Measuring the Cost
of Children
Concepts and Methodologies

families commission
kōmihana ā **whānau**

Measuring the
Cost of Children

Concepts and Methodologies

The Families Commission was established under the Families Commission Act 2003 and commenced operations on 1 July 2004. Under the Crown Entities Act 2004, the Commission is designated as an autonomous Crown entity.

Our main role is to act as an advocate for the interests of families generally (rather than individual families).

Our specific functions under the Families Commission Act 2003 are to:
- encourage and facilitate informed debate about families
- increase public awareness and promote better understanding of matters affecting families
- encourage and facilitate the development and provision of government policies that promote and serve the interests of families
- consider any matter relating to the interests of families referred to us by any Minister of the Crown
- stimulate and promote research into families, for example by funding and undertaking research
- consult with, or refer matters to, other official bodies or statutory agencies.

Measuring the Cost of Children
Concepts and Methodologies

A Report of the Families Commission

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EXECUTIVE SUMMARY

It is well known that it takes a substantial amount of both time and money to raise children. It is also known that the amount of time and money that parents invest in their children has some impact on the developmental outcomes for children. Child poverty is positively correlated with a number of negative child outcomes – which often persist once the child has become an adult. Because of this, the amount of time and money put into raising children is of interest in multiple areas of policy, including child poverty, benefit rates, child support payments and health and education subsidies.

This report reviews some of the main concepts and methodologies in the cost of children literature. It does not attempt to arrive at cost estimations. Cost measures range from the costs faced by parents (including opportunity costs), the costs faced by supporting family members and communities, and the costs of government contributions. The concept and methodology used to calculate the cost of children depend heavily on the purpose of estimation. An estimate of the minimum amount needed to raise a child at a socially acceptable standard of living will be substantially different to an estimate of the average expenditure of parents on children.

Australian researchers have published a considerable amount of material on the cost of children. In 2000 the Australian Institute of Family Studies produced *A Guide to Calculating the Costs of Children*, which contains several different types of cost estimates. The guide covers some of the main methodologies for estimation, including the budget standards approach and the expenditure survey approach.

The most recent estimates of the cost of children in Australia were obtained for a Ministerial Taskforce on Child Support. The results of two new studies using expenditure and budget standards methodologies respectively, were synthesised to produce the agreed Taskforce costs (see Percival and Harding 2005).

Comparatively little has been done in this area in New Zealand. Robertson (1993) produced a paper for the Office of the Children's Commissioner that critically reviewed two methods of estimation: the expenditure approach and the budget standards approach. Parallel work has been done by Easton (1980), Smith (1989), Jensen (1988) and Michelini (2001) on equivalence scales, Waldegrave, Stuart and Stephens (1996) on poverty standards and Snively (1988) and Crawford and Johnston (2004) on the redistribution of income across different households.

Estimates of the cost of children contribute to two areas of interest to the Families Commission. These relate to ensuring that families have enough income to maintain an adequate standard of living and to be able to live with dignity in our society, and ensuring that the cost of children are fairly distributed among those who receive the benefits.

Estimates of the cost of children may be used to assess the additional costs faced by parents in families with children compared to other family types, and the relative assistance that the government provides to families with children compared to those without. Other possible uses include assessing the appropriateness of the current child support payment scheme (as recently done by the Australian Ministerial Taskforce on Child Support (2005)), providing budgeting advice to families with children, and investigating poverty and the living standards of families with children.

However, there is no one right answer to the question as to how much children cost. In addition, any estimate of the cost of children depends on a variety of assumptions and restrictions that are open to debate. As a result, estimates of the cost of children are highly contested.

Furthermore, when applying an estimate of the cost of children to policy, it is important to consider the various interests that different parties will have in meeting this cost. For example, parents usually choose to have children in order to receive the intangible benefits that come from doing so and as such are willing to meet the costs of raising them and family members often provide support for similar reasons. Government has a range of interests in encouraging couples to have children including raising fertility levels, to ensure that children grow up to be capable, educated and skilled and to avoid the social and fiscal costs often associated with a disadvantaged childhood.

The appropriate cost concept and methodology to be used in estimating such a cost depends on why one wants to know the cost of children. If the purpose is to ensure income adequacy then the appropriate question to ask relates to the minimum income that is needed to raise a child. If the purpose is to assess the impact of these costs on parents, the average amount that parents spend on their children may be a more appropriate question. While both such figures would represent the cost of a child, they are likely to be vastly different from one another. For this reason, it is unlikely that a single cost estimate would meet all policy needs.

This report provides a summary of cost of children concepts and methodologies, with a primary focus on methodologies that estimate the direct parental costs. It is not exhaustive in its discussions of issues associated with such costs. This paper should be used only as a summary, and readers interested in calculating an estimate of the cost of children are encouraged to refer to the referenced papers for greater depth and detail.

1   INTRODUCTION

There is no single agreed definition of the costs of raising a child. Nor is there a definitive methodology for arriving at a measurement of any given definition. However, judgements are made about what it costs to raise a child in many areas of policy, including child support payments, family and child benefits, and poverty scales. This report reviews the cost concepts and methodologies that have been used in the literature.

Many different sectors of society contribute to the cost of raising a child. The main contributors are the parents or guardians who have primary responsibility for the care and support of the child. Both national and local government also make contributions. The national government contributes both on the expenditure side, for example education and health expenditure, and on the income side, for example tax concessions and family assistance payments to families with dependent children. Local government contributes in the services it provides for children. Extended family members, other members of the community and some community organisations may also make contributions in cash or in kind.

Estimates of the cost of children contribute to two areas of interest to the Families Commission. These relate to ensuring that families have enough income to maintain an adequate standard of living and to be able to live with dignity in our society, and ensuring that the cost of children are fairly distributed among those who receive the benefits of children.

Whilst there is a large literature on the cost of children, the majority of it focuses on the costs faced by the children's parents. The extent to which the cost of children impact on parents' ability to provide both an adequate standard of living for themselves and their children, and an adequate level of investment in their children, is of concern to both government and society in achieving poverty reduction goals. There are three different types of costs that parents face – money, time and lost income due to time out of the workforce.

Families with children are more likely to be in poverty than families without children. Measurement of living standards on New Zealand's Economic Living Standards Index (ELSI) showed that in 2000, 29 percent of children under the age of 18 had low living standards, compared to a figure of 20 percent for the whole population (Ministry of Social Development 2005). Low living standards are correlated with a number of negative outcomes, particularly for children (see for example Keating and Hertzman 1999). The Families Commission's *Focus on Families* (Stevens, Dickson, Poland and Prasad 2005) found that focus group participants were concerned about the inability of those on low incomes to provide adequate investments in and security for their children, particularly in the key areas of tertiary education, home ownership and insurance.

Because family income is usually shared amongst members within a household, and households are of different sizes and compositions, income measures alone do not provide a good measure of the purchasing power of households. A one-person household will enjoy greater per person consumption (and investment) than a five-person household on the same income. A possible solution is to compare per capita family income by dividing the income by the number of people in the family. However, this ignores economies of scale. A one-person household usually needs the same number of fridges and washing machines as a two-person household. Also, the

addition of a child to a household would have a different impact on the costs than the addition of an adult.

Equivalence scales have been developed to permit the comparison of households of different income, size and composition. Equivalence scales usually take a two-adult household as the base or reference household by applying a value of 1.0. The scales are then applied to the income of a household of a different size or composition – producing a measure called 'equivalised income'. In this way the incomes of households of different sizes and compositions can be readily compared.

Equivalence scales are not simple to produce. There are a number that have been estimated for New Zealand, all of which contain some theoretical and empirical problems (Stephens 1988). Expenditure equivalence scales contain an implicit cost of children estimate and so can be used along with expenditure data to obtain an estimate. One of the most commonly used income equivalence scales in New Zealand is the revised Jensen scale (1988). For more information on equivalence scales, see Gray (2005), Stephens (1988) and Creedy and Sleeman (2004).

This first part of this report reviews the different cost concepts that can be used. These concepts range from the type of cost (money, time or emotional), to who contributes to the cost (private individuals and organisation or the general public through government).

The second part of this report describes the different methodologies that have been used to calculate the cost of children. The methodologies are split up into those that produce estimates of the costs faced by parents, government bodies and private individuals or organisations.

The third part of this report looks at the estimates that have been produced in New Zealand and Australia.

2   COST CONCEPTS

When estimating the cost of children, the relevant concept depends on the purpose for which it will be used. This section provides a discussion on the different concepts of the cost of children and presents some of the more commonly used definitions in the literature.

2.1   Direct, indirect and intangible costs

The most common cost concept is that of direct costs. The direct costs are the physical payments made directly on purchases for a child. Examples include expenditure on food, clothes, entertainment, health and education. Goods consumed in a household tend to fall under one of three categories: those consumed entirely by children; those consumed entirely by adults; and those that are shared by both adults and children (eg television, microwave, lounge furniture, car). A major challenge in assessing the direct cost of children is determining what part of the cost of the shared goods should be allocated to the child. Various approaches to this problem will be addressed in the methodology section.

Just as there are direct costs in raising a child, there are also indirect or consequential costs. Indirect costs are expenditures incurred because of a child, although they do not involve direct spending on the child. The indirect cost most often considered is the opportunity cost of lost earnings. This might be the result of parental time out of the labour force, reduced hours, or reduced pay through a change to a lower paying job in order to participate in childcare responsibilities. The dollar value of both the direct and indirect costs increases with income.

