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No. 1

An Economic Framework
for the Evaluation of Child
Care Policy

Donald Verry

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**AN ECONOMIC FRAMEWORK FOR
THE EVALUATION OF CHILD CARE POLICY**

by

Donald Verry

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Paris 1990

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MANPOWER AND EDUCATION

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The child-care debate is fuelled by various protagonists -- early-childhood experts, educators, sociologists, economists -- who each tend to consider only one aspect of this multifaceted problem. Consequently, the debate is often confused and inconclusive, particularly when it comes to establishing government policy.

To ensure rationality in such public decisions, a general framework is needed to encompass all relevant aspects. This paper proposes a methodological approach to designing such a framework. It was prepared by Donald Verry, University College London, a consultant with the OECD's Directorate for Social Affairs, Manpower and Education.

The views expressed are those of the author and commit neither the Organisation nor the national authorities concerned.

* * * * *

Le débat sur la garde des enfants est alimenté par des protagonistes divers -- spécialistes de la petite enfance, éducateurs, sociologues, économistes -- qui ne prennent en général en compte qu'un seul aspect du problème alors que celui-ci en compte en réalité plusieurs. De ce fait le débat est souvent confus et peu concluant, en particulier en ce qui concerne l'intervention gouvernementale.

Pour s'assurer de la rationalité des décisions publiques dans le domaine de la garde des enfants, il faudrait pouvoir disposer d'un cadre global incluant tous les aspects pertinents. Ce document propose une approche méthodologique pour l'élaboration d'un tel cadre. Il a été préparé par Donald Verry, University College London, en sa qualité de consultant auprès de la Direction des affaires sociales, de la main-d'oeuvre et de l'éducation de l'OCDE.

Les points de vue exprimés sont ceux de l'auteur et n'engagent ni l'Organisation ni les autorités nationales compétentes.

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I. INTRODUCTION

This paper attempts to establish an economic framework for evaluating policy interventions in the provision of child care. While the framework uses the language and concepts of cost-benefit analysis (CBA) it is not an actual CBA of any particular policy intervention. Rather it attempts to identify broad categories (rather than magnitudes) of costs and benefits, and groups of potential beneficiaries of increased quantity and/or quality of outside-the-home child care. The intention is that this taxonomy can be used as a starting point for future evaluation of detailed policy proposals.

CBA itself is an approach whose strengths and weaknesses are well known to most economists¹, who are unlikely, therefore, to see it as a panacea or shortcut in the presence of the difficult conceptual and empirical problems that are likely to arise in the analysis of public expenditure. Non-economists are often suspicious, rightly pointing to actual or potential misuse of the technique.

Two particular criticisms are often levelled at CBA. The first is the danger that decisions will be made purely on what is easily measurable in circumstances where intangibles may be expected to dominate a complete evaluation of costs and benefits. Secondly, many studies consider costs and benefits purely from the point of view of economic efficiency, implying that the current distribution of income is optimal or, at least, acceptable.

These failings are not intrinsic to CBA. Certainly they are not appropriate in the context of child care, where the equity as well as efficiency effects of any proposed policies must be considered. This paper is predicated on the belief that, when used judiciously, CBA can be an extremely useful means of clarifying the main issues in economic and social policy formation. Nevertheless it is fully accepted that CBA is likely to be one input only into the determination of child-care policy. Child-care issues touch on deeply held beliefs and notions of justice which may not be easy to accommodate fully in a strictly economic analysis of the subject. It is both inevitable and proper that such beliefs should exert some influence in the formation of public policy.

It is important to recognise that when it comes to considering child-care policy options Member countries cannot be treated identically. They start from different positions with respect to social and economic objectives, currently available child-care facilities, labour market conditions, and political and social constraints on feasible policies. Therefore in the interests of devising a general framework which might be relevant to as wide a range of potential policies as possible this paper does not attempt to examine separately the myriad types of child care available, or even to specify the age group of the children whose care is considered (although much of what is discussed subsequently applies most clearly to the care of pre school aged children, some of the analysis carries over to the care of school children out of school hours).

Nevertheless because child-care costs and benefits clearly do depend on the type of care under consideration it is worth highlighting two particular dimensions likely to have a major effect on the outcome of any evaluation. The first of these is the extent to which care is home-based and provided informally (by parents, relatives, co-operative arrangements) as opposed to being provided formally, with licensed personnel outside the home. The second crucial determinant of costs and benefits is the extent to which child care is essentially custodial on the one hand versus primarily educational and developmental on the other (with custodial services provided as an inevitable by-product). Clearly there is a continuum of possible types of provision in each dimension. Schematically:

In terms of provision, child-care modes which fit into quadrant II are likely to be the most expensive, but also offer high benefits both to parents and children. Care types which fit into quadrant III may offer similar benefits in terms of allowing increased labour market activity by parents, but children benefit less, so that costs would need to be less than those of type II care, by an amount sufficient to at least offset the reduced benefits, if type III care was to be expanded ahead of type II.

