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ECONOMIC ISSUES IN THE USE OF INCENTIVES
IN FAMILY PLANNING PROGRAMS

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"It is in the best Pigovian and libertarian tradition that Government should induce individuals to behave socially, whether in the matter of abating smoke nuisances or having fewer children, through the use of special taxes or subsidies."

- Stephen Enke (1966, p. 55)

Introduction

The basic rationale given by proponents of programs designed to provide incentives or disincentives to affect individual family fertility behavior is that, without such programs, any reduction in aggregate fertility which might result from implementing traditional information and service programs in family planning will be "too low." That is, it is asserted that these existing supply-oriented programs will not significantly reduce desired family size to levels which would facilitate more rapid growth of output--in the aggregate and per capita. Hence, it is their aim to expand the scope of population policy from a supply-oriented role in family planning to supply and demand objectives.

The economist would interpret the action as, in effect, not only advocating policy measures designed to establish a universal micro, or family (and hence macro, or country) equilibrium in family size subject to the various environmental--economic, social, psychological and cultural--factors which currently shape individual (or couple) behavior, but advocating as well that the parameters associated with these influences be changed to effect lower

completed family size by some target group. In other words, the opportunity cost (broadly-defined) of children to parents should be increased.

It is the purpose of this paper to discuss some of the economic issues which emerge in consideration of these propositions. We begin by summarizing the principal results which have emerged from general economic discussions on the value of a prevented birth. We then examine the specific experience countries have had with the use of incentives to alter fertility behavior and consider some practical and conceptual issues which inhere in such programs. It is argued that meaningful estimation of the relative merits of alternative incentives programs vis-a-vis these issues requires that additional evaluation supplement the traditional economic cost-benefit model currently used. To illustrate and emphasize the need for supplementary analysis, in the final section we examine a specific, though hypothetical, exercise in cost-benefit analysis conducted along traditional lines.

Background

During the decade of the 1960's there arose a lively debate among economists which aimed at developing a methodology which would permit the estimation of the "on balance" worth to society of a marginal or additional child. The underlying question was whether the sum of individual choices by prospective parents, acting in a laissez-faire environment, would

add up to the best over-all fertility as judged in terms of the whole community's interest?¹ While it is not our purpose in this paper to explore in detail the development of this literature, a brief review of the main elements of such an analysis, including as well a discussion of some of its shortcomings, is essential to a broad understanding of the economics of the use of incentives for birth prevention.²

Taking measured income per capita as a proxy for economic welfare, Stephen Enke, in a series of articles in the early 1960's (Enke, 1960a, 1960b, 1960c) first popularized the notion that the pecuniary worth to a nation of preventing a birth was substantial. Stated alternatively, he argued that the present discounted value of a birth was negative, and hence that it would "pay" society to prevent the birth. The reason why the marginal child has a negative value to the nation is that the present discounted value of expected lifetime consumption outside the family exceeds the present discounted value of expected lifetime production outside the family; this is mainly because consumption begins at birth whereas production does not start until some 15-18 years later. It should also be noted that, as stated, the model implies that social costs and benefits are included as well as the costs and benefits which are borne by the family; that is why we add the qualifying phrases "outside the family."

In other articles (Enke, 1966; 1969; 1971), the essentially same conclusion is reached by way of developing a

demographic-economic growth model. Enke shows that lower fertility can benefit the rest of society through increased income per capita in the following general way: lower fertility will alter the age structure and the dependency ratio, permitting higher savings which can then be used for investment purposes, both public and private, which will stimulate growth. That is, by lowering the ratio of non-working to working population, lower per capita expenditures for education, health and housing infrastructure may be needed, which will simultaneously release resources for a higher potential level and more directly productive use of investment funds. This is especially so since the labor force will remain unchanged for some 15-18 years over what it would have been had fertility not fallen.

Of course, there are a myriad of related conceptual and operational difficulties associated with both theoretical and empirical exercises under either approach. For purposes of evaluating the economic implications of proposed incentives programs, or indeed to understand fully why it is argued that it is worthwhile to prevent a birth, several of these problems are of immediate concern. It is to such issues that we now turn.

Practically all of the difficulties encountered by the investment approach turn in one way or another on the definition and measurement of the relevant benefits and costs to be included in the model, and the determination of the approp-

riate discount rate to be used to convert the future streams of benefits and costs to present values. Unfortunately, close examination of these general problems reveals that they are linked to a series of fundamental conceptual problems. Thus, observations which indicate the inherent bias against births which results from employing any plausible discount rate, owing to the timing in the life-cycle of an individual's consumption and production, mask even more fundamental philosophical questions of import.

