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## D The generosity of family policy

The size of family payments relative to the private lifetime costs of children is likely to affect ‘marginal’ incentives to have a child by reducing their impacts on family budgets. As shown in the chapter 3, it is straightforward to calculate the changing incentive effects of upfront, non-means tested payments like the baby bonus. It is more difficult to estimate the effects of ongoing payments whose generosity varies with household income and with the age and number of children.

It is more difficult again to summarise the overall impact of the plethora of family payments, each with different designs and eligibility conditions.

This appendix sets out a rough method for assessing the overall impact of family payments, used as the basis for the estimates presented in chapter 3. The basic approach is to calculate the government subsidy as the ratio of all direct family payments<sup>1</sup> in any given year to an estimate of the total costs of children to families in that year (not their lifetime costs).

The main difficulty in doing this is the absence of yearly data on the costs of children. This appendix provides a method for estimating children’s costs in those years where data are missing from other observable features of the economy and population.

### D.1 Direct costs

AMP & NATSEM (2002 and 2007) have calculated the direct costs of children (by various age groups) for families of different sizes and incomes. The costs for an average income family with one child for all ages from 0 to 24 years was estimated by fitting a cubic spline to the published age group data. The incremental costs for 2<sup>nd</sup> (C2) and 3<sup>rd</sup> (C3) children by age were then calculated as:

$$C2_a = \left\{ \left( \frac{\sum_{a=0}^{24} C2_a}{\sum_{a=0}^{24} C1_a} \right) - 1 \right\} \times C1_a \text{ and } C3_a = \left\{ \left( \frac{\sum_{a=0}^{24} C3_a}{\sum_{a=0}^{24} C1_a} \right) - 1 \right\} \times C1_a$$

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<sup>1</sup> That is, excluding services such as provision of healthcare or education.

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We then approximated the average direct costs per child for each age group by weighting the costs by the rough probabilities of different parities:

$$C_a = 0.4 C1_a + 0.4 C2_a + 0.2 C3_a$$

Then the economy-wide direct costs up to age 21 years (TDC)<sup>2</sup> were estimated as:

$$TDC = \sum_{a=0}^{21} C_a \times POP_a$$

where  $POP_a$  is the population of children of age  $a$ .

For December 2007 and March 2002, the economy-wide costs of forgone wages associated with having children were approximated using information from Breusch and Gray (2004), appropriately updated by the changes in the hourly rates of pay over the relevant intervening periods.

Using these methods, in 2007, the aggregate economy-wide costs of children ( $\tilde{C}_{2007}$ ) were around \$110 billion with an average cost per child in that year ( $\tilde{C}_{2007} / POP_{2007}$ ) of just under \$18 000.

## D.2 The productivity link

In the steady state, as the economy grows, nominal per child costs can be expected to rise by real wage growth plus inflation (that is, with nominal productivity growth). Such a long-run condition is similar to other models of costs used in long-run projections (such as in the Intergenerational Reports and the Productivity Commission's ageing models). The underlying rationale is that the opportunity costs of women's labour should be proportional to wage rates, and that children's direct costs grow with economic growth as measured by output per input, reflecting the desire by parents to maintain children's relative living standards (consistent with the Becker model).

Accordingly, we assume that average children's costs are proportional to labour productivity so that  $\tilde{C}/POP = \gamma GDP/Hours$  where  $POP$  is the aggregate number of children between 0 and 21 years,  $GDP$  is gross domestic product,  $Hours$  are total hours worked and  $\gamma$  is a constant.

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<sup>2</sup> Children over the age of 21 were ignored because many will have left home. To impute the costs experienced by those who stay at home to the whole population of people aged 22 to 24 years would exaggerate costs. The understatement of costs resulting from ignoring those who do stay offsets the overstatement of covering children of younger ages who have left.

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Now  $GDP_{t+1}/HOURS_{t+1} = (1+g)GDP_t/HOURS_t$  and  $POP_{t+1} = POP_t(1+e)$  where  $e$  is the growth rate of the number of children and  $g$  the nominal growth rate in productivity. Accordingly:

$$\frac{\tilde{C}_{t+1}}{\tilde{C}_t} = \frac{\{POP_{t+1} GDP_{t+1}/HOURS_{t+1}\}}{\{POP_t GDP_t/HOURS_t\}} \Rightarrow \\ (1+v) = (1+e)(1+g)$$

where  $v$  is the growth rate in economy-wide children's costs.