II. POLICY CONTEXT

Why is there a need for governments to become involved in the provision and/or financing of child care? Economists would tend to answer this question by attempting to identify market failures which result in private decisions producing sub-optimal provision.

Some of the relevant market imperfections are likely to be of the informational variety. By its nature out-of-the-home child care is not easily observable (either *ex ante* or *ex post*) by parents, to whom the quality dimension is likely to be paramount. In such cases trust may substitute for information². This in turn would help to explain the pervasiveness of informal sector provision: friends, extended family, local cooperatives, charities, etc., are all likely to be more trusted by parents than would be profit-maximising suppliers of child care.

An efficiency argument for subsidising out-of-the-home child care could be made if it were believed that existing features of the tax-benefit system distort choices between market work, home work and leisure in such a way as to increase incentives for parents to supply child-care services in the home rather than go out to work and pay someone else to provide such services. Essentially child care provided at home, like other home production, is untaxed while market work is taxed (the implicit tax rate faced by a parent contemplating labour force participation (LFP) includes the loss of means-tested benefits as well as any income tax for which she or he becomes liable). Because taxation drives a wedge between the product and the consumption wage in the market, home production will be over-expanded relative to market work because the former will be undertaken up to the point where the untaxed marginal product is equal to the post-tax market wage. Assuming that such distortions are (i) unintended and (ii) are unlikely to be removed in the short run, then child-care subsidies can be used to offset them. Further, as empirical evidence suggests that women have higher labour supply elasticities with respect to market wages than do men, efficiency requires that they should be taxed less heavily than men, whereas current tax-benefit systems often impose higher implicit marginal tax rates on women. To the extent that women are on average less likely than men to participate in the labour market due to the presence of children, subsidising child care would improve efficiency.

Markets will also fail to supply the socially optimal quantity and/or quality of child care if social and private costs and benefits differ, i.e. if there are relevant "externalities" not taken account of by suppliers when making decisions based on benefits and costs accruing to them as individuals. This possibility is considered in more detail below.

In practice the major impetus behind governments' growing interest and involvement in child-care issues has been the impact of recent demographic trends in household formation, and changing work and employment patterns, rather than the consideration of economic arguments *per se*. Many of these trends -- later marriage, deferral of first child, smaller overall family size, etc. -- are well known and do not require further documentation here³.

In general, child-care arrangements affect both parents. In such cases, tax constraints on married or co-habiting couples can affect the joint decision-making process. In the case of single-parent households such considerations do not, of course, apply. A recent trend, which as yet has not been fully absorbed into the policy debate, is the growth of female-headed single parent families ("mother-only" families). This trend is due to increases in divorce, in separation and in childbirth out of marriage. If breakup rates for cohabitation remain higher than they are for marriage then the increase in the number of mother-only families is likely to continue as cohabitation becomes an increasingly acceptable substitute for marriage. The

growth of mother-only households seems to be associated with the "feminisation" of poverty and with increases in child poverty⁴. The reasons for this may relate partly to "poverty traps" associated with tax-benefit systems, but the financial and time constraints which impede full labour force participation of single mothers are likely to be contributory factors also. Subsidised provision of child care is one possible policy response to this problem. The emergence of mother-only households as a major source of potential poverty highlights the point made above; there are likely to be strong equity as well as efficiency grounds for government intervention in child-care policy.

When evaluating possible policy responses it is important to set the analysis in a realistic context; one is never contemplating beginning from scratch; child care is not being introduced into a no-childcare situation. In some sense, even if only tautological, 24 hours per day of child care is the current norm. What one is therefore contemplating is substitution between different types and qualities of child care. It is important, therefore, that evaluation is based on *net* benefits and costs, i.e. the benefits (costs) of the new type of care under consideration *less* the benefits (costs) of the care it replaces. Thus, in terms of the diagram in section I, if expansion of type II care was contemplated as a policy option its incremental costs and benefits relative to modes it will replace (probably a mixture of types IV and I) must be considered rather than the gross costs and benefits of type II care.

Similarly with respect to public provision or subsidisation. All Member countries already have a range of child-care measures in place. Therefore one is considering costs and benefits of expanding current systems at the margin, or changing their orientation and emphasis. This is a very different exercise, both in terms of methods of evaluation and likely outcomes, from evaluating the introduction of child care outside the home in the complete absence of such provision.