Another indirect cost is the cost of time spent supervising and engaging with children, and the additional time spent on household duties such as meal preparation. Whilst time that is substituted from the labour force to the child is usually considered, time that has been substituted from other activities such as home production, sleep or leisure, is less commonly considered. However this time is also an indirect cost of raising a child.

In addition to the opportunity costs of time, there are also opportunity costs in terms of money. This becomes particularly important when the direct costs of having a child necessitate running down assets or investments, or taking out a loan. These create additional costs for the family.

A different type of cost is that incurred when an adult needs to supervise a child on an activity that is not free – for example buying an adult movie ticket to take a young child to the movies or paying the supervisor fee when taking a child to a swimming pool. The literature tends not to mention these costs. It may be debatable whether they are considered direct or indirect costs. It is unlikely that they are direct costs as they do not involve direct spending on the child. An adult without children would pay the same price as an adult with children to see a child's movie. However it is an indirect cost if the adult would not have gone to that movie had they not had children. Just as children may cause parents to change their behaviour in a way that results in lost income, they may also cause a change in behaviour that results in extra costs, due to needing to be supervised (particularly when very young).[1]

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[1] Note that market childcare costs are a direct cost as the child directly receives the care being paid for. However, in the case of supervising costs, it is the parent who is directly receiving the service being paid for.

A third cost concept (which will not be covered in this report) is that of intangible costs. This includes the physical and emotional pain resulting from having a child. Examples are the discomfort of pregnancy and the pain of childbirth – not to mention the stress, worry and loss of sleep that comes with having a child. However, just as there are intangible costs, there are also intangible benefits. In most cases parents choose to have children, so assuming that people do not have children in order to make a net financial gain[2], the intangible benefits will outweigh the intangible costs.[3]

The focus of this report reflects the focus of the literature. Most of the focus will be on direct costs, with some discussion of indirect costs. Intangible costs will not be considered. Estimating such costs would be extremely difficult (more so than for direct and indirect costs) and there is currently no great policy need for such an estimate.

2.2 Private and public costs

When investigating the direct and indirect cost of children the distinction is usually made between private and public costs. The private costs are those borne by individuals or private organisations whilst the public costs are those incurred by local and national government. For example, if a parent takes their sick child to the doctor, the parent incurs the fees charged by the doctor and the government incurs the cost of any medical subsidy.

The literature tends to cover the private costs incurred by the parents only and so largely ignores both the public costs and the private costs incurred by other individuals and organisations. When calculating parental costs it is important to keep in mind that there are costs other than those faced by the parents. More importantly, private and public costs are often interchangeable – so when calculating the costs parents face, an implicit assumption is made that the public costs remain constant.

For example, if the government chose to increase expenditure on subsidising doctor visits for children, this would be likely to both decrease the actual direct costs to parents who would have taken their child to the doctor anyway, and increase the actual direct costs for parents who can now afford to take their child to the doctor but previously would not have. The dynamic impacts of policy changes become particularly important when comparing parental costs across time in a period of substantial social policy change.

2.3 Actual and minimum standard costs

A third distinction must be made between the actual expenditures that are made on children and a socially acceptable minimum level of expenditure on children. Actual expenditure is the amount that parents spend on their children, which is heavily dependent on the income of the parents as well as the number and age of the children. This measure of costs can identify, for example, what a family on the average New Zealand income actually spends on their children. The minimum standard cost refers to the expenditure necessary to achieve a socially acceptable minimum standard of living.

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[2] Given the large immediate direct and indirect costs of having children and the uncertainty of future direct and indirect gains, this assumption seems reasonable.
[3] This statement also assumes that people can accurately assess the intangible costs and benefits before deciding to have children.

The choice of which concept to use will depend on the purpose of the cost estimate. For example, an interest in the living standards of families with children would need an actual cost concept, whereas an interest in poverty and the ability of unemployed or low-income families to provide an adequate standard of living for their children would involve a minimum standard cost concept.

The minimum standard expenditure level may be seen as a 'fixed cost' of children (given current prices and the current understanding of the needs of children), regardless of income. Parents with equivalised income above a certain amount would be able to meet this cost and those with equivalised income below would not. This level of equivalised income is often referred to as the poverty line.

However, discretionary spending on children increases with income, in keeping with the overall increases in consumption that produce higher living standards for those on higher incomes. For a further discussion of the fixed and variable cost of children see Banks and Johnson (1993).

2.4   Cost factors

Even using an identical cost concept and an identical methodology, cost estimates will vary depending on a number of different factors. For this reason it is important to take into consideration the following factors when estimating the cost of children.

Family income: Whilst the total dollar amount spent on children usually increases with income, the proportion of income spent on children usually decreases. This could be a result of several factors. Firstly, if parents put their children's needs ahead of their own, and their income is too low to meet both their own and their children's needs, then they may give up items they need to provide for their children. Once their children's needs have been met, further increases in income may go entirely towards meeting the parents' needs or shared needs, thereby reducing the proportion of income spent solely on the children. Second, if both the parents' and child's needs have been met, an increased proportion may be devoted to savings or investments (Ministerial Taskforce on Child Support 2005). Third, in cases where gross income is being considered, an increase in income may lead to an increase in the proportion of income spent on tax, thus reducing the proportion spent on children (all other things being equal).

Child earnings: The move from being a dependent child to an independent person is gradual and as such children have the capacity to contribute towards their own costs in an increasing manner as they get older. From participating in domestic work, to receiving pocket money and then participating in formal paid work, children have varying degrees of ability and responsibility in contributing to their own costs.

The age of the child: Studies have shown that, excluding costly childcare for very young children, the cost for parents usually increases as a child grows older (Robertson 1993 and Harding and Percival 1999). It is likely, however, that costs would initially be very high just before and just after the birth of a child – particularly a first-born. These costs would include 'set-up' costs such as moving to more spacious accommodation and purchasing baby furniture, as well as loss of income for time out of the labour force if the mother was working prior to giving birth.

The number of children in the family: Economies of scale mean that the cost of an additional child is less than that of the previous child. Economies of scale take place on goods such as housing, and savings through bulk buying and hand-me-downs. However, once the addition of a child exceeds the capacity of assets, this can be

associated with large costs. For example, the presence (or expected presence) of a child motivates a move to a larger house.

The age and gender of all children in the family: Whether children can share a bedroom or not usually depends on the age and gender of the children and so this combination will substantially impact on housing costs (Harding and Percival 1999).

The time at which the estimate is taking place: Across time comparisons need to be adjusted for inflation and standards of adequacy are likely to vary over time. In addition there are likely to be seasonal and cyclical differences.

The place in which the estimate is taking place: Costs are likely to vary, both on a regional and national level. For example, housing costs are usually lower in rural New Zealand areas than larger metropolitan areas.

The type of family: Costs can differ significantly depending on whether the household is a one-parent or two-parent household. This may reflect the lower average incomes of one-parent households or a lower level of economies of scale (Percival and Harding 2005). In addition, costs will be different for a family that contains extended family members who pool their resources.

Children with a disability or prolonged illness: Costs will likely be much higher and much more variable for children with a disability or prolonged illness. Most cost of children methods do not take this into consideration.

Culture: Costs may vary by culture, particularly in terms of dietary requirements, remittances and community donations.

2.5   Summary

The term 'cost of children' means different things to different people. This section has described the different cost concepts that may come to mind when this term is used. It has highlighted the need to be specific as to the concept being considered when the term 'cost of children' is used. In addition it has outlined a number of the different factors that influence the costs. These factors highlight some of the ways in which costs may differ from family to family.

Diagram 1: A number of individuals and organisations contribute to the cost of children. These contributions may be complements or substitutions of other contributions.
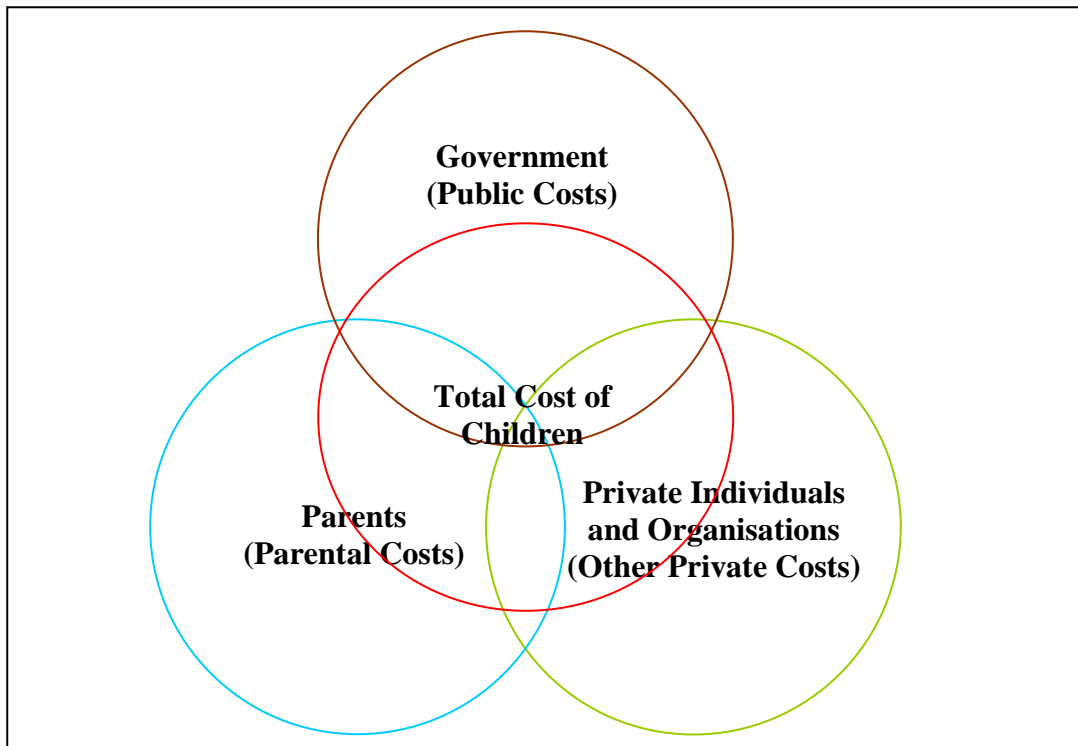
3   METHODOLOGIES

This section covers the main methodologies used in the literature to measure the cost of children. The appropriate methodology for estimating costs will usually depend on the type of cost being estimated. This section is split into three parts – methodologies for estimating parental costs, non-parental private costs and public costs. Whilst only a summary of each method is presented here, references are provided for those readers interested in a more detailed description.