In the steady state, with zero population growth and a stable age structure,  $e=0$  and therefore  $v=g$ , which is a sensible long-run result.

An advantage of this model is that it takes account of the growth in the population of children as well as economic growth. Were, for example, the growth in the population of children to be negative, then for given productivity, costs would fall as a share of GDP. In contrast, an estimate of the costs of children based on a fixed share of GDP ignores the population dynamics of children.

### D.3 Estimating costs for the missing years

In 2007,  $\gamma$  can be estimated as  $\gamma = \{GDP/Hours\} / \{\tilde{C}/POP\} = 280.72$  using National Accounts data on GDP and the Labour Force Survey for hours worked. A similar calculation can be made for 2002, giving an alternative value of  $\gamma=307.9$ . We use the 2007 value in the calculations that follow, but the difference made to the results from using the 2002-based estimate is small.

Given a value of  $\gamma$ , then for any given period  $\tilde{C}_t = \gamma POP_t \times GDP_t/Hours_t$ . An estimate of family policy subsidy rate ( $s$ ) (as shown in table D.1) can be derived as:  $s_t = GOV_t/\tilde{C}_t$  where  $GOV_t$  is aggregate nominal transfers to families and children.<sup>3</sup> The results suggest that the Australian Government currently meets about one quarter of the full private costs of having children.

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<sup>3</sup> This includes payments defined by the AIHW as 'family' benefits, though some do not relate to the additional *direct* costs of caring for children. For example, parenting payments are akin to conventional pensions, providing income support to a group of people (largely) outside the labour force. There is justification for including these payments as an offset against the full costs of parenting because they reduce the forgone wages of carers of children when they are outside the labour force. However, GOV excludes government payments made indirectly to children, such as through provision of educational and health services. These are not included in the analysis since such payments are not transfers to parents to help defray the private costs of children.

**Table D.1 How much do governments subsidise the private costs of children?**

Experimental estimates, 1998-99 to 2005-06

	<i>Govt nominal spending on children and families (GOV)</i>	<i>Private costs of children (<math>\tilde{C}</math>)</i>	<i>Subsidy rate (s)</i>
	\$m	\$m	%
1998-99	16 088	74 766	21.5
1999-00	17 329	77 789	22.3
2000-01	20 168	83 843	24.1
2001-02	21 893	89 369	24.5
2002-03	22 195	92 835	23.9
2003-04	27 122	100 020	27.1
2004-05	25 760	103 406	24.9
2005-06	26 580	111 487	23.8

<sup>a</sup> Payments are restricted to welfare expenditure, comprising cash paid to recipients of income support and welfare services (benefits-in-kind). The spending includes that by all Australian Governments. Payments include Parenting Payments made to people caring for children, as well as the Maternity Payment (the 'baby bonus'), FTB (A&B), the Immunisation Allowance, the Large Family Supplement and various other sundry payments. It excludes the costs associated with provision of schools or other government services to children.

Source: Australian Institute of Health and Welfare 2007, *Welfare expenditure Australia, 2005-06*, Health and Welfare Expenditure Series, No. 31, AIHW cat. no. HWE 38, November, Canberra; and PC estimates.

These experimental estimates suggest that changes in family policy increased the government subsidy rate to families by 2.3 percentage points from 1998-99 to 2005-06. Denoting  $s_1$  and  $s_2$  as the subsidy rates for 1998-99 and 2005-06 respectively, this implies that the changing generosity of family policy between these years reduced the net costs of children to families by:  $r = 100 (s_2 - s_1) / (1 - s_1) = 3 \text{ per cent}$ . However, this result reflects the choice of 1998-99 as the base year. For all other alternative base years (except 1999-00), the subsidy rate in 2005-06 is lower.

Another, narrower, measure of the generosity of family policy provides a different perspective. The measure is based on non-hypothecated family payments that directly address the additional costs of children (table D.2). Over the period 1998-99 to 2006-07, the subsidy rate defined on this basis ( $k$ ), increased by just over 3 percentage points, implying that it reduced private costs by  $\hat{r} = 100 (k_2 - k_1) / (1 - k_1) = 3.6 \text{ per cent}$ .

## D.4 What does family policy imply for fertility?

While there is a large empirical literature on the impacts of family policy on fertility, much of it is flawed or does not derive conventional price elasticities

(appendix E). Moreover, one of the better studies — Gauthier and Hatzius (1997) — finds no significant effect of family policy on fertility in Anglo-Saxon countries (including Australia).