The heart of the matter, of course, lies in the area of welfare economics, and the central difficulty is in the lack of a social welfare function.³ Several economists have noted this difficulty⁴ and have further analyzed its implications for the cost-benefit approach to estimating the worth of a prevented birth (Krueger and Sjaastad, 1962; Leibenstein, 1969; Simon, 1969). The fact is that the use of an average measure like income per capita as the welfare criterion obscures the fact that differential benefits and costs will be borne by different individuals, both inter- and intra-generationally. This means that in order to properly determine the value of a prevented birth a social welfare function must be devised, in Leibenstein's words,

"that takes into account the rights of future generations, the preferences of children as well as the parents, and the private rights and interests as well as social rights and interests. The real question is not whether a child pays off in monetary values but whether on balance all the utilities, to the parents, to third parties, and to children them-

selves, are positive or negative." (Leibenstein, 1969, p. 117).

This broad statement summarizes quite succinctly the multifarious nature of the problems encountered by pursuit of an active population policy. There are, first, a variety of private benefits and costs associated with the birth and life of a child which are internal to the family. At the same time, the existence of externalities means that third parties are also affected--costs and benefits are engendered by the private decision which affect society-at-large or other individuals.⁵ Together, the implication which can be drawn is that only from a macro-economic viewpoint, which takes into consideration as many interdependencies as possible, can a meaningful cost-benefit calculation be made.

In contrast to the just-mentioned and present-oriented investment planning approach to estimating the macro-economic worth of reduced fertility, the alternative growth model approach seems to be future-oriented since it traces out over time the effects of reduced fertility now via the set of equations relating demographic variables to economic ones. Nevertheless, as Enke and others have shown, the two approaches lead to similar conclusions about the net benefits of reducing fertility.⁶ We also note that, just as there are possibly strong reservations voiced against the investment approach to estimating the worth of a birth, critics have pointed to a variety of shortcomings of the growth model approach as well--the possibly "mechanical" (rather than "behavioral")

nature of such formulations, the availability and quality of data required by such models, and our inadequate understanding of such key relations as the production and consumption functions, the impact of technology, and so on, are examples of concern.⁷

The purpose of our summarizing these developments is to emphasize the following points:

1. Many economists argue cogently that the negative value of a prevented birth or the income-increasing effect of reduced fertility asserted by others is a tenuous conclusion, owing to the ambiguity surrounding the direction and magnitude of many coefficients in the various relationships and, indeed, even the interrelationships in the set of equations connecting population change and economic welfare.⁸
2. Nevertheless, it is generally agreed that there is a divergence of private and social benefits and costs due to the existence of market failures, principally externalities.⁹ In fact, only if it can be shown that the social worth exceeds the private worth of preventing a birth will an incentive program be justified (aside from information-type programs which aim at eliminating ignorance regarding the family's ability to choose a family size consistent with their preferences).

3. Any incentive program aimed at reducing fertility can be expected to alter the distribution of benefits among individuals different from the distribution of costs. Hence, use of the cost-benefit methodology requires that specific distributional criteria be included in the evaluation.¹⁰

In sum, this writer agrees totally with the observation that "the question of 'who gains how much from fertility reduction' has been largely ignored in the literature on benefits and costs of family planning that has grown up in recent years." (Robinson, 1973, p. 262). This should not be the case. What we must begin to evaluate is the effect on overall social welfare and its distribution among different groups. The tentative suggestion is that perhaps more attention should focus on the welfare effects to the individual of particular tax or subsidy programs, and relatively less on aggregate cost-benefit analyses which emphasize income per capita as the welfare criterion. (Operationally, this may mean that incentive programs which have clearly-identifiable welfare-increasing merits, such as maternal or child health, or perhaps nutrition programs which are tied to the incentive for fertility reduction, are of particular interest.) The latter exercises, to be sure, are useful for providing a broad view. Our point, however, is that additional insights into the macro-worthiness of projects can be revealed by examining the micro effects of the proposed action. Before

continuing the discussion any further along these lines, however, it would seem appropriate that we first discuss with some precision the possible policy measures to which we refer when using the terms incentives and disincentives.

Incentives and Disincentives

Accepting that the net value of a prevented birth to society is positive, and that policy aimed at altering the perceived cost of children to individual couples by introducing taxes and subsidies into the price structure to internalize the social costs of a child is generally warranted,¹¹ there remain several general questions which should be answered about such programs before economic analysis of the merits of using incentives can continue. For example, just what do we mean by the terms incentives and disincentives?