3.1   Parental costs

Parental costs are the costs that are faced by parents when they have a child. These costs include parental expenditures on children, loss of income from parents leaving or reducing time spent in the labour market, and loss of time to spend on domestic work, sleep and leisure. Parental costs are the most common cost of children cost concept measured in the literature. The reason for this is that many policy concerns surround both the obligation and ability of parents to provide for their children and the role of government in supporting parents to do this. Each of these cost estimates assume that government spending remains constant as changes to policy can change the costs faced by parents.

The methodologies covered here are:
*   the budget standards approach which measures a minimum standard cost
*   the expenditure survey approach which measures actual expenditure costs
*   regression analysis which measures the opportunity cost[4] in the form of the lifetime wage a mother would have had if she had not become a mother
*   simulations which measure the indirect parental costs
*   the use of time-use surveys to measure time costs.

3.1.1 Budget standards ('basket-of-goods') approach

The budget standards approach is a measure of what the direct parental cost *should* be to raise a child at a given standard of living. It is a measure of the minimum level of expenditure on children that is considered socially acceptable (also known as a basic needs cost). It is derived by costing the goods and services required by "particular households living in a particular place at a particular time in order to achieve a specified standard of living" (Australian Institute of Family Studies 2000). The standard of living used in the estimate depends on the context: it may be a standard of living that meets only the very minimum requirements to sustain life; it may reflect a minimum income required to meet basic needs and to allow active participation in society; or it may reflect some other minimum level of expenditure that is considered socially acceptable. Examples of such differing levels of expenditure can be seen in the University of Otago's food cost survey (University of Otago 2005).

The budget standards approach is usually used to determine a minimum amount of income needed to maintain an adequate standard of living. Such information can be used to assess levels of income assistance intended to make a contribution towards the parental costs of raising a child. Examples of such assistance in New Zealand include family support payments and the foster care allowance.

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[4] This makes assumptions about the counterfactual actions of the woman (ie assumes she would have stayed in the labour force if she had not had children).

The budget standards approach has three main advantages over other approaches, in that it is a needs-based analysis and is both transparent and flexible (Saunders, Chalmers, McHugh, Murray, Bittman and Bradbury 1998). The needs focus of this approach means that it can be used to assess poverty and living standards. It produces a minimum level of income necessary to raise children at a given standard of living.

The method is also transparent. This means that it is readily understood by the public and the subjective decisions made by the authors can be clearly seen (and criticised) by others. Owing to the systematic nature of the calculations, assumptions can be stated at each point in the process and can also be readily viewed.

The method is flexible. The impact of the assumptions can be tested, and they can be changed if they are thought no longer appropriate. In addition, individual items can be removed or added, and the impact of these changes can be tested. This helps when debating whether or not a specific item ought to be included. If it is found to make little difference to the estimated cost, then it makes little difference whether it is included or not.

There are several limitations to this approach. The first is that the budget standards approach, like most cost of children methodologies, is subjective. Decisions have to be made as to what goods and services are necessary and what are not. Estimates can vary greatly depending on the researcher's idea of a minimum standard and the necessities that are included in it. In order to limit problems occurring because of this, a mix of inputs is usually used to make such decisions. These include 'expert opinions', standards recommended by official bodies, focus groups and expenditure data.

In New Zealand, Waldegrave et al (1996) worked around this limitation by using focus groups alone to derive a budget. After carrying out different focus groups of different types around New Zealand they were surprised to find a great deal of consistency within the dollar amounts allocated to the budgets. Unfortunately they only investigated the costs of a two-adult, three-child household and a one-adult, two-child household, and so it is not possible to infer child costs from this work alone.

In developing a budget of goods in a focus group, the method employed by Waldegrave et al (1996) combines the budget standards approach and the survey opinion approach. The survey opinion approach involves conducting an opinion survey that asks a representative sample of families to estimate how much they spend on their children. This approach is not often used, as results tend to be inaccurate owing to parents' difficulty in making such estimations on the spot (McDonald 1990). Gray (2005) notes findings from authors such as Flik and Van Praag (1991)[5] that results substantially differ when even subtle changes are made to the survey questions.

Table 1 below shows the results of the focus groups, split into various focus group categories. This demonstrates some of the broad cost categories that may be considered when determining the necessities for an acceptable minimum standard of living, and how much is needed to meet these costs.

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[5] Flik, R., & Van Praag, B. (1991). 'Subjective poverty line definitions'. *De Economist*, 139(3):311-330.

Table 1: Weekly expenditure estimates, Lower Hutt, 1993: Estimates of minimum adequate weekly expenditure for two adults and three children, by low-income panels ($ per week)						
	Focus group type					
Expenditure category	Māori	Samoan	Pākehā	Sole parent	Wage earning	Average
Food	100	150	100	130	90	114
Household operations	10	10	10	15	10	11
Housing	150	180	150	150	150	156
Power/heating	30	20	20	25	20	23
Phone	11	10	10	10	10	10
Transport	40	30	40	55	60	45
Activities/recreation	15	10	25	21	30	20
Insurances	11	11	15	20	15	14
Life insurance/super	20	10	20	10	5	13
Exceptional emergency	10	20	10	10	5	11
Appliances	10	6	10	5	4	7
Furnishings	10	6	5	-	3	5
Medical	15	5	15	5	15	11
Clothing/shoes	37	10	20	20	15	20
Education	6	5	8	15	10	9
TOTAL	475	483	458	491	442	470
Source: Waldegrave et al (1996)						

A second limitation of the budget standards approach is that it is difficult to ensure a consistent standard of living across groups of budget items. Saunders et al (1998) attempted to limit this problem by stating some 'rules-of-thumb'. For example, a 50 percent ownership rule was decided for the 'modest but adequate' budget, meaning that all items included at this living standard must be owned by at least half of the population. Similarly, a 75 percent rule was used for the low-cost budget, even covering the frequency and type of holidays undertaken. Whilst such rules are arbitrary in themselves, they enhance the transparency of the cost decisions.

Another limitation is the risk that participants' decisions as to which items are necessary might be constrained by the low income being envisioned. This problem is most likely when focus groups of individuals on a low income provide input into what goods they consider necessary. People are likely to focus on how much they spend, given their low income, as opposed to the minimum amount necessary. They may have a preconceived idea of what the total minimum amount should be and allocate that to different parts of the budget, rather than estimating how much should be spent on various items to determine a minimum total amount. Equally, individuals in the focus groups who are on high incomes may have inflated expectations of what is necessary, in order to maintain their own accustomed standard of living.

Furthermore, a decision must be made about how to treat asset replacement costs and how to include such assets in a weekly budget. If an asset such as a car needs to be replaced, it involves a large initial cost when it is purchased, with smaller maintenance costs over other periods. However, budget standards costs are usually displayed as a weekly budget. Most budget standards approaches distribute asset replacement costs over their estimated life of use. For example, if a car costs $10,000 to replace, will last the family for 10 years and, at the end of those 10 years will have a resale value of $4,000, then the cost per year of the car is $600 (10,000/10 – 4000/10) and the cost per week is $11.54 (excluding all other costs

relating to running the car). In this way, the budget assumes knowledge of the future costs and the lifespan of assets. A further aspect for consideration with reference to this is how the presence of children influences the cost of assets (eg a larger car) and the lifespan of assets (ie wear and tear). The presence of children is also likely to influence the need to purchase new assets.

Time allocations are not considered in this methodology, but the cost of the child will be affected by whether one parent, both parents, or no parents work in paid employment, and whether they work full-time or part-time. For example, two-income families will incur childcare costs which would probably be absent from (two-parent) one-income (or no-income) families. Some estimates get around this by excluding childcare costs from the budget. Others estimate a number of different budgets to match a variety of employment combinations.