**Table D.2 Government transfers targeting the direct costs of children**  
1998-99 to 2006-07

	<i>Family allowances (ALLOW)</i>	<i>Share of GDP</i>	<i>Share of private costs (k)</i>
	\$ m	%	%
1998–99	7 334	1.21	11.0
1999–00	7 314	1.13	10.6
2000–01	10 253	1.49	13.7
2001–02	11 104	1.51	14.0
2002–03	10 690	1.37	12.9
2003–04	15 316	1.82	17.2
2004–05	13 554	1.51	14.7
2005–06	14 389	1.49	14.5
2006–07	15 204	1.45	14.2

<sup>a</sup> These comprise non-hypothecated payments intended to assist parents with the direct costs of children. It includes maternity allowances (the baby bonus), family tax benefits (A and B), the one-off ‘More help to families’ payment and equivalent payments that were made prior to these benefits. It excludes ‘in-kind’ benefits, such as child care subsidies, and income replacement measures, such as parenting payments. The value of ALLOW is used in the subsequent analysis to illustrate the possible effects of family policy on fertility. This narrower definition is consistent with that used by the best quality panel studies, whose parameters we apply in the analysis below. Nevertheless, if GOV is used rather than ALLOW, the results are qualitatively similar, but with family policy having a slightly weaker impact on fertility.

Source: FACS (various issues), Annual Reports, and OECD Social Expenditure Database.

However, suppose that, in fact, Australian fertility was as responsive to family policy transfers as OECD countries in aggregate. What would this then imply for the impact of government family policy changes in the last few years? A first step in undertaking this calculation is interpreting the parameters from the empirical literature.

### Interpreting parameters from panel data studies

Gauthier and Hatzius’s (1997) measure of the generosity of family policy is the ratio of all family allowances for a two child family to average male wages in manufacturing (B). In their study, they found that  $\ln(TFR_t) = 0.87 \ln(TFR_{t-1}) + 0.42B_t + \varphi Z_t$ , where TFR is the total fertility rate and  $Z_t$  are a vector of other variables. Assuming that only B changes then in the long run (when  $t=T$ ):

$$\ln(TFR_T) - \ln(TFR_0) = 0.42\Delta B_t / (1 - 0.868) = 3.19\Delta B_t,$$

where  $TFR_0$  is the base year TFR. For small changes,  $100 \times \ln(TFR_T) - \ln(TFR_0)$  closely approximates the percentage change in the fertility rate (%TFR) so that  $\%TFR \cong 3.19 \Delta B_t$ .

Gauthier and Hatzius note that the average TFR in the OECD was 1.71 and that B was 0.0531. A 25 per cent increase in the generosity of family payments implies that for the OECD,  $\%TFR \cong 3.19 \times 0.25 \times B_0 = 4.2$  per cent or an increase of around 0.07 babies per woman.

The difficulty in applying this approach in an Australian context is that — across all payment types — B is not directly available. However, an estimate of B can be derived as follows. By definition,

$$B = \frac{(\text{Aggregate annual benefits to 2 child families}) / (\text{Number of families with 2 children})}{\text{Hourly wages in manufacturing} \times \text{average weekly hours} \times 52}$$

$$= \frac{q}{w.h.52}$$

Where q is the average family payment to 2-child families, w is the wage rate and h is hours. Suppose that  $\rho$  and  $\theta$  are the share of families with one and two children respectively. Then the number of families with two children =  $\theta \times$  the total number of families =  $\theta F$ ; the number of families with one child =  $\rho F$  and the number of families with three or more children =  $(1 - \rho - \theta) F$ , where F is the total number of families.

Suppose that the average benefits per family are  $q/2$  for a one child family and  $1.7q$  for a three or more children family. In that case, total family benefits (ALLOW) are:

$$ALLOW = F q (\theta/2 + \rho + 1.7 [1 - \rho - \theta]) \text{ so that } q = \frac{ALLOW}{F (\theta/2 + \rho + 1.7 [1 - \rho - \theta])}$$

Now from ABS data, w is close to average full-time earnings per hour across the economy (v). Now aggregate family income (y) can be defined as around:  $y = \mu F v h.52$  where  $\mu$  is the number of full-time equivalent persons per family.<sup>4</sup> Accordingly,  $F v h 52 = y / \mu$ . Now the full costs of children ( $\tilde{C}$ ) is some proportion of family income, so that  $y = \tilde{C} / \gamma$ .

