 2008b).

The fiscal boost from this strong economic growth facilitated the Australian Federal Government's implementation of a series of increases to family-related benefits and cuts to personal income tax rates. For children born after July 1 2001 the Australian Federal Government introduced a new tax offset, known as the 'First Child Tax Refund' (also called the 'Baby Bonus') which was payable to the parents of new-born children, until the child was aged five, with the annual amount depending on the level of parental income before the birth of the first child and the subsequent reduction to that income and a having a maximum of A$2,500 per annum (ATO 2007; Daniels 2009). With effect from July 2004, a universal, flat-rate payment to the parents of new born children, originally known at the 'Maternity Payment' (but following widespread media

and popular misnomer renamed as the 'Baby Bonus'[5]), was introduced, whilst the payment at birth to the parents of a smaller, means-tested payment (the 'Maternity Allowance') and the 'First Child Tax Refund' were discontinued. At the same time the amounts and eligibility for means-tested payments to the parents of dependent children (known as 'Family Tax Benefits') were increased (Australian Government, 2004)[6]. In 2008 the incoming Labor Government announced that it would prevent high income earning families from accessing the Baby Bonus and a benefit whose value is determined by the income of the lower paid parent[7] (Australian Government 2008).

The Baby Bonus would represent a fairly substantial sum to most people of childbearing age in the short run, but is small in relation to the estimated lifetime costs of children (Breusch and Gray 2004; Henman et al. 2007; Lattimore and Pobke 2008). According to McDonald (2006a), the simplicity, transparency, and certainty and immediacy of receipt of the payment should contribute to the scale and rapidity of its effect on fertility. However, as he acknowledges, empirical assessments have tended to find the effect of such benefits on fertility have been small (Ermisch 1988; Gauthier and Hatzius 1997; Milligan 2005; McDonald 2006b).

The previous Australian Government's preference for families to be the beneficiaries of its fiscal policies appears at least in part to have been motivated by pronatalism (Heard 2006). Whereas previously the Australian Government's reports to the United Nations indicated its national fertility rate to be 'satisfactory' and its policy to

[5] Henceforth we refer to this as the Baby Bonus.

[6] The changes were announced on 11 May 2004. The new Maternity Payment/Baby Bonus was scheduled to increase from an initial A$3,000 for each child born after 1 July 2004 to A$4,000 for each child born after 1 July 2006, and again to A$5,000 for each child born after 1 July 2008.

[7] Families earning more than A$75,000 in the six months following the birth will be ineligible for the 'Baby Bonus'. Recipients of this payment will be paid in fortnightly installments over six months, rather than as a lump sum. Families earning more than A$150,000 will be ineligible for the benefit known as 'Family Tax Benefit B'.

be ‘no intervention’, in 2005 it reported fertility to be ‘too low’ and its policy to ‘raise’ it. The most widely publicised statement to this effect was then Australian Government Treasurer Peter Costello’s remark made whilst promoting the 2004 budget; ‘If you can have children it's a good thing to do - you should have one for the father, one for the mother and one for the country, if you want to fix the ageing demographic’, (Dodson 2004). However a reassessment of the political stance on fertility has by no means been restricted to the political right. In June 2000 the Australian Council for Trades Unions (ACTU) launched a campaign to raise awareness of the relationships between working time and family life and to press for family-related leave, whilst, around the same time, leading politicians in the then opposition Australian Labor Party expressed concerns that fertility may fall too low (Davis 2001; Heard 2006). Demographer Peter McDonald has played a prominent role in Australia’s public debate on the acceptability of and the prospects for changing its fertility levels (McDonald 2000a; 2000b; 2001; 2002; Parr, 2005). According to Heard (2006), McDonald’s ‘gender equity’ theory may be credited with encouraging a subtle shift in the feminist agenda in Australia away from advocacy of women’s work as an alternative to raising a family towards the encouragement of women’s combination of both work and family (McDonald 2000a, b, c; Heard 2006). The apparent revival of pronatalism and the waning of antinatalism in Australia’s public debate may have enhanced the psychological benefits parents derive from childbearing (a ‘halo effect’) (McDonald 2006a).