The OECD is already well supplied with documentation on the current systems of child-care provision in Member countries. A preliminary synthesis and typology is provided in Ergas (1990). No attempt is made here to provide a similar survey. However it is worth stressing the obvious point that both the kinds of costs and benefits and their magnitudes are likely to depend on the current orientation of a country's approach to child care. For example, the equity gains will depend on whether a **targeted** (categorical) approach is used to direct benefits to lone parents and low income households or whether such groups are catered for within a universal income-support or anti-poverty policy. In many countries the categorical rather than the universalistic approach has dominated recent trends in policy formulation. In spite of the possibility of the stigmatisation of target groups, and the consequent low take-up of benefits, it is felt that limited public funds are likely to be more efficiently deployed when used selectively.

With respect to the efficiency of child-care policy, a crucial determinant is the extent to which such policy is integrated with the labour market, i.e. is specifically geared to the achievement of specific labour market outcomes. The economic benefits of public support of child care are most likely to be maximised if such support is integrated with labour market policies. One method of achieving this is to make access to child-care facilities wholly or partially employment-contingent. Another is to encourage the provision of day care facilities at the place of employment; where this

does not happen spontaneously there may be a case for the government offering tax credits to firms providing nursery facilities and/or making such provision tax-exempt for employees, rather than treating it as a taxable "perk". Similarly, maternity leave and time off for caring for children during infant illnesses can encourage shorter labour force breaks, and less job changing after childbirth.

In Sweden, for example, eligibility for certain child-care benefits and provision is contingent on a prior employment record. Eligibility for certain child-care benefits is contingent on the parent currently working or receiving approved education or training. In general the "universalistic objectives of Swedish child-care legislation are qualified by a priority system which establishes that children between one-and-a-half and seven years of age whose parent(s) are either employed or studying have the right to a full-time place in a day care nursery, and that children in the same age group whose parent(s) are home-makers have a right to a part-time place. Swedish policy thus seems to distinguish between different kinds of needs more on the basis of parental involvement in employment and education than on the basis of family income and structure. Its underlying rationale appears to be the creation of an integrated system linking employment, education, and child-care services, rather than of a safety net to assist families facing particular hardships." (Ergas, *op. cit.*)

III. BENEFITS AND COSTS OF STATE SUPPORT OF CHILD CARE

This section provides a simple taxonomy of potential benefits and costs of government intervention in child care. Discussion of the main kinds of benefits and costs is kept as general as possible so that the framework can be applied to a range of policies. Naturally the absolute and relative magnitudes of different benefit and cost items will, in practice, depend on exactly what type of child-care policy is being evaluated. For example, one important determinant of both benefits and costs is whether the facility on offer is primarily educational (e.g. kindergartens) or custodial (day care centres).

In order to provide the taxonomy with some structure it is useful to begin by listing the several distinct groups likely to receive benefits and/or incur costs as a result of increased and/or improved child-care provision. The following is suggested:

- i) parents;
- ii) children;
- iii) firms;
- iv) suppliers of child care (carers);
- v) society at large.

This is not a unique listing. It would be possible for example to add the government itself, or the Treasury, in order to highlight how child-care programs affect the government budget. However, as the government acts, or is presumed to, on behalf of the citizens it governs, it is not here identified as a separate category of gainer or loser⁵.

For each of these groups we can attempt to identify major benefit and cost items. Benefits can in turn be subdivided into those which promote efficiency goals and those whose primary impact is distributional.

Using these breakdowns, table 1 provides a simple taxonomy of child-care benefits and costs. This cannot be claimed to be definitive. There is inevitably a degree of arbitrariness and overlap in the items listed, and these could in turn be expanded or consolidated. Nevertheless the taxonomy provides an initial framework for thinking about the benefits and costs of child-care policy.

It needs to be stressed that the items enumerated in the table are **potential** benefits and costs. In any **actual** evaluation the mix and magnitudes of benefits and costs will depend both on the particular policy being evaluated and the context in which it is being considered. The relative emphasis on custodial and educational objectives has already been mentioned as an example of the former determinant. An example of the importance of the country context relates to the objective of increasing labour force participation (LFP) of women. Countries which already have high LFP rates for mothers (such as Sweden) are unlikely to benefit as much in this respect as are countries (Holland, Japan) with lower LFP rates.

Here we can expand briefly the point made above about the need to distinguish carefully between gross and net effects of policy. For example if some particular child-care policy induces substitution between out-of-the-home care and in-the-home-care, failure to account for reduced amounts of the latter would exaggerate both the costs and benefits of the policy. Some of the income generated in an expanded child-care sector simply measures payment for services previously supplied in the home. Such substitution of paid- for unpaid-child care does not represent a net increase in output for society. In practice, of course, child-care services provided in the home and in the market or government sectors are unlikely to be identical. Any changes in quantity and/or quality that result from a change in supplier need to be accounted for. The value of unpaid-child care provided in the home can be measured, to a first approximation, by either the cost of professional child care or the alternative market value of the mother's time [See Bonke (1988)].