One difficulty when attempting to decide on necessary goods and services is that not everything used by the child will be used by the child alone. Objects like a television, fridge, house and car will be used by the child, but cannot be considered wholly a cost of the child, as most parents would have had these before having children. In this report these items will be referred to as 'shared goods'.[6] The most influential shared good is housing and its treatment should be stated explicitly. However, while the parents may already own these items before children are born, the presence of children may or may not motivate the purchase of further items, such as more televisions, a house with an extra bedroom or a bigger car. The number of children a family will have before needing to 'upgrade' existing assets is likely to depend on the excess capacity of assets present before children, the preferences of the parents and the age and gender of the children. Researchers generally treat shared goods in one of three ways.

The first is to ignore these items and include only those costs that can be allocated with confidence, completely to the child. The advantage of this is increased confidence that the final cost estimate is made up only of goods consumed by the child. The disadvantage is that it only represents part of the cost of a child as parents face increased costs in relation to many items when they have children. For example, they may need a house with more bedrooms, and they may need to replace appliances more often because of more frequent use. A cost estimate made on this basis will be an underestimate, and so should be considered only broadly indicative.

The second way of dealing with this problem is to allocate a proportion of the cost of the shared good to the child. This means that the estimate of the cost of children should more closely reflect the total parental cost; however the proportion allocated is subjective and often difficult to determine. Some researchers use a per capita approach to shared goods in which costs are distributed equally across all household members. This method would be likely to overestimate the cost of children as the adult costs are usually greater than the child costs.

The third way is to create a budget based on two households with the same standard of living, one with children and one without. The cost of children is then the difference between these two budgets. In this way, for example, the difference in the cost of a two-bedroom house compared to a one-bedroom house would be allocated to the child. While doing this neatly solves the problem of shared goods allocation, it creates a new problem by assuming the adults' behaviour remains the same whether

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[6] The economics literature calls these 'household public goods'. This name is not used in this report to avoid confusion between the cost of children in relation to household public goods and the cost of children in relation to public expenditures.

or not they have children. This may be averted, however, if specific items can be identified and, in particular, the costs of shared goods in the two households compared.

For a more detailed discussion of the budget standards approach and estimates made see 'Development of Indicative Budget Standards for Australia' (Saunders et al 1998).

To demonstrate the detail that is often used with a budget standard estimate, Table 12 in Appendix Two displays the food items for a single mother with two children. This is part of a low-cost but acceptable budget created and published by the Vincentian Partnership of Social Justice in Ireland. In making the budget the quantity, quality and price of each item must be specified. In this budget, items are split into the following categories: food, clothing and footwear for each person, sewing materials, health care, personal hygiene, personal accessories (eg alarm clock, mirror, child's backpack), cosmetics, furniture, kitchen and hardware (eg saucepans, knives, cheese grater), stationery and paper goods, toilet paper and cleaning materials, home security, tools, paint, wallpaper and timber, small materials (eg nuts and bolts), postage, telephone, shoe repairs and dry-cleaning, TV, audio, video and repairs, sports goods, newspapers, magazines, books, household games, toys, seasonal items (eg balloons), equipment/processing (eg camera), plants, flowers, garden products, sports activities (eg swimming), arts, entertainment, outings, TV licence, school and club expenses, housing (rent, insurance), transport, job search costs, pet expenses and credit charges (eg electricity, gas).

With each item, the question is not whether a person can afford such items on a low income, but rather whether someone on a socially acceptable minimum standard of living ought to be able to afford such items. These budgets have been created (in such detail) for two other family types: a two-parent, two-children family and a pensioner couple.

3.1.2 Expenditure survey approach

The expenditure survey approach measures the *actual* direct cost, faced by parents, to raise a child at a given standard of living. It measures the additional or marginal cost to parents of having children. This is done by comparing household expenditures for couples or single parents with a child, to those of couples or singles respectively without a child, holding living standards constant. The difference between the relevant pairs of estimates is designated as the marginal cost of the child. Similar comparisons can be made to estimate the costs of additional children.

The advantages of the expenditure approach are that it provides a full cost measure without needing to determine a method for treating shared goods, and it allows the researchers to see what parents are actually spending on their children.

The limitations of the expenditure approach are that it assumes that a couple with children and a couple without, who have the same standard of living, behave in the same way. This may not be true. For example, if both adults in the childless family work and only one adult in the family with children works, and if work clothes cost more than home clothes, then the estimate of the cost of the child is likely to be too low owing to the additional cost faced by the family without children.

In addition this estimate tells the researcher only how much parents are actually spending. It provides no guidance as to whether such a cost is adequate or whether

the items chosen for expenditure are beneficial (eg whether food items are nutritionally adequate).

The expenditure approach is usually used to estimate income distributions and for related welfare analysis. For example, it is an important consideration when investigating the effectiveness of redistribution policies in the form of tax progressivity and welfare payments (Valenzuela 1999a). It is also important for child support policies that are based on the concept that the parents should contribute the same proportion of their income to expenditure on the children post-separation as they did prior to separation.

The biggest challenge, when using the expenditure survey approach, is developing a method by which the standard of living of a family with children may be compared to the standard of living of a family without children. Income cannot be used as a comparison because of the different demographic characteristics of a family with dependent children compared to the family without dependent children. When a couple has a child, their standard of living is likely to fall as income is usually fixed and resources need to be reallocated from the couple to the child.

Four different methods are commonly used in the literature in order to make a standard of living comparison. These are the Engel method, the Rothbarth method, the iso-prop method and the complete demand system method.

The Engel method is based on Engel's Law (developed by Ernst Engel in 1857), which states that as income rises, the proportion of income spent on food falls. This method assumes that a couple with children and a couple without who spend the same proportion of total income on food have the same standard of living. For example, if a couple with no children has a total weekly expenditure of $500, and a couple with one child has a total weekly expenditure of $600, and both spent 15 percent of their total weekly expenditures on food, then the difference – $100 – can be considered to be the weekly cost of the child (Percival and Harding 2000). The most common criticism of this method is that if children are relatively more intense consumers of food than adults, then this method will overestimate the cost of children.

The Rothbarth method was developed by Erwin Rothbarth in 1943. It adjusts for the above difficulty with the Engel method by basing living standards on the proportion of income spent on 'adult goods'. These are goods that children do not consume at all. Items commonly placed in this category are tobacco, alcohol and adult clothes. This method assumes that two families that spend the same amount on items such as tobacco, alcohol and adult clothes have the same standard of living.

An implicit assumption in the Rothbarth method is that adult goods consumption is separable from the consumption of other goods. This implies that the proportion of the budget allocated to adult goods remains the same whether or not the family has children Bradbury (1989). It assumes that, whilst having children may impact on the dollar amount that parents have available to spend on adult goods, having children will not impact on the adults' decisions to continue buying adult goods.

However, this assumption will not always hold. Preferences may move away from the adult goods due to greater comparative utility (happiness or satisfaction) from spending time and money on children. Conversely they may move towards the adult goods, due to a fall in the relative price of adult goods because of an increase in the number of individuals who consume non-adult goods (Deaton and Muellbauer 1986). If the presence of children results in preferences moving away from the adult goods,

then the Rothbarth method will overestimate the cost of children. If a relative price difference occurs because of the presence of children, and so adult goods consumption increases, then the Rothbarth method will underestimate the cost of children.

Since the publication of Deaton and Muellbauer (1986), it has been considered that the Engel method may represent an upper bound for the cost of children and the Rothbarth method a lower bound. However, Percival and Harding (2000) point out that the Engel method would only represent an upper bound if the food component makes up a large proportion of child costs. Whilst this may be the case in the developing countries on which Deaton and Muellbauer's estimates are based, this is less likely to hold in developed countries.

The iso-prop method (similar to the 'Canadian' method; see Michaud, Cotton, and Bishop 2004) attempts to get around the problems with the Engel method by creating a 'basket of necessities' used to benchmark the standard of living. For example, Harding and Percival (1999) used the proportion of total expenditure that went on food at home, fuel and power, household non-durables for home use (eg disposable nappies), postal, telephone and telegram charges and personal care products and services (eg shampoo). They assumed that families that spend the same proportion of income on this 'basket' have the same standard of living. The criteria behind items selected by Percival and Harding (2000) is that they are easily identified as necessities and are a mix of items which children and adults consume with various intensities (allowing for both upward and downward bias). However, like the Engel method, this method is only reliable if the basket chosen accurately reflects family welfare.

A different approach that could be taken to estimate expenditure on children is the complete demand system method. One of the advantages of this method over the Engel, Rothbarth and iso-prop methods is that it allows for differences in preferences between a family without children and a family with children. It does this by constructing a model that includes these aspects based on consumer demand theory. It models the cost functions of the family to determine the cost of children.

Another advantage of the complete demand system method is that it can incorporate time allocation decisions and thereby include the costs of time spent looking after children. This is an important aspect of the cost of children because expenditure data are based on the price paid for market goods. In most models all goods that are home-produced are ignored. If both parents work, then the cost of childcare may be included in the cost of children methods. However, if one parent stays at home and does the childcare themselves, the child is usually considered to cost less.

This method is used by Apps and Rees (2000) based on expenditure and time-use data. Each individual has their own utility function. Adults allocate their time between paid employment, domestic activities, childcare and leisure. (Leisure is everything not included in the other three categories. As is the case in most of the economics literature, leisure includes activities such as sleeping and studying as well as other activities we might usually think of as leisure, such as reading a book or watching television.)

Adults are also allowed to choose to allocate their income between market consumption goods and market goods that are used as input into home production (eg can choose whether to buy a cake or to buy flour to make a cake). This method takes both the direct and indirect cost of children into account in a way that is not mutually exclusive.