A substantially-increased government subsidisation of child care costs also could have contributed to the fertility increase (McDonald 2006a). The use of formal non-parental childcare by parents, partly in order that market work can be resumed earlier by

mothers, has increased considerably. This is despite increases in average childcare fees which were well above the rate of inflation (ABS 2006a, b; FaCSIA 2007, ABS 2008b). The average hours worked by mothers with young children also has increased (Guest and Parr 2010). The provision of organised, non-parental childcare in Australia is heavily regulated. The use of formal childcare is associated with a greater number of hours of market (i.e. outside the home) work by the mother, higher income, younger maternal age, and sole parenthood (Craig 2007 a, b). Australia's childcare benefit system of payments, which has been in effect from July 2000, provides means-tested benefits which partially cover childcare costs up to certain limits for childcare which satisfies official quality assurance criteria (Australian Government FAO 2007). A substantial tax rebate for childcare costs up to a specified limit per child for women who are participating in the labour force or studying was announced in the 2005 Federal budget, with effect for expenses incurred over the 2004-05 financial year[8]. This rebate would simultaneously reduce costs of children and increase the financial incentive for mothers to work. The potential lifetime receipts from the Child Care Rebate far exceed those from the Baby Bonus, and are greater for higher income families and families with larger numbers of children in child care. However the lack of transparency and the complexity of the calculation, the inherent difficulties in predicting post-child income and child care costs, and the lack of immediacy in receipt of payment may have dampened any effect on fertility (McDonald 2006a).

According to McDonald (2006a) in addition to financial assistance to families with children and assistance with child care costs, policies which allow parents to more

[8] The rebate was initially for 30 per cent of the 'gap' between the child care costs and child care benefits up to a maximum of A$4000. The Rudd-lead Labor Government increased the rate of childcare rebate to 50 per cent up to a maximum of $7,750 with effect from 1 July 2008.

readily combine having children with income generation may also affect fertility. Such policies include those relating to parental leave, those relating to the number of hours to be worked, and those relating to the flexibility of the timing of work hours. In Australia in recent years there have been some improvements in access to parental leave. Although Australia remains among the small minority of Western Industrialised Countries without a statutory provision for paid maternity leave[9], there has been some improvement in access to parental leave which is funded by employers (UNSD 2005). However, the pace of improvement has been slow and uneven across sectors, with women who have permanent positions, public sector workers, women with professional occupations, and women who work in larger organisations being more likely to have access to and to use such leave (Baird 2005; ABS 2006c; Whitehouse *et al.* 2006; Baxter 2008). Only a small minority of Australian men take paid parental leave and the durations of their paid leave tend to be far shorter than those for women (Whitehouse *et al.* 2006). Since 1993 a man or a woman who acts as primary carer for their child has been entitled to take up to 52 weeks unpaid parental leave, subject to certain conditions. A majority of Australian mothers take some unpaid leave, either consecutively with paid maternity leave or as their sole form of maternity leave. In contrast, few fathers do so (ABS 2006c; Whitehouse *et al.* 2006). The modest widening of access to paid parental leave might be expected to have contributed to the increase in fertility, particularly among the groups

[9] In 2010 the legislation to introduce 18 weeks of paid parental leave at the national minimum wage for families whose primary carer earns less than A$150,000 per annum from January 2011 was passed (Australian Government 2010a). The "Fair Work Act" which came into effect from 1 January 2010 introduced a minimum set of terms and conditions of employment, including a right to 12 months unpaid parental leave, a right to request a further 12 month, and ten days paid personal carer's leave per year (Australian Government 2010b). In 2010 the Federal Opposition announced its intention to introduce a scheme for 26 weeks paid maternity leave at the standard salary if elected.

with greater access to paid parental leave (Gauthier and Hatzius 1997; Duvander *et al.*, 2007).