Some of the main items from the table are now discussed in more detail.

Labour Supply (Participation and Hours of Work)

Increased LFP or increased hours of work of mothers already in the labour force are likely to be the main economic consequences of government child-care policy. Increased LFP, assuming it is voluntary, is likely to be considered "desirable". However this need not always be the case. Suppose for example a single mother is currently forced to work by financial exigency. Increased child-support (where this is not work-contingent) may induce her to

Table 1

A SIMPLE TAXONOMY OF CHILD-CARE COSTS AND BENEFITS

	BENEFITS		COSTS
	efficiency	equity	
Parent -----	increase in lifetime post-tax earnings (via increased LFP, hours of work, education, etc.)	reduction in financial hardship and "time poverty" for single parents	loss of utility of staying at home less disutility of work
	net increase in leisure	reduction of educational and training and earning inequality between men and women	outlays to cover child-care fees
Child -----	socialisation, acculturation	compensatory development & improved educational opportunity for disadvantaged children	reduced parental contact
	improved educational achievement		
	increased labour market earnings	reduced risk of abuse for "at-risk" children	
Firm -----	reduced labour turnover, absenteeism, recruitment costs, etc.		direct outlays on child-care provision
	increased returns to firm-financed on-the-job training		lost output due to maternity leave and other leave provisions
Carers -----	net increase in post-tax earnings		outlays on wages and salaries, rents, equipment, etc.
Society -----	all above (avoiding double counting) plus:	all above (avoiding double counting) plus:	all above (avoiding double counting) plus:
	easier structural adjustment due to more flexible and mobile labour force	reduction in aggregate measures of poverty and inequality	cost of any subsidy provided to parents, firms, or carers
	increased tax receipts due to parental income gain		
	reduced social security expenditures		
	reduced inflationary pressures from skill bottlenecks (more skilled labour force)		
	easier financing of pensions and health care in an ageing population due to reduced dependency ratio (increased LFP, and in longer term increased fertility)		
	reductions in health costs (reduced post-natal depression, fewer children's accidents, etc.)		
	reduced educational costs (fewer repeated years, less remedial education)		

withdraw from the labour force or substitute part-time for full-time work. Society loses marketable output from such substitutions, but the welfare of the mother (and possibly the child also) increases. The net effect on social welfare depends on the relative weights placed on the gains and losses.

Optimal LFP therefore requires a balance between the advantages to both parent and child of their spending time at home together and the disadvantages of prolonged labour force withdrawal.

In this context it is necessary to consider the effects of public policy on LFP over the whole life cycle. If policy is sufficiently "generous" to encourage a parent not to work until her/his child is, say, ten years old (as in Norway) this will make subsequent LFP more difficult. The objective of minimising the duration of labour force withdrawals so as to increase the returns to human capital investment by individuals or firms (both on and off the job) is an argument for making benefits transitional, i.e. ending or tapering off when a child reaches a certain age (e.g. 3 years). Tapering off also reduces the public expenditure cost of child-care support. Swedish social policy related to retraining, child care, flexible work arrangements etc., is formulated on the presumption that work is the norm for all citizens, including mothers.

Macroeconomic effects

Flexible child-care policy can have a number of macroeconomic benefits, as listed in the table in the "benefits to society" entry. In general these derive from increasing the flexibility and skills of the labour force.

One source of increased flexibility resulting from the greater availability (and improved quality) of child care is the greater discretion afforded to parents in the timing of periods of labour force participation. This timing will, in part, depend on labour market conditions: for example where periods of non-participation are planned (for education, leisure, or both) it makes sense, *ceteris paribus*, to take these when labour market are depressed and earnings and employment prospects are relatively poor. Conversely tight labour markets make participation more rewarding. Child care availability reduces the constraints upon individuals in responding to labour market opportunities.

Because child care can reduce career interruptions it increases the incentives for both firms and individuals to invest in skill formation. In turn both occupational and geographical labour mobility are improved, facilitating economic growth and helping to avoid inflationary skill bottlenecks.

In Sweden the high tax costs of child-care provision do not appear to have led wage negotiators to seek compensating wage increases. While the high tax cost of child care contributes to the long-term near constancy of the after-tax real wage in Sweden, the extra LFP enables after-tax household income to increase, an outcome which appears to satisfy Swedish trade unions.

In turn the macroeconomic climate will affect the scale and timing of child-care policy reform. When there is unemployment, child care-induced increases in LFP may show up as increased unemployment⁶. Either the new labour force entrants will be unemployed or they may displace current job holders. In the longer run economic history suggests that increases in the size of the

labour force are usually met by new job creation, and that both technical change and increases in the demand for the products that labour produces enable absorption of a growing labour force into employment without reductions in real earnings. In the shorter run however depressed labour market conditions generate pressures to reduce rather than increase labour force participation (in the recession of the early 1980s for example many governments introduced incentives for early retirement). The political economy of economic reform suggests that policies which may be expected to increase labour supply, of which child care is one, are likely to be more favourably received when labour demand is strong.