In fact, these terms do require clarification, since various writers have employed them in reference to implementing family planning programs and yet have had different definitions in mind. In this paper the definition of incentives used by Berelson (1969) and Robinson and Horlacher (1971) is generally accepted. Thus, incentives as used here refer to payments, or subsidies in money or kind, made to couples to contracept, postpone, or limit births.¹² Similarly, disincentives refer to negative subsidies, or taxes and other policy actions which attempt, and are generally perceived, to raise the cost of children.

For reasons given below the terms are naturally some-

what ambiguous, or to a degree, arbitrary, but our rationale for adopting these definitions should help to clarify matters. In this paper we are trying to examine certain implications which arise when policy intentionally aims to directly alter the benefits and costs of children as perceived by some target population. Hence, the definition should refer to the individual whose behavior will presumably change as a result of the altered parameters in his choice function.

A few additional comments dealing with quantitative and qualitative aspects of incentives are in order. The quantitative dimension of incentives refers to the size of the subsidy or tax. Logically, any service which is provided at a price lower than the market price involves a "subsidy" to the consumer, and a subsidy can exceed the cost or price of the service. Now, this brings us to a qualitative distinction which should be made--namely, the distinction between resource, opportunity, and transfer costs.

The opportunity cost of producing one unit of, say, commodity X is the amount of some other commodity, Y, that must be sacrificed in order to use resources to produce X rather than Y. It is the social cost of producing X. Resource (or exhaustive) costs refer to the payments required to use scarce factors of production to produce a given commodity. Transfer (or non-exhaustive) payments, on the other hand, involve an exchange of claims on resources--they are simply redistributive operations. In terms of subsidies,

we will say that, quantitatively, it can be a partial, full, or over-full subsidy in terms of resource costs, and that it will entail a pure transfer in the amount of the subsidy minus resource costs. In all cases, of course, the subsidy involves opportunity costs, as Demeny (1961) has properly noted.¹³

With these thoughts in mind, let us now turn to a brief review of the experience to date of countries which have implemented incentive and disincentive schemes. Generally, in almost all countries in which supply-oriented programs in family planning exist (they total a large and growing number) there are provisions for subsidizing to some extent some of the costs of the programs. However, the purpose of the subsidies has not been to induce additional demand so much as to enable the indigent to afford the service--in other words, it has been the purpose to provide the ability or means to contracept (make existing demand effective) rather than to significantly affect the willingness to contracept. Hence, this review will focus on those programs which, not incidentally, but rather directly aim at increasing demand.

Such programs have been implemented in some fashion in such countries as Ghana, India, Mauritius, Pakistan, the Philippines, South Korea, Taiwan, and the United Arab Republic.¹⁴ Predictably, in addition to the plans which have reached the operational stage--at least on a test basis--there are also a variety of as yet untested proposals.¹⁵

Because of the great diversity of incentive and disincentive schemes, detailed discussion of each one seems inappropriate here. However, a brief summary description of efforts in a few selected countries where major plans have been tried can usefully serve to provide the reader with a "flavor" of such programs. Their experiences will also point to issues which deserve, but have not received, careful economic analysis.

India was the first country in which a large-scale incentive scheme was started:

- (a) In 1956, the state of Tamil Nadu (then Madras) began to offer \$6.67 to male or female sterilization adopters. By 1970, the central government assumed the cost of scaled incentives (\$1.50 for the IUD, \$4.00 for a vasectomy, and \$5.30 for tubiligation)
- (b) Additionally, "vasectomy camps" have been held periodically in parts of India. At the Ernakulam camp in 1971, for example, incentives in money and kind totalling \$15.20 for men and \$18.00 for women adopters of sterilization were given (including cash, food, clothing, special work leaves, household utensils, and a chance to win a special lottery with a first prize award of \$1,333).
- (c) Finally, private-tea estates in 1971 initiated

a blocked savings account into which the company paid an amount each month that eligible women (those with four or fewer children) remained not pregnant. The account is to be remitted at wife's age 45, with interest, minus penalties tied to the number of births after joining the program. Should a fifth child be born, the total account would be cancelled.