Research Questions

The preceding review of trends suggests fertility levels may have been affected by a some or all of the following; family benefits, economic variables (either macroeconomic or individual-level), access to family-friendly working conditions, and tempo effects. Hence we aim to test the following hypotheses:

1. The introduction of the range of changes coinciding with the introduction of the Baby Bonus has contributed to the increase in fertility over the period 2003-2007. Since the amount of the Baby Bonus is small in relation to the lifetime costs of additional children, the magnitude of the effect is likely to be small

2. The introduction of the Child Care Rebate has contributed to the increase in fertility. As with the Baby Bonus, we expect the magnitude of this effect to be small.

3. Women whose work entitles them to paid maternity leave and to other family-friendly working conditions will have higher fertility than employed women without such entitlements. We expect the magnitude of such effects to be small, because the value of paid parental leave typically represents only a small fraction of the lifetime costs of children. A second reason for expecting the effects to be small is that entitlements to such benefits may change in the future because of changes of employment and changes to employment conditions.

4. Economic prosperity is associated with higher fertility. This is tested through consideration of a combination of variables measured at the individual-level and

macroeconomic variables measured at the state and territory level. The macroeconomic variables were included because the broader economic climate may affect the expected affordability of additional children.

In testing these hypotheses a range of possible confounding factors will be controlled for, including in age, parity, interactions between age and parity, marital status, birthplace, highest level of education and whether studying full-time.

Data and Method

The data used are from Waves 1 to 7 of the Household, Income and Labour Dynamics in Australia Survey (HILDA for short). Wave 1 of this nationwide, longitudinal survey was conducted in 2001 and subsequent waves on an annual basis. The sample design employed a multi-stage cluster sample of households. Remote areas of the country were not sampled (Wooden and Watson 2007). A multi-stage, cluster sample design was used, and 13,969 men and women from 7682 households and 488 census collection districts, which were stratified by State or Territory, and metropolitan or non-metropolitan, were successfully interviewed for Wave 1, with the household response rate being 66 per cent and the individual response rate 61 per cent. The retention rate for individual panel members between Waves 1 and 5 was 74 per cent. Data are regularly collected on family formation and background, employment and unemployment history and status, and income. Modules of questions on other special topics have been added to the core content for individual Waves (Watson and Wooden 2002a, 2002b; Wooden and Watson 2007).

The response variable is a binary variable indicating whether or not the respondent had given birth to a child in the 12 months before the interview. This was constructed from data on the age of the youngest child and on the number of children a women had ever had from Waves 3 to 7 of HILDA. Multilevel logistic regression models were used for the analysis (Goldstein 1995). The model has the form:

$$\text{logit}(Y_{i,j+2}) = \alpha + \sum\beta_k X_{i,j,k} + u_i + e_{i,j}$$

where the subscript ij refers to the observation from Wave j (j=1,..,5) for woman i and u_i is a random effect for woman i. $Y_{i,j+2}$ is whether the woman gave birth in the year before j+2, and thus is estimated using data from Waves 3 to 7. The explanatory variables of principal interest are whether the Baby Bonus and the changes to family benefits which coincided with its introduction and whether the Child Care Rebate could have affected fertility in the time period considered. Empirical assessment ("best fit") was used to determine the most appropriate time lag between the announcement of a major change to benefits and the effect of that change on fertility. The interval between the measurement of the other explanatory variables and the response variable has been chosen to be two waves (roughly two years) in order that the measurement of the explanatory variables predates the conception of children born in the year before the interview for the response.

The analysis is of 15,477 observations from women aged 15-44 at the time of the measurement of the explanatory variables (roughly 17-46 at the end of the year for which the response is estimated). 3,246 observations involving explanatory variables from Wave 1 and the response variable calculated from Wave 3 were included, along with

3,061 from Waves 2 and 4 combined, 3,075 for Waves 3 and 5 combined, 3,010 Waves 4 and 6 combined, and 3,085 Waves 5 and 7 combined. The data were weighted in line with national-level births data.