Child-care policy may be a crucial component in coping with imminent problems of supporting health and pension expenditures on ageing populations. The contribution of child care is twofold. The basic cause of ageing populations is the failure to produce enough children - the majority of countries in Western Europe and North America have fertility rates below the replacement level. So to the extent that child-care policy, broadly defined, acts as a subsidy to childbearing, it will produce long term benefits by "correcting" the age distribution of the population⁷. Child-care policy becomes a part of a broader population policy. For example France wishes to encourage the "third child" and child-care policy is seen as one of the instruments for fulfilling this objective.

Secondly, if increased labour supply results in a permanent net gain to the exchequer (i.e. if increases in tax revenues plus savings in benefit payments exceed government outlays on the provision or subsidisation of child-care services), then one benefit is that the pension and health care financing burden per member of the labour force is reduced.

All of these macroeconomic benefits can be thought of in economic terms as externalities: private providers of child care will not take them into account when choosing the amounts of health care to supply. To the extent that such arguments are compelling, they suggest that private provision is sub-optimal, and offer a rationale for government intervention to increase the quantity and/or quality of child care. Similar arguments are likely to apply to the socialisation and acculturation benefits received by children in the formal, out-of-the-home day care sector (although these may be at least partially reflected in parents' willingness to pay).

Equity effects

As the table suggests, these accrue both to the parents' generation and the children's generation.

The fundamental equity effect of child-care policy is to be sought from reductions in inequality of opportunity that still exist between men and women in the labour market. The conflict between family and career remains greater for women than for men, especially for single mothers, but for married women also.

Child-care policy may also be expected to make a contribution to the alleviation of poverty. The poor of the parents' generation benefit either by being freed to increase their incomes by increased labour market activity and/or by gaining some leisure time. The relief of "time poverty" is likely to be especially important to single mothers who, in general, have substantially less leisure time than married mothers.

Non-parental child care can produce benefits even if the time freed is not used to increase labour market earning; one possibility is that the income effect of reductions in the private cost of child care may induce single mothers to move from full-time to part-time work. The benefits of such increases in leisure (or non-market work) time could however still be approximately valued using the market wage appropriate to the individual in question (based on age, education, experience, etc.). If leisure is chosen over market work when both are possible, an hour of extra leisure at the margin must be valued at least as highly as the hourly market wage (plus any utility, or less any disutility, of work *per se*). In equilibrium, with no market imperfections, the marginal utility of time spent in each activity is equalised, so that using the market wage to value non-market time, whether used for leisure or home production (including child care) will give an exact valuation in all time uses in the absence of any net utility or disutility attached to particular activities.

If child care has health and educational benefits (relative to home-based care) and/or improves a child's home environment due to increased household income, then this helps both to reduce child poverty in the short run, and in the longer run to reduce inequality of opportunity experienced by succeeding generations.

Provision or subsidisation of child care to achieve equity objectives is a form of redistribution in kind. Before any prospective equity gains from child-care provision can be legitimately used to support government provision or subsidisation of such services, it is necessary to ask whether the same benefits could not have been achieved at less cost (or greater benefits could have been achieved for the same cost) by redistribution in cash. Economic theory tells us that, in general, redistribution in cash is preferable because it distorts individual choices less than does redistribution in kind. In practice this result requires qualification in two respects. Firstly cash redistribution is also distorting, not between different goods and services but between work and leisure. Secondly, taxpayers may be more willing to support redistribution in kind than in cash, allowing more redistribution. For example taxpayers may be more willing to support lone parents by subsidising child care than by transferring cash to them, some of which may be spent in ways of which the taxpayer disapproves.

Costs

It could be argued that the cost side of child-care evaluation is likely to be more straightforward than the benefit side (this is often the case with social policy in general, and education-related policy in particular). Even where that is true it is important not to conclude that it is any less important to get the cost calculations correct. There is no logical primacy to either half of the calculation in CBA.

There may even be circumstances in which comparing the costs of alternative policy options is the crucial part of the exercise. This is where the options under consideration are known or assumed to have approximately equivalent benefits. Then cost-effectiveness rather than cost-benefit becomes the appropriate technique. If any option is to be chosen it should be the cheapest. Cost-effectiveness is likely to be greatest where child-care provision can utilise labour and capital inputs which are currently used for

care-related activities. For example, paying teachers to extend the school day may be a cost-effective way of providing custodial care for young children with working mothers, although there is a problem of how to provide care outside the school year, which is unlikely to coincide with the working year.