Bringing these various expressions together:

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<sup>4</sup> This also takes into account the unemployed, who are assumed to be equivalent to 0.25 of a full-time worker given that they receive unemployment benefits of around 25 per cent of average weekly earnings.

$$\begin{aligned}
B &= \frac{q}{\text{w.h.52}} = \frac{\text{ALLOW}/\{F(\theta/2 + \rho + 1.7[1 - \rho - \theta])\}}{\text{v.h.52}} = \frac{\text{ALLOW}}{(\theta/2 + \rho + 1.7[1 - \rho - \theta]) F \text{ v.h.52}} \\
&= \frac{\text{ALLOW}}{(\theta/2 + \rho + 1.7[1 - \rho - \theta]) y / \mu} = \frac{\text{ALLOW}}{\tilde{C}} \times \frac{\mu \gamma}{(\theta/2 + \rho + 1.7[1 - \rho - \theta])} \\
&= k \times \frac{\mu \gamma}{(\theta/2 + \rho + 1.7[1 - \rho - \theta])}
\end{aligned}$$

This expression implies  $B$  is proportional to  $k$  (the subsidy rate derived above). The actual relationship depends on the fixed parameters shown (table D.3 and D.4). A simpler back of the envelope calculation, based on the rough assumption that  $B \cong \text{ALLOW}/y = k \times \tilde{C}/y = k \times \gamma$ , suggests slightly smaller values of  $B$  (table D.4), but substantiates that  $B$  is probably around 10 per cent in Australia.

**Table D.3 Key parameters for deriving the ratio of family subsidies to income (B)**

<i>Parameter</i>	<i>Description</i>	<i>Value</i>	<i>Source</i>
$\gamma$	Aggregate children's' cost share of family income (%)	37.2	Breusch and Gray (2004) and AMP/NATSEM (2007)
$\theta$	Share of families with 2 children (%)	40.6	ABS Cat. No. 2068.0 - 2006 Census Tables
$\rho$	Share of families with 1 child	38.5	ABS Cat. No. 2068.0 - 2006 Census Tables
$\mu$	Full time equivalent income recipients per family	1.1	ABS Labour Force Survey (ST FA2)

*Source:* PC calculations and sources as noted above.

**Table D.4 Estimates of B**  
Experimental estimates, 1998-99 to 2005-06

	<i>B (complex method)</i>	<i>B (simple method)</i>
	ratio	ratio
1998-99	0.0478	0.0410
1999-00	0.0458	0.0393
2000-01	0.0595	0.0511
2001-02	0.0605	0.0519
2002-03	0.0561	0.0481
2003-04	0.0746	0.0639
2004-05	0.0638	0.0547
2005-06	0.0628	0.0539
2006-07	0.0617	0.0529

*Source:* PC estimates.

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## Implications

Given the above results, an initial TFR of 1.758 in the fiscal year 1998-99, and Gauthier and Hatzius's parameter estimate, the long-run effect of the change in B from 1998-99 to 2006-07 would be:

$$\text{TFR}_T - \text{TFR}_0 = (e^{3.19 \times (.0617 - .0478)} - 1) \text{TFR}_0 = 0.08 \text{ babies per woman} .^5$$

However, this estimate is the long-run effect, not the effect apparent to date. It also abstracts from other factors that may have influenced recent fertility. To consider this, Gauthier and Hatzius's model was used to decompose recent changes in the TFR into three factors:

- the influence of the changing generosity of family benefits (through  $\Delta B$ ) from 1998-99
- the impact of all other influential factors (Z) subject to change on a year by year basis after 1998-99
- the effects of pre-1998-99 influences that are captured by the lagged dependent variable in Gauthier and Hatzius's model ('history').

The simulation suggests that were Gauthier and Hatzius's parameter estimates relevant in an Australian context, the changes in family policy may have raised fertility by around 3.7 per cent (or by 0.066 babies per woman) over the period June 1999 to June 2007 (table D.5). Changes in other factors over this period raised the TFR by 0.07 babies per woman, while the influence of shocks prior to June 1999 contributed to a fall in the TFR of 0.064 babies per woman.

Notably, the apparent contribution of family policy to the change in fertility from June 2005 to June 2007 has been much smaller than the effects of other factors (Z).