Independent Variables

Following the discussion in the introduction, the independent variables were chosen to test for the effects on fertility of family benefits, individual and macro-level (i.e. state or territory level) economic factors, entitlements to parental leave and other family-friendly working conditions, tempo effects (i.e. interactions between age and parity), migration, education, and marital status.

Prospective family benefits. We consider the effects of the prospective family benefits resulting from having a child based on what the anticipated regime of benefits would have been during the conception window for the year of observation for whether a woman gave birth. Two dummy variables were entered; the first ("Baby Bonus") indicates whether fertility in the period of measurement could have been affected by the introduction of the Baby Bonus and the range of changes which occurred concurrently. The second ("Child Care Rebate") indicates whether fertility in the period of measurement could have been affected by the introduction of the 30 per cent rate of Child Care Rebate. Interactions with income were also fitted to test whether the effects of these changes varied with income..

Macroeconomic Variables Measured at the State or Territory Level. The male and female unemployment rates and labour force participation rates for October of the relevant year, and the household savings ratio were included.

Entitlement to Family-Friendly Work Conditions. Binary variables indicating whether the woman was entitled to paid or unpaid maternity/parental leave, permanent part-time work, home-based work, and to flexible hours.

Work-Related Variables. Labour force status was categorised according to whether the respondent was employed, not employed or not in the labour force, and, if employed, the current main occupation at the time of interview. Income was measured by real disposable income from all sources for the most recently completed financial year before the interview. Figures were adjusted to real terms using official consumer price indices. The main occupation was coded according to the 1 digit categories for the Australian and New Zealand Standard Classification of Occupations (ANZSCO) 2006 classification (ABS 2006d).

Education-Related variables. The highest level of education was categorised into Bachelors degree or higher, diploma or certificate, completion of year 12 (the final year of schooling in Australia) or for migrants the overseas equivalent, and Year 11 (or its overseas equivalent) or less. A binary variable indicating whether the respondent was currently studying full time also was included.

Birthplace. The various overseas countries of birth were grouped along geographical and linguistic grounds.

Marital Status. This was categorised into whether the woman was married, cohabiting, divorced, separated or widowed, or never married and not cohabiting.

Age, Parity and Interactions Between Them. The categories for parity were zero, one, two and three or more. Age was grouped into five years wide age ranges.

Results

The logistic regression model shows that the effects of the changes in family benefits, both the effects of the changes which coincided with the introduction of the Baby Bonus and the effects of introduction of the Child Care Rebate, almost certainly have been very small: both coefficients are very small in magnitude and not significantly different from zero (Table 2). This conclusion is robust to one year changes in the assumed lag time between the announcement of the change to benefits and its effect on fertility[10]. Interaction terms between the family benefit variables and income were also tested for., because the Child Care Rebate and some of the benefits which were either increased or discontinued at the time the Baby Bonus was introduced are income contingent and because there may be a diminishing marginal utility of money as income increases. However the interaction terms also proved non-significant. The lack of significance of the family benefit variables is consistent with our theoretical expectations and with empirical analyses across a range of national contexts (Gauthier and Hatzius 1997; Gauthier 2007; Guest and Parr 2010).

The effects of a range of state or territory level macroeconomic variables measured prior to conceptions of the births all such variables all were found to be small and not statistically significant[11] [12]. There are, however, significant effects of individual-level economic variables on fertility. These findings would seem to indicate the economic

[10] The time lags considered were firstly a five months time lag between the budget announcement and the start of the year of observation of the births and secondly a 17 months' time lag.
[11] Even when these variables are entered singly the measured effects are still not significant.
[12] There is however a significant negative correlation between the (male and female combined) unemployment rate measured at the end of the year of observation of births and fertility. This may indicate that an expected increase in the unemployment rate decreases fertility. However this variable has not been included in the model in Table 2, because it temporally follows the response and hence the measured correlation could be affected by reverse causality (i.e. an effect of fertility on the unemployment rate).