The major direct cost items are likely to be fairly standard; wage and salary costs, annualised capital costs (of physical assets), equipment costs, etc. As with most education-type activities the personnel costs (wages and salaries) are likely to be the largest single cost item, typically accounting for something between 60% and 80% of total costs. What general points can be made about the determinants of child-care costs?

- i) Type of care. In general personnel costs will depend both on the staff/child ratio and on the cost per member of staff. The cost per member of staff will depend on qualification and experience required, and will tend to be higher when child care is of the type that fits in to quadrant II of the diagram above; i.e. the more educational and developmental is the formal care being supplied. The staff/child ratio will also depend on the type of care being provided and, in addition, on the age of the children. It is generally recognised that the care of very young children requires high staff/child ratios even if the care is essentially custodial in nature.
- ii) The nature of the child population being offered care. Compensatory pre-school care for "at-risk" children is likely to be more expensive than is the case for "low-risk" children who derive greater educational and developmental benefits from their home environment [see Cameron (1986)].
- iii) Location. Where wage rates and property prices vary regionally so will the costs of providing similar amounts and types of care.
- iv) Government regulation. Where government intervenes to set minimum standards (for physical facilities, adult/child ratios, class size, qualified/unqualified staff ratios, etc.), costs will obviously be affected. Regulation can extend from minimal requirements to ensure health and safety to very expensive restrictions on space/child ratios and staff/child ratios. In general the more stringent the regulations the more difficult it will be for private suppliers to earn the profits needed to induce them to enter the industry and retain them in it. Of course it may be the case that as well as increasing costs regulation increases the benefits of child care by producing a higher quality service⁸. Whether private demand will enable profits to be made when government regulations "gold plate" the product is, of course, another question. If not, then governments which believe in the social benefits conferred by their regulatory activities (or believe regulation to be required on paternalistic grounds) will be forced to consider some kind of subsidy - either to the suppliers or demanders of child care.
- v) Scale. One general factor which certainly affects costs is the scale of provision. Scale is important where average and marginal costs differ, i.e. where there are economies or dis-economies of scale. Economies of scale are likely to increase as children get older (care

of very young children is likely to require high staff-child ratios) and where provision emphasises custodial rather educational objectives.

- vi) Opportunity costs. As on the benefit side it is necessary to distinguish between private and social costs. If a private supplier has to pay a given wage to employ an extra carer, that is a private cost irrespective of whether the carer was previously in work or not. From the social point of view, however, the cost depends on what is lost elsewhere when the extra carer is employed. If carer is drawn from the unemployed the true opportunity cost (the "shadow wage") is less than the market wage. Conversely if child care uses "free" inputs, such as church halls, community centres, or volunteer labour, the social cost of these resources is only zero if they would have remained unused if not devoted to child care. If child care displaces alternative uses of these resources their cost is the social value of these alternatives.

IV. EMPIRICAL STUDIES

This concluding section provides brief examples of different types of empirical research relevant to the evaluation of child-care policy. It is not intended to be comprehensive literature survey, still less to provide findings in which policy decisions could be based, given that research in this area is still at a relatively early stage. The intention, rather, is to attempt to identify the strengths and weaknesses of each approach. This can provide some guidance as to the type of information required for more systematic evaluation of child care.

The Case Study Approach

This approach evaluates particular child-care programs. Case studies can be fully-fledged CBAs or more partial evaluations, looking, for example, at post-program educational and/or labour market progress of participants.

One set of case studies which have received much attention in the child-care literature relate to the Perry Preschool Program. This is a compensatory preschool program in Ypsilanti, Michigan, for disadvantaged black children aged three and four, selected on the basis of their own low IQ scores and their parents' low educational attainment and socio-economic status. The participants in the study were randomly assigned to a subject group receiving the preschool program and a control group excluded from it. The study is based on children born between 1958 and 1962, who have been followed continuously and their post-program progress monitored.

The program and selected results are described in Weikart *et al.* (1978), Schweinhart and Weikart (1980), Berrueta-Clement (1984), Barnett (1985), and Cameron (1986). Here a few summary results only are reported. The table shows program effects in a number of educational and social dimensions. The beneficial program effects are significant and striking.

The educational and employment effects in the table suggest that program participants would have higher labour earnings than members of the control group. Indeed this is the case. One estimate (Berrueta-Clement) puts the increase in the present value (using a 3% discount rate) of pre-tax lifetime earnings at nearly \$24,000 (1981 prices).