To illustrate this, consider two families. Both families are identical except that one parent in the first family has a comparative advantage in the labour market (earns a higher wage) and one parent in the second family has a comparative advantage in home production (is able to produce things more quickly or of better quality). It may then make sense for the parent in the first family to work in the labour market and buy market goods (eg buy a cake for dessert) whilst for the parent in the second family it may make sense to buy the inputs and produce goods at home (eg bake a cake for dessert). Both families may end up with the same standard of living. However the first has higher family income and expenditures than the second. Complete demand system models are able to take this relationship between time use, income and expenditure into consideration when estimating the cost of children.

A model that is often used is the Extended Linear Expenditure System (ELES).[7] This model assumes that there is a 'subsistence' or 'committed' set of goods that all households buy, and then another set which the household chooses based on the income left after purchasing the subsistence amount of goods, and the household's preferences. One of the problems with this method is the 'identification problem'. This occurs because there is one less equation than there are unknown variables. A method used to solve this is to include an equation relating to income and a common marginal propensity to consume (the same amount of an extra dollar is spent by all households).

Valenzuela (1999b) used the ELES model to estimate the cost of children using Australian expenditure data, and Michelini (1999) also used this model to estimate the cost of children using New Zealand expenditure data. Both papers use this method to go on and state the equivalence scales derived by such estimates.

The main disadvantages of the complete demand system method are that the models are often complex and both their robustness and sensitivity to assumptions are difficult to measure (Gray 2005). In addition, the choice of utility function will influence the cost that is calculated.

3.1.3 Foregone earnings estimation

Regression analysis is usually used to estimate the indirect parental cost of foregone earnings. Foregone earnings are the income that parents would have received if they had not had to change their labour market behaviour in order to care for children. Examples of such changes in behaviour range from leaving employment to reducing hours worked or changing jobs.

In order to measure these costs, the earnings of women with no children are compared to the earnings of women with one, two and three or more children. However, differences in circumstances influence decisions on whether to have children and how many hours to work. Various influencing factors such as education, household income, labour market experience and potential welfare benefits need to be held constant in the comparison. Ideally, panel data are used in order to exclude immeasurables that may be correlated with included variables, such as ability and, perhaps, natural beauty (see Hamermesh and Biddle 1993) for a discussion about the impact of beauty on earnings). For a more detailed discussion of foregone earnings estimation see Chapman, Dunlop, Gray, Liu, and Mitchell (1999).

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[7] This model assumes a linear and directly additive utility function. Due to the assumption regarding additive utility, only broad groupings of consumed goods can be used (Pollak & Wales 1992).

Another method sometimes employed to estimate foregone earnings is simulations. Simulations assume some 'typical' characteristics based on data such as the average earnings of a low-skilled woman, a mid-skilled woman and a high-skilled woman. In addition to producing estimates of life cycle earnings (and as a result the indirect cost of children), it also allows an analysis of the impact of theoretical changes to the parameters (eg a change to the tax rate). Authors who have used such methods include Davies and Joshi (1999) and Chapman et al (1999).

3.1.4 Time-use surveys

Whilst the opportunity cost of lost earnings is a common method used to quantify the cost of time spent caring for children, an alternative method is to use time-use surveys to quantify the cost as a replacement cost (ie the market cost of child supervision). Whilst parents often have to spend less time in paid employment in order to care for children, they usually spend less time doing other activities such as sleeping and relaxing. A mother who maintains full-time employment still incurs time costs from caring for her children.

The difficulty that arises from estimating time costs is that caring for children tends to be a mix of leisure and work. However, several definitions of work, such as an activity which one could hire someone to do, or an activity which yields benefits to someone else, are such that childcare may be considered work. Work is rarely defined solely as an activity for which the worker receives no pleasure from doing.

Further difficulties that arise when calculating time costs are how to treat the intensity of the care (sometimes referred to as a primary or secondary activity) and how to treat the care of more than one child. Whilst caring for an additional child has little impact on foregone earnings or supervisory time, it generally does have an impact on the intensity of the time the parent spends on the children. This can range from one-on-one activities generally being less stressful for parents than looking after a number of children, to the ability of several children being able to entertain themselves or one older child being able to supervise a younger child (Folbre, Yoon, Finnoff, and Fuligni 2004).

Time costs are usually measured by time-use surveys. Time-use surveys are usually conducted using time diaries in which survey participants record their time use. These diaries may cover several days, or several weeks. New Zealand conducted a time-use survey in 1999. The time-use survey found that the average person spent 6.1 hours per week on care in the home, which was valued at an average of $3,032 per annum (Statistics New Zealand 2001). Australian estimates found that on average, in 1997, women spent 5.3 hours per week on childcare and men 1.9 hours (Ironmonger 2001).

3.2   Non-parental private costs

Whilst it would be fair to say that in most cases the majority of private costs, both direct and indirect, fall on the parents of the child, other private individuals and organisations usually make some contributions. Extended family, neighbours, friends, charity organisations and private sponsorship of children's events or facilities, are all examples of private entities that may share the cost of children. However, little is known about the contributions made by such people.

The contributions made by charity organisations would probably be the easiest to quantify. The need of families to access food banks is sometimes used as a poverty measure. However, like government expenditures, it would be difficult to quantify all goods and services produced by private individuals and organisations for the benefit

of children, and to some extent these contributions may be substitutes rather than complements to parental and government expenditures.

Another area of interest is that of cross-household parental contributions to the cost of children. While estimates of the cost of children in one-parent families have been made, they have only been so in relation to the sole parent. It is possible that in many cases of separated parents, the other parent may spend a significant amount of time and money on the child. Sharing the care of children in separated families would be likely to create additional costs due to the need to duplicate many items (house with child's bedroom, child's bed, clothes, toys etc) and contact arrangement costs may occur (eg in some cases a third party may need to facilitate the changeover).

3.3 Public costs

The public costs estimate the amount of government expenditure allocated to children. This cost usually includes both direct financial support and in-kind provision of services such as health and education.

Whilst there has been much focus on the direct parental cost of children and some focus on the indirect parental cost of children, there has been little focus on quantifying the public cost of children. Contributions made by government to the cost of children may also be considered in terms of the reallocation of resources by government from families without dependent children to families with dependent children, or in life cycle terms of taxing an individual's income when they do not have dependent children and contributing to the cost of children when they do have them (income-smoothing).

Although little has been done in the area, it is important both in terms of assessing the relative contribution that government is making towards the cost of children, and in terms of assessing the impacts of different government policies on the cost of children as faced by parents. Increased government contributions to the cost of children may either supplement parental expenditures or replace them. To understand such influences, a better understanding of intra-family resource allocation is needed.

Researchers who do attempt to estimate the public cost of children usually only do so in the wide categories of health, education and childcare. Although other expenditures are likely to be made on children, they are less easily identified as such.

3.3.1 The expenditure approach to calculating public costs

Most studies that consider the public cost of children use an approach similar to the expenditure approach discussed under parental costs. Percival and Harding (2000) used Australian Bureau of Statistics household expenditure data which included estimates of the value of the publicly-subsidised health, education and childcare services used by households. Using this information, they estimated the amount of publicly-subsidised health, education and housing spent on a child by looking at the difference in expenditure on two couples (one with a child, one with no children) who had the same standard of living. They used the iso-prop method to calculate a family's standard of living.

Snively (1988) investigated the redistributive effect of the government budget across 1981/82, 1985/86 and 1987/88. This piece of work was done under the Study of the Effect of the Government Budget on Redistribution (SEBIRD). The key questions asked were who gets what out of the government budget, who is liable for payments, and is the net effect of spending and tax measure redistributive (and if so, who gains.

The study uses model households based on household type and income group. It considers households' receipt of social welfare benefits, pensions and government interest payments, and of government expenditure on health, education and other general expenditures. It does not investigate expenditure on children directly, but rather compares households that contain children to those that do not.

Stephens and Bradshaw (1995) investigated the generosity of New Zealand's assistance to families with dependent children by doing an 18-country comparison. They assume a number of different model families including both single-parent and two-parent families, number of children ranging from one to four, the ages of the children including three years, seven years and 14 years and eight different employment-earnings scenarios. While these model families may not be representative of actual families within a country, they provide a benchmark for comparisons. Dollar comparisons are made across the countries using purchasing power parity. The paper considers direct child cash benefits, personal income tax, health costs, pre-school education and school costs across the model family types. Comparisons between the countries are made in a number of different ways including the net disposable income as a proportion of net disposable income for a childless couple on the same earnings level and the structure of child benefit packages broken down by the above considerations.

Crawford and Johnston (2004) did not calculate the public cost of children, but they did calculate government household expenditures on health and education for New Zealand. To calculate this for education they took the national average expenditure per student of various educational programmes (eg early childhood, primary, secondary, tertiary education) and then allocated them to Household Expenditure Survey households that included students attending the various programmes. The health expenditure was calculated by allocating demographic national averages (eg 65 to 69-year-old female Māori with a Community Services Card).

Haveman and Wolfe (1995) used this approach to calculate public expenditures in the United States. They included education, social services, the legal system for children, housing, federal food programs, health care, social security benefits to children, aid to families with dependent children and Earned Income Tax Credits to come to an estimated total of $333,473 million (1992) dollars. This makes up just over a third of total child expenditures (35 percent).