effects on fertility are a matter of individual circumstance, as opposed to being related to the broader macroeconomic climate. Table 2 shows that women who are unemployed and seeking work have significantly lower fertility than women who are not in the labour force. The higher fertility of women who are not in the labour force may be explained by more home-centred values among this group (Hakim 2003). The fertility of women in employment varies significantly with the type of occupation. Women in professional occupations have the lowest fertility, followed by women in clerical and administrative occupations. There is a significant positive effect of a woman's income on her fertility[13]. Internationally the slope of the relationship between income and earnings differs, being positive in some contexts and negative in others (Andersson et al. 2009). There are in theory two opposing effects of higher pre-first child income on fertility: it makes children more affordable but may also increase their opportunity cost. The pattern of higher fertility among those with higher incomes suggests that the former effect is stronger. Increasing levels of post-child labour force participation and reductions in the earnings foregone as a result of children, partly due to an increasing substitution of child care services for maternal time, would have contributed to the emergence of this pattern (Breusch and Gray 2004, Day and Dowrick 2010). Among those who already have had one or more children a higher income may reflect circumstances which allow child-rearing and maintaining a high income to be readily combined and this in turn may mean a relatively low prospective loss of earnings from having further children would be anticipated. Conversely a lower income, in some cases, may be because a previously high

[13] The possibility of a non-linear effect was tested for by including squared and cubic terms. However these were later removed due to lack of significance.

income was sacrificed in order to look after children, and hence a high opportunity cost would be anticipated to result from future children.

The effects of a range of variables indicating whether the woman knew she was entitled to certain family-friendly working conditions, including parental or maternity leave, permanent part-time work, home-based work and flexible working hours, were found to be small and not statistically significant[14]. The effects of the state or territory-level means of these variables were also tested for, since, with the possibility of women changing employment, access to such conditions may be a matter of their wider availability rather than whether they may be accessed through the current employment. However the effects of the state and territory-level means also were not significant.

There are significant baseline effects and interactions between age and parity. Whilst in most age ranges women at parity one have the highest fertility, the combined interaction and baseline effects imply that above age 35[15] women at parity zero have the highest fertility. Below the age of 25 the fertility of women with parity two exceeds that for women with parity zero. For women with parity two or more fertility reduces as age increases upwards from the 20 to 24 years age range, whilst for those with parity one it peaks in the 25 to 29 age range and for those with parity zero fertility in the 25 to 34 age range.

Not surprisingly, women who are currently in full-time education have significantly lower fertility than women who are not studying full-time. After controlling for the effects of age and parity and the other variables in the model, fertility increases

[14] Even when the variables were entered singly, as opposed to together, the effects were not significant.
[15] It should be noted the measurement of age of for roughly two years before the end of the year of observation of fertility.

significantly as the woman's highest level of education increases[16]. Other analyses of the HILDA data have produced a similar result (Drago et al. 2009; Parr 2010). The education effects reflect the "catch-up" effect among lower parity women in a particular age range being stronger among the more highly educated[17]. Since higher education is an indicator of higher lifetime earnings the explanation may also be linked to any difference in the prospective work-related costs of children having become less important than the greater affordability of children which higher education would create, discussed earlier.

There are significant effects for birthplace. The fertility of migrant women is generally lower than that of the Australia-born, with the fertility of women who were born in continental Europe and women who were born in Asia being significantly so[18]. Thus in contrast to the pattern for some European countries, increasing levels of immigration have not contributed to the increase in fertility in Australia (Sobotka 2008).

Conclusions

Australia's early 21st century increase in total fertility has coincided with the Australian Government's adoption of a view that the national fertility rate is 'too low' and its implementation of policies, in particular increases in family benefits, to raise the national fertility rate (UNPD 2006, 2008). However, rather than Australia being a model for successful pronatalist policy, we find that the contribution of recent increases in family

[16] The exclusion of the remote areas where fertility is high and levels of education are low may have affected this pattern.
[17] Cumulative fertility by age decreases as the highest level of education increases.
[18] In Australia migrants tend to be more highly educated than the Australia-born, especially the Asia born (Parr and Guo 2005). These effects are net of the fertility-increasing effects of these higher levels of education.