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<sup>5</sup> Another back-of-the-envelope calculation based on Ermisch (1988) suggests that a doubling of child allowances increases the TFR by 8.6 per cent (or an underlying point elasticity of 0.086). Assuming a roughly constant elasticity, this implies that the 29 per cent increase in B from 1998-99 to 2006-07 would have increased the long-run TFR by around 2.5 per cent or 0.044 babies per woman. These variations highlight the uncertainty about the likely impact.

**Table D.5 A ‘what if’ analysis of the impact of family policy**

June 2000 to June 2007<sup>a</sup>

<i>Year end June</i>	<i>B</i>	<i>Z</i>	<i>History</i>	<i>Total TFR change</i>
Contribution to $100 \times \Delta \log \text{TFR}$ in each year (or about the % change in the TFR)				
2000	-0.08	0.48	-0.57	-0.17
2001	0.51	-0.76	-0.49	-0.74
2002	0.48	-0.08	-0.43	-0.03
2003	-0.03	0.66	-0.11	0.52
2004	1.83	-0.48	-1.17	0.17
2005	0.51	1.07	-0.39	1.19
2006	0.35	1.42	-0.29	1.48
2007	0.18	1.68	-0.18	1.68
1999 to 2006	3.74	3.98	-3.63	4.09

<sup>a</sup> The model is  $LF_t = aLF_{t-1} + hB_t + Z_t$  where  $LF$  is  $\log(\text{TFR})$ ,  $B$  is the benefit measure and  $Z$  are all the other influences. In each year,  $B$  is subject to some shock:  $\varepsilon_1$  (for June 1999 to June 2000),  $\varepsilon_2$  (for 2000 to 2001) and so on. Similarly  $Z$  is subject to similar shocks ( $\zeta_1, \zeta_2$  and so on). In addition, shocks prior to June 1999 continue to affect the TFR through the lagged dependent variable (the ‘history’ effect). The cumulative effects of  $B$  on  $\log(\text{TFR})$  from June 1999 to June 2007 is  $h\varepsilon_1(1+a+a^2+a^3+\dots+a^7) + h\varepsilon_2(1+a+a^2+\dots+a^6) + \dots + h\varepsilon_8$ . A similar measure can be derived for shocks to  $Z$ . Recall that  $100 \times \Delta \log \text{TFR}$  is very close to the percentage change in the TFR in each year.

Source: PC calculations.

The results above are likely to exaggerate the real impact of family policy in Australia for the reasons outlined in chapter 3. Moreover, the underlying model has some dynamic features that are unrealistic and that are likely to overstate the impacts of policy:

- The effect of any given policy shock grows continuously over time.
- Adjustment is very slow. It takes about five years after a policy shock for even half of the effect to be felt on fertility rates. While it is likely that people do not respond immediately to the changing generosity of family policy, the protracted nature of this response appears improbable.

A more credible depiction of fertility behaviour would entail:

- a small initial effect (associated with a short lag in recognition and the period of confinement)
- a bigger effect over several subsequent years
- followed by a negative effect, reflecting the fact that some of the initial response involves bringing forward children that parents were going to otherwise have later in their lives (a tempo effect).

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Limits to data availability meant that Gauthier and Hatzius were obliged to use a simple dynamic specification<sup>6</sup> that, by its nature, ruled out the latter tempo effect — adding to the likelihood that the long-run effect of family policy is overstated.

### *Additionality*

Even though the results in table D.5 are likely to be reflect an upper limit of sensitivity of Australian fertility to family policy, it is useful to consider their implications for the number of (long-run) additional children per dollar of public support of families. A back of the envelope calculation suggests:

$$\text{Impact} = [e^{(3.19 \times (B_{2006-07} - B_{1998-09}))} - 1] \times \text{Births}_{1998-99} = 11\,301 \text{ babies}$$

$$\text{Cost} = \text{ALLOW}_{2006-07} - k_{1998-99} \times \tilde{C}_{2006-07} = \$3.43 \text{ billion}^7$$

Accordingly, the policy effect is 0.0000033 extra babies per dollar of additional funding or just over \$300 000 of public funding per baby. If — as is more likely — the real responsiveness of fertility to family policy is less than this, then clearly the amount of public funding needed to induce an additional baby rises commensurately.

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<sup>6</sup> Only a lagged dependent variable.

<sup>7</sup> The estimate of the cost is the government's expenditure level in 2006-07 had the subsidy rate stayed at its 1998-99 level.