3.4 Summary

This section has described the methodologies used in the literature to calculate various concepts of the cost of children. The appropriate methodology for a cost of children estimate depends very much on the concept that is being considered. The next section goes on to show the use of the cost concepts and methodologies to calculate cost of children estimates.

4   SOME ESTIMATES

This section discusses some of the cost of children estimates that have been calculated in New Zealand and Australia. The purpose of this section is not to say how much a child costs (although these estimates are included) but rather to show the use of the concepts and methodologies described in this paper.

The extensive research that has been done in this area in Australia recently incorporates much of the work done in other overseas countries, such as the United Kingdom, America, Ireland and Canada. The methodological research that has been done in these countries has been incorporated into the body of this paper. New Zealand and Australia are used as examples of the work that has also been done elsewhere. Whilst the cost estimates differ country by country, depending on the prices of goods and opinions as to what constitutes a suitable standard of living, the application of the methodologies does not differ significantly between countries.

4.1   New Zealand

There has not been much research done in New Zealand on the cost of children. Robertson (1993) conducted a review of the literature for the Office of the Children's Commissioner. The review compared the expenditure approach to the budget standards approach. It found that New Zealand estimates are limited to those of Fergusson et al (1990) which depend on self-reported income adequacy and Jensen (1988), which use Household Expenditure Survey data. It noted that a New Zealand budgetary analysis would be highly desirable.

Waldegrave et al (1996) did some research using low-income focus groups throughout New Zealand to obtain a budget for a household containing two adults and three children and a household containing one adult and two children. Whilst this does not produce an estimate of the cost of children, it is interesting to note the methodology used and the surprisingly consistent results found across focus groups of different cultures and regions. Interesting differences included a minimum amount considered necessary by Māori and Samoan groups for gift giving (tangihanga, whānau, church and family, both here and in the Pacific), and the amount spent on housing in different areas around New Zealand.

Rather than calculating the cost of children directly, both Jensen (1988) and Michelini (2001) have calculated expenditure equivalence scales (not to be confused with the more commonly used income equivalence scales). These scales describe how much additional expenditure is needed in order for a family with children to be as well off as a family (or individual) without children. They are a version of the expenditure approach, but calculate a scale, rather than a dollar value, which can be applied to compare the income of a single person living alone with the level required for a larger family.

Jensen (1988) estimated family expenditures on children using income equivalence scales and the New Zealand Household Expenditure and Income Survey. Several different income equivalence scales were used to develop expenditure equivalence scales. He assumed that households of different compositions, that spend the same proportion of income on consumption, have the same standard of living. This assumption is made on the basis of a positive relationship between income and the rate of savings. From this assumption he was able to apply income equivalences to expenditure data to obtain expenditure on children. The estimate of the cost of children depended on which income equivalence scale was used.

Michelini (2001) also calculated family expenditures on children.[8] Using 1994-95 Household Economic Survey data, he derived some expenditure equivalence scales from which it is possible to derive the cost of children. The cost of children is based on the assumption that families with the same utility have the same standard of living. This means that expenditures on children can be derived using a set level of expenditures for the reference household (one adult and no children). For example the mean expenditure equivalence scale for a one-adult household with a child aged between zero and three is 1.448. Thus if a one-adult household spends $100 a week, the one-adult, one-child household needs to spend $144.80 a week to achieve the same level of utility.

The main restriction of Michelini's estimates is that the model does not explicitly include economies of scale. It assumes that the marginal cost of adding a child to a family is the same whether or not there are other people in the household. The reason for this was that explicitly allowing for economies of scale added complexity to the estimates, decreasing their accuracy but resulting in only a small difference. The result of doing so, however, means that a child of a single parent costs the same amount as a child in a two-parent family and the cost of a second child is the same as the cost of a first child of the same age.

Whilst economies of scale are not included explicitly, they are incorporated implicitly in the age estimates. However, these economies are assigned such that the cost of a child decreases with age. When comparing different families it is the older children who are being 'added' to the family.

Table 2 below compares several different New Zealand expenditure scales. Easton (1980) estimated the costs using the savings ratio and the Household Expenditure Survey. Smith (1989) uses the Extended Linear Expenditure System and the 1985/86 Household Expenditure and Income Survey.

Table 2: Estimated New Zealand expenditure scales				
	Estimates based on			
Household composition	Easton (1980)	Jensen (1988)	Smith (1989)	Michelini (2001)
1 adult and no children	0.657	0.603	0.510	0.651
2 adults and 1 child	1.257	1.222	1.345	1.292
2 adults and 2 children	1.483	1.430	1.687	1.533
2 adults and 3 children	1.753	1.690	2.140	1.736
Note: The reference household, with an equivalence scale of 1.0 is the 2-adult, 0-children household.				

4.2 Australia

There has been a considerable amount of research done in Australia on measuring the cost of children. Summarised below are several key estimates. Tables displaying the cost of children estimates in more detail can be found in Appendix One.

Lovering and Lee (Australian Institute of Family Studies 2000)) estimated the cost of children in 1984 and 1989 respectively, the former using the budget standards

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[8] He used an indirect utility model with several variations that allowed for differences in demand flexibility.

approach and the latter using the expenditure survey approach. The Australian Institute of Family Studies (AIFS) regularly updated both the Lovering estimates and the Lee estimates, using changes in average weekly earnings for the former and the Consumer Price Index for the latter, up until 1999.

Lovering used the budget standards approach, excluding shared household items such as housing, transport, education and medical expenses. Lee used the expenditure survey approach using the 1984 Australian Bureau of Statistics Household Expenditure Survey. A family's living standard is estimated using the proportion of expenditure spent on food, and shared goods are included in the estimate.

In 1999 AIFS decided to stop updating and publishing the estimates as they were rather dated and it seemed likely that people had started to take the estimates as 'facts' rather than subjective estimates. In the same year AIFS invited researchers from three institutions to each write an article on how they would estimate the cost of children. The authors of these articles were Harding and Percival, Saunders, and Valenzuela. Their methods and some estimates are provided below.

Harding and Percival used an expenditure survey approach to estimate the costs of Australian children (up to age 17) in 1993-94, as faced by parents. They used an iso-prop method to estimate the standard of living in order to compare families with and families without children. They used the 1993-94 Household Expenditure Survey, looked only at two-parent families and had a sample size of 2,658.

Saunders compared the Lovering estimates, updated by the Consumer Price Index for the March quarter of 1997, with a corresponding budget standards estimate. The budget standards estimate was based on Saunders et al (1998) but adjusted to reflect the underlying assumptions and coverage of Lovering's estimates. The purpose of such a comparison was to check how robust Lovering's estimates were compared to those estimated with modern data and methods. In general, it was found that the costs were fairly similar, with the main differences to be found in the area of household provisions, entertainment and toys, all of which were higher in the budget standards estimates than the Lovering estimates.

In addition to comparing the budget standards estimates to the updated Lovering estimates, Saunders also compared the budget standards estimates to the updated Lee estimates. The important factor in these comparisons is that the budget standards estimates measure the costs of meeting a child's needs at a set standard of living whereas the Lee estimates measure actual expenditure on children.

Valenzuela used a complete demand system approach. She used the Household Expenditure Survey data from 1984, 1988-89 and 1993-94 and an Extended Linear Expenditure System (ELES) model. Valenzuela found that housing contained large economies of scale whilst food contained very few economies of scale. In addition she found that the number of children in the family impacted on expenditure on adult goods. She predicted that this might be due to parents wanting to set a good example for their children.

Harding and Percival (1999) provided a table comparing the above three approaches. This table is replicated below (Table 3). Whilst the figures are not directly comparable (for example, the budget standards estimates were originally done in 1997 but were deflated to 1993-94 dollars) they do provide an indication of how they compare. Harding and Percival's iso-prop approach tends to lie between Valenzuela's ELES method and Saunders' budget standards approach.

Table 3: Indicative estimates of costs of children at specified expenditure levels, 1993, 94*				
Number of children	Low-income families			
	Total family expenditure	ELES[1]	Iso-prop[2]	Budget standards[3]
1 child	458	68	68	97
2 children	552	110	176	202
3 children	604	150	238	254
	Modest-income families			
1 child	613	92	116	135
2 children	749	150	253	278
3 children	895	227	378	425
*The budget standards estimate for one child was derived by averaging the costs for a girl aged six and a boy aged 14, while the comparable cost using the iso-prop methodology was derived by averaging the costs for a child aged five to nine and a child aged 10 to 14. For two- and three-child couples the age of the child using the budget standards methodology is as shown in Saunders (1999:69), while in the iso-prop methodology the children falling within the same age ranges as the budget standards estimates were calculated. The ELES estimates do not appear to vary by the age of the child. [1] Valenzuela [2] Percival and Harding [3] Saunders				
Source: Harding and Percival (1999:Table 4)				

4.3   Summary

This section has shown how the concepts and methodologies have been used in New Zealand and Australia to arrive at estimates of the cost of children. It has provided examples of the use of the budget standards methodology and the expenditure methodology (including the Engel method, the iso-prop method and the complete demand system method). These are illustrative examples only, and are focused on the direct costs faced by parents.

5   CONCLUSION

Estimates of the cost of children may be used to ensure that families have enough income to maintain an adequate standard of living and to be able to live with dignity in our society, and ensure that the cost of children are fairly distributed among those who receive the benefits of children. However, estimates are highly contentious in the assumptions that are made to estimate them and the reliability of the estimates. Estimates also vary greatly depending on the components that are included and as such it is important that estimates are clear about what costs they do or do not include.