benefits to the fertility increase, so far at least, almost certainly has been very small indeed. The lack of significance for two family benefit-related variables is broadly consistent with the findings of the international literature and of simulations for Australia (Gauthier 2007; Lattimore and Pobke 2008). Economic modelling approaches, such as Ermisch (1988), Cigno and Ermisch (1989) and Guest and Parr (2010), show that such a finding is to be expected since the increase in family benefits represents only a small subsidy of the lifetime costs of an additional child (Henman 2001; Breusch and Gray 2004; Henman et al. 2007). Our findings differ from Drago et al. (2009) who found the introduction of the Baby Bonus produced a small but significant increase in fertility intentions and inferred that a similar increase in fertility would result. The wider range of control variables used in our study, particularly the interactions between age and parity, may explain the differing assessments of the effects of the Baby Bonus.

The percentages of women reporting they knew they were entitled to parental leave increased somewhat between 2001 and 2005 whilst the percentages with access to home-based work or flexible working hours remained constant. Since the fertility of women whose work entitles them to parental leave is not significantly higher than that of than employed women who were either without such entitlements or did not know whether or not they were entitled to such leave, and in view of similarly small effects of the state-level averages for these variables, such changes to family-friendly working conditions on fertility have had little effect on fertility. This may provide grounds to speculate that the introduction in 2011 of a universal government-funded paid parental leave scheme will not raise fertility substantially.

If the family benefit changes and access to family-friendly working conditions do not offer robust explanations for the increase in fertility over the period from 2002-2007, what else does the analysis suggest could have done so? The first factor is a correction for tempo distortion (a "catch up" effect). This reflects an increasing proportion of women at zero parity between 2001 and 2005, particularly in the later childbearing ages, and the higher than average propensity of these women to have children 1-2 years later. Our models also show that fertility is reduced whilst studying and the "catch-up effect" is stronger among more highly educated women. Thus patterns of participation in and graduation from education may be seen as structural influences which contribute to tempo distortion and its subsequent correction; there will be reduced fertility when larger cohorts of students are obtaining their education followed by subsequent fertility increases. Current government policy is to raise the percentage of 25 to 34 year olds with at least a Bachelor's level qualification from 29 per cent to 40 per cent (Bradley et al. 2008). Our model implies the pursuit of ambitious targets may induce a second wave of tempo effects, with an initial decrease in fertility as numbers of students are increased being followed by recuperation as there is a flow-on effect on the number of graduates.

Economic factors also are related to fertility. The multilevel formulation of our models shows the effects of economic effects are mostly the product of changes at the individual level. The evidence of a woman's fertility being affected by the broader macroeconomic climate in which she lives is weak. The effect of economic change over time, inferred by our model, is the balance of a complex mixture of counterbalancing effects of changes in patterns of labour force participation, unemployment, income and occupation. The time period considered was an economic "boom time". Our model

suggests the considerable increase in real disposable income per se has contributed to the increase in fertility. However there have also simultaneously been a large increase in female labour force participation and changes in the patterns of women's occupations which, ceteris paribus, have had fertility-reducing effects.

Table 1: Family Benefit Regimes Applying to Observations of Births for Various Waves of Survey Used

Approximate Window of Time for Observation of Births (Survey Wave in Brackets)	Main Family Benefits Which Would have Been Anticipated
November 2002-October 2003 (Wave 3)	First Child Tax Refund, Family Tax Benefits
November 2003-October 2004 (Wave 4)	First Child Tax Refund, Family Tax Benefits
November 2004-October 2005 (Wave 5)	For children conceived after May 2004 (born in most cases after February 2005) the $3000 Baby Bonus and increased Family Tax Benefits but not the First Child Tax Refund.
November 2005-October 2006 (Wave 6)	For children born before 30 June 2006 a $3000 Baby Bonus and the increased Family Tax Benefits. For children born after 1 July 2006 a $4000 Maternity Payment. For children conceived after May 2005 Child Care Rebate
November 2007-October 2007 (Wave 7)	$4000 Maternity Payment, increased Family Tax Benefits, and Child Care Rebate