Putting all costs and benefits together it has been estimated that the benefit-cost ratio of one year's participation in the Perry Preschool Program is in the order of seven to one (Barnett, *op. cit.*)

When considering the broader subsidisation of child care the question arises as to whether such highly favourable results based on a small high quality program (there was a staff/child ratio of approximately 1:5, the personnel were highly qualified, home visits as well as out-of-the-home activities were included) can be generalised to large scale programs not necessarily targeted at disadvantaged children. The answer is, in all probability, "no". Net gains in educational achievement, cognitive ability, etc., are much less for children from more "favourable" home environments than the children in the Perry program.

Exchequer costs and benefits.

Instead of examining a particular scheme in a particular location, as in the Perry program, this type of study attempts to evaluate the net fiscal impact - which is not the same as the net social benefit - of government expenditure on child care. Fiscal gain includes increases in tax revenue consequent on increases in market work by mothers plus savings on benefits previously paid out to non-working mothers (or households containing them) such as tax rebates for dependent spouses. The annual net fiscal impact is the sum of such gains less the annual outlays, including tax expenditures, on the program(s) in question.

Anstie *et al.* use this approach to calculate the fiscal impact of the Australian Children's Services Program (CSP), a program which subsidises (via operational support and fee relief) work-related day care for about 85,000 working mothers. They find that the annual tax gain plus benefit saving exceeds the annual costs of the program by 56%. This finding depends on the crucial assumption that the number of new jobs created is equal to the number of all working mothers participating in the project. In other words the assumption is that program participants have not displaced other workers (whose tax revenue would be lost, and who would become eligible for benefits). It is of course possible to test the sensitivity of the results by assuming positive displacement rates. Alternatively one can calculate what proportion of working women in the program has to be in new jobs for the project to break even (i.e. have a neutral fiscal impact). The Australian CSP is estimated to break even fiscally as long as the proportion of new jobs to program participants does not fall below 65%.

Opportunity costs of child rearing

Estimates of the loss of income associated with interruptions in work history due to raising children can be used as a measure of the benefits of child-care provision which reduce the frequency and duration of such interruptions.

Table 2
EFFECTS OF PERRY PRESCHOOL PROJECT
(percentages except IQ and achievement test scores)

	Experi- mental Group	Control Group	p	N
<u>Early Childhood</u>				
IQ at Age 5	95	83	0.01	93
<u>Late Childhood</u>				
School years in special education	16	28	0.04	112
Ever classified mentally retarded	15	35	0.01	112
<u>Adolescence/Early Adulthood</u>				
Mean achievement test score (age 15)	122	95	0.01	95
High school graduation	67	49	0.03	121
Post secondary education	38	21	0.03	121
Arrested or detained	31	51	0.02	121
Employed at age 19	50	32	0.03	121
Receiving welfare at age 19	18	32	0.04	121

- Notes:**
1. The "p" in column 3 is the probability of observing differences between the experimental and control groups at least as great as those in the table if the null hypothesis of no differences were correct.
 2. "N" in column 4 is the number of observations (experimental plus control).
 3. The national population mean for the age 5 IQ score is 100.

Source: Barnett (1985).

Estimation of the lifetime income loss due to child rearing requires cross-section or panel data on individuals, including their personal characteristics and labour market history. From these data age-earnings profiles for women, conditional on marital status and number of children, can be constructed. Earnings at any age are determined by the probability of participation and, conditional on participation, on hours worked and the hourly wage. The essence of the empirical approach is the econometric estimation of equations showing how participation, hours and wages are affected by the presence, numbers, and ages of children.

That such income losses can be substantial is shown in the tabulation (see Table 3) of some of the central results from an Australian study of this type [Beggs and Chapman (1988)].

Table 3

PRESENT VALUE OF LIFETIME EARNINGS BY NUMBER OF CHILDREN
(lifetime earnings of women with no children = 100)

Discount rate (%)

	0	5	7
Number of Children			
0	100	100	100
1	47	53	57
2	39	47	51
3	33	42	47

Note: Personal characteristics other than number of children are set equal to sample means.

Source: Beggs and Chapman (1988).

Thus at a 5% discount rate the birth of the first child reduces a woman's lifetime labour income by about one half. Subsequent children further reduce earnings, but by proportionately less - in relation to labour market effects there are some economies of scale in child rearing. The earnings reductions come about from the lower LFP, shorter hours and lower wages associated with having children. Of these three factors the first, reduced labour force participation, has the major effect.

How accurately such estimates measure the potential benefits of policies to provide or subsidise child care is problematic for several reasons:

- i) There are many well known difficulties associated with the econometric techniques used in generating the estimates. These include sample selection bias, imputing a wage for non-participants, the difficulty of capturing over-time effects from cross-section data, etc. While there has been much progress in recent years in diagnosing and treating such problems, even state-of-the-art estimates are subject to considerable margins of error.
- ii) Such studies estimate the opportunity cost of having children⁹ rather than the costs imposed by the absence of sufficient or appropriate child care. To the extent that some diminution of labour force attachment is due to taste or other factors unrelated to child care this method will overestimate the benefits of increased child care.