The appropriate cost concept for ensuring income adequacy is that of the minimum costs faced by parents. Such an estimate would contribute to assessing the adequacy of parental incomes and the ability of parents to provide a minimum standard of living for their children. This could be estimated solely on a 'poverty' basis in assessing those at the bottom end of the distribution, although the method could also be extended to provide estimates for various levels of living standards. This may be particularly appropriate to current debates about the ability of New Zealand middle-income families with dependent children to meet costs, particularly in the area of childcare as mothers are being encouraged to participate in the labour market.

In estimating such a minimum cost the budget standards approach would be the most appropriate methodology. Both the Australian detailed estimate process (Saunders et al 1998) and the New Zealand Poverty Measurement Project focus groups (Waldegrave et al 1996) provide a basis from which such an estimate might be developed.

Family assistance payments and the distribution of taxes in New Zealand has recently become an important area of discussion. Prior to the Working for Families package (for which the first changes took place at the end of April 2005), New Zealand provided less family assistance for families with children compared to other Organisation for Economic Co-operation and Development (OECD) countries, as can be seen in the OECD report *Taxing Wage 2003/04* (OECD 2004). Apart from assistance to single parents with children, New Zealand offered the least assistance to families with dependent children relative to families without. In a comparison of New Zealand with other OECD countries, Stephens (2003) also found that New Zealand was towards the bottom of the list for assistance to families with children, both in terms of taxes and benefits and in terms of high user-charges for services.

A cost of children estimate contributes to such discussions using the concept of a minimum level of expenditures and the concept of expenditures actually made to achieve a certain standard of living. The former would contribute in terms of the minimum costs that are faced by parents and the latter would contribute to assessment of contributions of different parties to the cost of children.

In calculating the expenditures that parents make to raise a child at a certain standard of living, the Household Economic Survey (HES) is the most appropriate data source currently available. The HES is run by Statistics New Zealand and collects data on both income and expenditure by New Zealand households. There have been some criticisms of these data due to the small sample size (approximately 3,000) and limited categories of expenditure data (Robertson 1993).

A further cost of children estimate that is appropriate when looking at the distribution of the cost of children is the public costs, and the proportion of costs that are met by

parents, the public and other private individuals (such as resource sharing by extended family across households). Such estimates would allow analysis of the distribution of the costs (and benefits) of children and child-rearing across genders, generations and between those with and those without children.

Policy areas for which a cost of children estimate would be helpful are not limited to the two areas described above. An example of another policy area for which a cost of children estimate would be of use is that of parental child support payments.

The formula used to determine the level of child support payments a liable parent is required to pay is not explicitly based on the cost of the child, although it does incorporate an implicit concept of the cost. The payment requirements are based around an underlying principle that the child's standard of living should reflect that of the liable parent. An appropriate cost of children concept here is that of the direct actual costs to parents. An appropriate methodology would make use of expenditure data.

In 2004 Australia set up a Ministerial Taskforce on Child Support to review various aspects of child support, such as the link between child support payments and time children spend with each parent, data on cost of children for separated parents and the formula used to calculate the level of payments. In order to do this the Taskforce commissioned several estimates of the cost of children using the budget standards approach, the expenditure survey approach, and an entire review of all previous research on the cost of children.

Several of the common findings in the cost of children literature drove their recommendations. These are:
- Child costs increase with age (excluding childcare costs); a two-tier payment scheme is proposed – one tier for children and one for teenagers.
- The cost of an additional child is less than the previous one due to economies of scale; a three-tier scale is recommended here for one, two and three or more children.
- As parental income increases, the proportion spent on the child decreases; payments are recommended to reflect this.
- Indirect costs are potentially just as important as direct costs; it is recommended that payment amounts are lower if a child spends more than the equivalent of one night a week with a paying parent. In order to avoid undue financial influences on the time spent with children, there are only three tiers recommended for this.

The appropriate cost concept and methodology depends on why one wants to know the cost of children. For this reason, it is unlikely that a single cost estimate would meet all policy needs. The main methodologies that were used by the Australian Ministerial Taskforce on Child Support to provide a rounded view were the budget standards approach and the expenditure survey approach. However, alternatives include a focus group-centred minimum standards approach based on the methodology developed by Waldegrave et al (1996), and an estimate of the government expenditures that go to children or families with children.

This paper has sought to emphasise how the particular concept of 'cost of children' and the methodology for making estimates depend on the purpose for which the estimate is to be made. However, owing to the complexities involved in estimating the cost of children, all methodologies are subject to criticism either on a theoretical

or empirical basis (or both). Despite these constraints, cost estimates do have an important role to play in a range of policies concerning families and children.

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APPENDIX ONE

The results of several Australian studies of the cost of children are listed below. These include Lovering (AIFS 2000), Lee (AIFS 2000), Harding and Percival (1999), Saunders (1999) and Valenzuela (1999b). A summary of all these studies can be found in *A Guide to Calculating the Costs of Children* (Australian Institute of Family Studies 2000).

Lovering (AIFS 2000)

Table 4: Basket-of-goods approach (Adjusted to CPI figure March quarter 1999)					
Low-income families (below average weekly wage)					
	Age of child				
	2 years	5 years	8 years	11 years	Teenage
$ per week	32.25	41.42	50.80	53.87	80.26
$ per year	1,684.03	2,199.19	2,649.05	2,811.27	4,186.17
Middle-income families (average weekly wage and above)					
	Age of child				
	2 years	5 years	8 years	11 years	Teenage
$ per week	48.57	54.47	70.34	91.05	133.55
$ per year	2,533.72	2,843.78	3,668.86	4,631.82	6,964.66
Note: Included are food and clothing, fuel, household provisions, costs of schooling (not fees), gifts, pocket money and entertainment. NOT included are housing, transport, school fees or uniforms, childcare, medical or dental expenses. Holidays are a component of the middle-income figures only.					
Source: Australian Institute of Family Studies (2000).					

Lee (AIFS 2000)

Table 5: Expenditure survey approach (Adjusted to AWE figure December quarter 1998)								
Age of child (years)	Food ($ pw)	Transport ($ pw)	Recreation ($ pw)	Household goods ($ pw)	Housing and utilities ($ pw)	Clothing ($ pw)	Other* ($ pw)	Total expenditure ($ pw)
0-1	33.29	49.13	34.18	33.91	27.39	18.46	18.35	214.85
2-4	29.27	38.16	27.26	31.25	17.53	16.20	15.74	175.76
5-7	30.85	39.79	41.03	28.25	22.14	18.73	12.43	190.11
8-10	43.07	55.16	41.28	29.67	14.97	17.30	27.30	229.30
11-13	47.45	47.03	38.42	32.96	31.85	25.03	31.96	254.99
*Includes medical and dental costs, education costs and other miscellaneous costs. Costs of children vary according to the number of children in the family, the parents' incomes and whether one or both parents are working.								
Note: The figures in the table relate to a one-child, one-income family with an income of $722.80 gross per week.								
Source: Australian Institute of Family Studies (2000).								

Harding and Percival (1999)

Table 6. Estimated average costs of a single child, by age of child and quintile of gross family income, 1993-94					
		Age of child			
Gross income quintile	Average quintile	0-4 ($ pw)	5-9 ($ pw)	10-14 ($ pw)	15-17 ($ pw)
1 (lowest)	$410	52	62	89	127
2	$620	70	82	111	154
3	$810	86	99	132	178
4	$1,030	104	119	154	204
5 (highest)	$1,700	157	177	219	280
Source: Harding and Percival (1999).					

Table 7. Estimated average costs of children by number of children and gross family income quintile, 1993-94				
Gross income quintile	Average income	1 child ($ pw)	2 children ($ pw)	3 children ($ pw)
1 (lowest)	$410	70	136	196
2	$620	91	173	242
3	$810	110	204	282
4	$1,030	132	240	328
5 (highest)	$1,700	191	338	453
Source: Harding and Percival (1999).				

Saunders (1999)

Table 8. Estimates of the costs of children at the 'modest but adequate' standard derived from the Lovering individual and limited budget standards methods								
Component	Lov C(2)	LBS G(3)	Lov C(5)	LBS G(6)	Lov C(11)	LBS B(10)	Lov C(15)	LBS B(14)
	$ pw							
Food	26.82	25.30	24.95	30.29	51.23	42.14	60.35	53.64
Clothing & footwear	8.72	5.56	10.06	6.89	10.06	5.15	14.27	7.29
Household provisions	2.07	8.24	2.07	8.03	2.07	6.44	2.07	9.10
Energy (eg heat, gas)	6.78	3.68	6.78	3.20	6.78	2.57	6.78	3.20
Schooling	-	-	1.63	1.96	1.63	11.04	9.58	12.08
Entertainment	-	7.16	3.83	8.81	7.66	5.46	9.58	8.81
Pocket money	-	-	0.96	-	1.92	-	19.16	-
Toys & gifts	3.72	7.25	3.72	7.79	6.59	6.91	10.42	6.06
Total	**48.11**	**57.19**	**54.00**	**66.97**	**87.94**	**79.71**	**132.21**	**100.18**
Note: Lov=Lovering estimates; LBS=limited budget standards estimates; C=child (age in brackets); G=girl (age in brackets); B=boy (age in brackets).								
Source: Saunders (1999).								