Table 2 Logistic Regression of Whether a Woman Aged 15-44 Gave Birth (Full Model)

Variable	Coefficient	SE	P
Baby Bonus	0.124	0.164	0.448
Interaction of Baby Bonus and Income	-0.005	0.006	0.346
Childcare Rebate	-0.073	0.176	0.680
Interaction of Child Care Rebate and Income	0.004	0.006	0.528
State or Territory Level Macroeconomic Variables			
Male Unemployment Rate	-0.057	0.059	0.334
Female Unemployment Rate	0.041	0.043	0.344
Male Labour Force Participation Rate	0.036	0.037	0.318
Female Labour Force Participation Rate	-0.019	0.029	0.514
Savings Ratio	0.479	1.185	0.686
Work Entitlements			
Paid or Unpaid Parental Leave	0.137	0.117	0.241
Permanent Part-Time Work	0.013	0.110	0.906
Home-Based Work	0.052	0.128	0.686
Flexible Hours	-0.040	0.105	0.705
Highest Education			
Bachelors Degree or Above	0.523***	0.130	0.000
Diploma or Certificate	0.268**	0.120	0.025
Year 12	0.304**	0.121	0.012
Year 11 or Less (Baseline)	0.000		
Full-Time Student	-0.847***	0.197	0.000
Real Annual Disposable Income ($'000)	0.008*	0.005	0.088
Current Labour Force Status			
Employed	-0.198	0.205	0.334
Unemployed	-0.395*	0.220	0.072
Not in Labour Force (Baseline)	0.000		
Occupation			
Manager	-0.306	0.236	0.194
Professional	-0.823***	0.218	0.000
Technician and Trade	-0.258	0.272	0.342
Community and Personal Service	-0.451**	0.227	0.047
Clerical and Administrative	-0.716***	0.211	0.001
Sales	-0.276	0.227	0.223
Machinery Operators and Drivers	0.215	0.468	0.645
Labourer (Baseline)	0.000		
Birthplace			
English-Speaking	-0.126	0.161	0.433
Europe	-0.553*	0.299	0.065
Asia	-0.329*	0.183	0.072
Other Overseas	-0.021	0.224	0.926
Australia (Baseline)	0.000		

Marital Status			
Married	0.041	0.220	0.854
Cohabiting	-0.367	0.229	0.108
Separated, Divorced or Widowed	-0.431	0.295	0.144
Never Married and Not Cohabiting (Baseline)	0.000		
Age			
15-19 (Baseline)	0.000		
20-24	2.118**	1.013	0.036
25-29	1.518**	0.635	0.017
30-34	1.425***	0.376	0.000
35-39	0.712*	0.396	0.072
40-44	-0.112	0.451	0.804
Parity			
0	0.525	0.344	0.127
1	1.472***	0.330	0.000
2	0.752**	0.332	0.024
3+ (Baseline)	0.000		
Age x Parity Interactions			
20 to 24 x Parity 0	-0.389	1.041	0.709
20 to 24 x Parity 1	-0.437	1.057	0.679
20 to 24 x Parity 2	-0.276	1.136	0.808
25 to 29 x Parity 0	0.730	0.666	0.273
25 to 29 x Parity 1	0.117	0.671	0.861
25 to 29 x Parity 2	-0.360	0.704	0.609
30 to 34 x Parity 0	0.774*	0.430	0.072
30 to 34 x Parity 1	-0.123	0.426	0.772
30 to 34 x Parity 2	-0.433	0.442	0.328
35 to 39 x Parity 0	1.192**	0.467	0.011
35 to 39 x Parity 1	0.135	0.461	0.769
35 to 39 x Parity 2	-0.328	0.470	0.485
40 to 44 x Parity 0	1.635***	0.562	0.004
40 to 44 x Parity 1	-0.019	0.573	0.973
40 to 44 x Parity 2	-0.725	0.590	0.219
Constant	-5.641	1.741	0.001

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