- iii) The implicit assumption, if opportunity cost of children is to be used as an estimate of the potential social rather than private benefit of child care, is that the income loss to the individual reflects a loss of output to society. Apart from the usual required assumptions about earnings reflecting marginal product one must again assume no displacement if a previously non-participating mother joins the work force as a result of improved child-care opportunities.
- iv) When estimating LFP, hours and wage equations, education, on-the-job training and work experience are implicitly treated as exogenous control variables. When evaluating child-care policies such variable are better treated as being endogenous, i.e. they are likely to be themselves affected by the greater labour force attachment allowed by improved child-care opportunities. Failure to allow for this endogeneity is likely to cause the true benefits of child care to be underestimated. In principle this problem could be avoided by embedding human capital formation within a life cycle model in which labour supply, education and training and family size and structure are all simultaneously determined. Needless to say such models are highly complex, both theoretically and empirically, [see Heckman (1976)]. However greater availability of panel data is likely to produce increased activity in the development of such models in the near future.
- v) The opportunity cost method does not allow for possible benefits accruing to the child from out-of-the-home child care, nor any of the external effects discussed above.

In spite of these difficulties the opportunity cost method is potentially promising. Much could be learned if it could be repeated in a number of countries (with different amounts and methods of child care) using standardised research methods and definitions of variables. Because many personal characteristics have been controlled for, remaining differences in opportunity costs of children between countries may offer some indication of the effects of country differences in child care.

Direct Estimates of Effects of Child-Care Provision on LFP and Earnings.

In assessing the potential benefits of subsidised child care it is vital to understand how participation decisions are made. If some of the main benefits of improved child care derive from increased LFP over the life cycle (shorter withdrawal post-childbirth, accentuation of deferred childbirth and smaller family size trends) it is important to model the determinants of participation, and in particular the role played by the cost and availability of child care. Similar remarks apply to the determinants of labour earnings of participants.

With the exception of the case study approach, this is the most direct approach to evaluating labour market effects of child care. The data requirements are quite demanding however. Not only does one require (as in the opportunity cost approach) personal and household data relating to mothers, but in addition one requires data on child-care provision which display sufficient variation for its independent effects on LFP and earnings to be estimated in an econometric model. For these reasons such studies are rare.

One example, relating to Sweden, [Gustafsson and Stafford (1988)] combines household data from a national survey in 1984 with data on public day care for each of Sweden's 285 Communities (these have discretion over local provision and pricing of day care places, thus generating the required variability in the data). The authors' estimates reveal that the number of places available per child and, to a lesser but still significant extent, the price per place, have a large effect on the probability of market work by mothers. The study also suggests that the effects on earnings of earlier labour force re-entry and of extra on-the-job training generate sufficient tax revenues to almost cover the tax costs of child-care provision. However the authors question the applicability of their Swedish results to countries with different family structures, work ethic, etc.

NOTES

1. There is a vast literature on CBA. A relatively straightforward introduction and rationale is found in Pearce (1986), and in the Introduction to Layard (1976). The subject is also treated in most modern public finance texts such as Stiglitz (1988) and Brown and Jackson (1986).
2. Similar arguments apply to the provision of health care, where the asymmetry of the information held by doctor and patient can explain some of the observed characteristics of the "market" for health care. See Arrow (1963).
3. See various papers in the Journal of Labor Economics, Vol. 3, 1985, No. 1, Part 2 for discussion of these trends in relation to female labour force participation.
4. For example in Britain in 1980, 36.2% of children in mother-only families live in households with less than median household income (adjusted for family size) as opposed to 8.1% of children in husband and wife families. The comparable figures for the US are 59.3% versus 13.8%, in Norway 8.6% versus 3% and in Sweden 8.3% versus 4.4%. See Kamerman and Kahn (1988). On the feminisation of poverty see, for example, Smith and Ward (1989).
5. In Section IV below reference is made to studies examining the budgetary impact of child-care programs.
6. This short run unemployment effect could be mitigated if child-care support were targeted to regions or skills where labour shortages exist. However it is not clear how this could be achieved, or if it would be desirable on equity grounds.
7. In fact the underlying determinants of fertility are likely to be more complex. While child care is a subsidy to child bearing it also enables greater labour force attachment, which in turn is associated with smaller family size. The net effect on fertility is not predicable a priori.
8. Regulation may also reduce parents' private search costs by reducing the variability in quality of private provision. Reduced search costs, and greater certainty about the nature of the product, may increase parents' willingness to pay for privately supplied child care.
9. Essentially the effects are estimated as the coefficients on dummy variables for number, and ages, of children in cross-section participation and hours equations.

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