Table 9. Estimates of the costs of children at the 'low-cost' standard derived from the Lovering individual and limited budget standards methods								
Component	Lov C(2)	LBS G(3)	Lov C(5)	LBS G(6)	Lov C(11)	LBS B(10)	Lov C(15)	LBS B(14)
	$ pw							
Food	20.29	19.51	22.40	24.83	31.10	32.46	37.34	42.01
Clothing & footwear	4.29	5.01	5.06	6.18	7.03	4.57	10.79	6.86
Household provisions	1.53	4.87	1.53	4.80	1.53	3.40	1.53	5.34
Energy (eg heat, gas)	4.90	3.19	4.9	2.71	4.90	2.08	4.90	2.71
Schooling	-	-	4.63	1.96	4.63	11.04	5.75	12.08
Entertainment	-	7.08	3.83	5.78	3.83	3.55	9.58	5.78
Pocket money	-	-	0.71	-	1.92	-	5.75	-
Toys & gifts	0.96	3.63	0.96	4.44	1.44	4.01	3.83	2.65
Total	**31.97**	**43.29**	**41.02**	**50.70**	**53.38**	**61.11**	**79.47**	**77.43**
Note: Lov=Lovering estimates; LBS=limited budget standards estimates; C=child (age in brackets); G=girl (age in brackets); B=boy (age in brackets).								
Source: Saunders (1999).								

Table 10: Comparison of the costs of a child in one-child family using the Lee and modest but adequate methods ($ per week in February/March 1997)						
Expenditure Item	Lee C(2-4)	LBS G(3)	Lee C(5-7)	LBS G(6)	Lee C(11-13)	LBS B(14)
Food	28	25	29	30	45	54
Transport	36	3	38	3	45	3
Recreation	26	-1	39	9	37	17
Household goods	30	88	27	46	31	27
Housing and energy	17	32	21	32	30	32
Clothing	15	12	18	14	24	15
Other	15	5	12	5	30	5
Total	**167**	**164**	**184**	**139**	**242**	**155**

Notes: All figures have been rounded to the nearest dollar. The budget standards assume that the household is renting privately. 'Other' includes health and personal care expenses.

Source: Saunders (1999).

Valenzuela (1999b)

Table 11: Cost of children estimates for selected income groups: 1993-94 HES ($AUS)					
Family Type	Year	Gross weekly family income	Total weekly family expenditure attributable to...		
			1 child	2 children	3 children
Low income	1984	177	30	46	71
	1988-89	233	54	75	105
	1993-94	325	59	81	107
Medium income	1984	330	89	119	162
	1988-89	415	95	137	191
	1993-94	592	107	148	201
High income	1984	675	243	297	392
	1988-89	985	227	325	463
	1993-94	1,400	252	350	476

Source: Valenzuela (1999b).

APPENDIX TWO

Table 12: Low-cost but acceptable basket of food for one week: lone mother with girl aged four and boy aged 10			
Item	Quantity	Cost (€)	Unit Price €
semi and other skimmed milk	6 pints/wk	0.69/litre	2.35
other liquid milk, full proce [sic]	4 pints	2.74/litre	6.22
Yoghurt	6 x 125g	0.25 ea	1.50
Cheese, natural hard, cheddar	3 medium chunks/sandwiches	4.96/kg	0.59
beef, minced	640g, 1 large (220g cooked), 1 medium (140g cooked), 1 small (100g cooked) portion	2.69/kg	1.72
bacon and ham, uncooked, rashers, pre-packed	250g, 6 back rashers (cooked 25g/rasher)	10.45/kg	2.61
broiler chicken, uncooked, including frozen	small, 1.2kg chicken	2.69/kg	3.23
frozen burgers	3 x 56g (raw) economy burger	2.50/kg	0.42
fish, white, uncooked frozen	610g raw, 2 large (175g), 1 medium fillet (120g cooked), 1 small fillet/steak (50g cooked)	17.69/kg	10.79
other canned or bottled fish	450g tuna, 3 x 45g sandwich portions, 3 x 100g av portions	4.97/kg	2.24
frozen convenience fish products	9 fish fingers (28g each cooked)	2.20/kg	0.59
Eggs	10 eggs	0.83/6 eggs	1.38
Butter	30g/wk (100g/4wks)	2.41/kg	0.07
soft margarine	80g/wk (250g/3wk – 11 medium spreadings/wk)	3.64/kg	0.29
vegetable and salad oils	1 litre/5wk	0.62/litre	0.12
Reduced fat spreads	250g/wk (36 medium spreadings/wk)	3.64/kg	0.91
Sugar	1.5kg/10wk (38 level tsp)	0.86/kg	0.13
jams, jellies, fruit curds	135g, 9 av spreading/wk	5.03/kg	0.68
current year's crop potatoes purchased Jan to Aug	2.3kg, 5 large (220g cooked), 4 medium (175g) and 4 small portions (120g)	1.48/kg	3.40
cabbages, fresh	275g, 1 large (120g), 1 medium (95g), 1 small (60g portions)	0.89 ea	0.89
cauliflower, fresh	390g, 2 large (120g), 1 medium (90g), 1 small (60g portions)	1.49 ea	1.49
leafy salads, fresh	120g, 6 sandwich portions (4 leaves per 20g portion)	0.59 ea	0.59
carrots, fresh	640g/wk, 4 large (85g), 3 medium (60g edible), 3 small (40g edible)	0.99/kg	0.63
onions, shallots, leeks, fresh	3 x 150g medium raw onions	1.39/kg	0.63

mushrooms, fresh	168g, 3 stewed av servings	2.59/kg	0.44
tomatoes, fresh	510g, 6 medium (85g)	2.39/kg	1.22
tomatoes, canned or bottled	2 large (400g) tins	0.88/kg	0.70
peas, canned	210g, 1 large (100g), 1 medium (70g), 1 small (40g) portion	1.27/kg	0.26
beans, canned (including baked beans)	810g/wk, 2 large (190g), 2 medium (135g), 2 small (80g) portions	0.19/420g	0.37
frozen chips and other frozen convenience potato products	370g oven, 1 medium (165g), 2 av small (100g) portion	2.12/kg	0.78
all frozen vegetables and frozen vegetable products not specified elsewhere	255g/wk, 3 av (85g) portion sweet corn	3.49/kg	0.89
Oranges, fresh	1540g, 9 medium (120g without skin)	1.49/7	1.92
apples, fresh	1kg, 9 medium (112g) with core	2.39/10	2.15
bananas, fresh	1800g, 12 medium (100g) without skin	1.23/kg	2.21
canned peaches, pears and pineapple	405g, 3 av portions pears (135g)	2.40/kg	0.97
fruit juices	3360g, 21 x 160g av glass	0.99/litre	3.33
bread, white, sliced standard	1 x 800g large, 1 x 400g small	0.65/ 800g	0.97
bread, wholemeal, sliced	1 x 800g large, 1 x 400g small	2.38/kg	2.86
Flour	1kg/4wk	0.62/kg	0.16
buns, scones and teacakes	420g, 7 x 60g teacakes	1.09	1.09
Biscuits, other than chocolate	1 x 200g pack/2 wk, 12 x Lincoln	1.04/ packet	0.52
Biscuits, chocolate	1 x 200g pack/2 wk, 13 chocolate and nut cookies	7.30/kg	0.73
high fibre breakfast cereals	560g, 4 weetabix (20g bix) per day, 1 box 24	1.91/kg	1.07
Rice	140g dry, 2 small cooked (100g), 1 medium cooked (180g portions)	1.19/kg	0.17
canned pasta	660g, 3 x 220g av portions, 1 large (440g), 1 small (215g) can	0.59/kg	0.39
other cereal convenience foods	150g dry, 2 small (150g) and 1 medium (220g) cooked portions	5.00/kg	0.75
Tea	75g/wk	1.58/250g	0.53
coffee, instant	50g/wk	12.50/kg	0.63
soups, canned	670g, 1 small (150g), 1 medium (220g) portion, 1 large (300g)	1.98/kg	1.33
salad dressings	3 x 12g (1 portion each)	6.69/kg	0.24
pickles and sauces	9 x 12g (3 portions each)	4.20/kg	0.45
meat and yeast extracts	18g, 9 x 2g medium spreadings Marmite, plus 3 x 5g gravy browning	g=9.39/kg; m=14.8/kg	0.40
ice-cream	2 av portions (75g each) and 1	1.27/ 2	0.13

	scoop portion (60g)	litres	
Salt	1 level tsp	1.19/kg	0.02
soft drinks, concentrated	12 x 50g av measures	1.28/litre	0.76
soft drinks, unconcentrated	3 x 500g bottles	0.50/litre	0.75
chocolate coated filled bars/ sweets	3 x std Mars bars (65g)	0.57 each	1.71
boiled sweets and jellies	2 tubes fruit gums	2.12/ pack of 4	1.06
Total			**75.43**

Food consumed away from home

Item	Retailer	Quantity per year	Unit price €	Cost per year €	Cost per week €
Happy Meal	McDonalds	24	3.50	84	1.62
Big Mac Meal	McDonalds	12	5.25	63	1.21
Mac Flurry	McDonalds	36	1.75	63	1.21
				210	**4.04**

Source: Vincentian Partnership for Social Justice (2004).