Taiwan has lately initiated several programs of general interest:

- (a) An educational bond scheme was started on a pilot basis in a rural township in 1971 for couples with 0-2 children and wife's age not over thirty. Annual savings deposits, with interest, would accumulate to an amount sufficient to send two children to high school (and would be used for that purpose). The account would be cut in half if the woman had a third child, and would be totally forfeited with the birth of a fourth child.
- (b) In July, 1973, the government cut the subsistence allowance (includes rice, salt, edible oil, and fuel, or cash equivalent) paid to all their employees for children beyond the third.
- (c) A child-spacing plan was recently funded which provides eligible participants (all couples in Taichung City with wife aged 15-27 who have had

a recent birth) with free delivery and hospital care, and other, nutrition-related benefits, if the period between first and second births is at least 40 months.

Finally, a number of social measures to discourage large families were put into effect in Singapore in August, 1973. These include an increase in delivery fees, scaled by parity; limitation of paid maternity leave to children only; reduction of income tax relief to cover three children only; lower priority for choice of primary school admission for children of fourth birth order and above; elimination of priority for large families in the allocation of subsidized housing.

Based on close examination of these and other actual or potential incentives schemes, it is clear that they can be classified along many lines.¹⁶ For example, we can distinguish among programs by type of behavioral change which the scheme is attempting to elicit (initiation, continuation, or more effective contraceptive practice; payment for periods of non-pregnancy or birth, or for child-spacing); in the economist's jargon, by the intermediate "outputs" of the program. Alternatively, we can look to the method or methods used as "inputs" (withdrawal of maternity benefits, or other tax and welfare benefits; provision of old-age security; direct cash payments, and so on). Other functional distinctions would include:

1. whether or not the exclusion principle applies to the incentive (village plans may pose problems associated with public goods--for example, "free riders").¹⁷
2. the timing of the payment--is payment made immediately or withheld until some financial (maturity of a 20-year bond), physiological (menopause) or other benchmark is reached? Clearly, the role of time preferences (Pohlman (1971, p. 11) asserts that people are generally "myopic") and inflationary expectations, at least, will affect acceptor response.
3. Whether the payment is made by a private source or by local, state or national government (it will become evident that the amount of the payment warranted will vary on this account).
4. Whether the payment is graduated or non-graduated, either by technique of contraception (IUD versus sterilization), acceptor characteristics (age, parity or income), or other criterion.

Having noted several possible ways to characterize incentives schemes, and a few specific issues implied by the distinctions, we should systematically note other important and general conceptual and operational difficulties which depend on the matrix of characteristics which could pertain to possible incentives programs. There are, or so

it would seem from a review of the literature dealing with incentives, innumerable practical difficulties in administering incentives. Problems associated with cheating--double-payment (husband and wife), multiple IUD insertions by a woman, et cetera--and other administrative difficulties which are of justifiable concern to administrators are often cited, and hence largely ignored here. We do, however, address certain conceptual questions which deserve to receive much more attention than has been given to date.

The basic plea we wish to make has already been mentioned, that attention should focus on the distributions of gains and losses which attend these programs. Obviously, depending on the mix of characteristics outlined above, alternative states of welfare result. Incident to a program, for instance, such third parties as about-to-be born children may be extremely disadvantaged by possibly punitive tax or social welfare constraints imposed on parents.

Generally, whether a program generates net benefits to society requires that many difficult-to-answer questions be addressed. Robinson (1973, p. 266) summarizes the main elements involved in a series of six related questions:

First, what sort of fertility differentials exist in the population and how do these correlate with income, location, and other socioeconomic characteristics?

Second, what are the out-of-pocket costs of children by parity levels for families in the various socioeconomic strata of the population?

Third, are children still viewed as creating

any of the several sorts of micro benefits so widely discussed and, if so, how does this attitude differ by socioeconomic groups?

Fourth, are there substantial welfare-transfer programs under which part of the maintenance or development costs of the excess fertility is borne by the rest of the population?

Fifth, is the high fertility likely to tax the nation's potential for agricultural development, either by driving farmers back to more subsistence-oriented production or by simply bidding up prices of food and fiber?

Sixth, can migration from the high-fertility to the low-fertility regions occur freely and, if so, what are the long-run implications of such migration in terms of urban infrastructure required, welfare-transfer payments, and political and social stability?

W. C. Robinson (1973, p. 266)

To better appreciate the magnitude and significance of these questions, we will delay further discussion of them until we have reviewed in some detail one of the more traditional economic analyses of the net benefits to society which presumably result from offering incentives.

Evaluating Alternative Incentives Schemes

The fact that the mix of characteristics of incentives programs bears importantly on changes in welfare among individuals has been noted, and the allied need to evaluate alternative schemes has been emphasized, as a result of our brief survey of country-specific experiences with incentives. In this section we review a traditional methodology which aims at insuring allocative efficiency in the use of scarce resources--enables us to evaluate alternative schemes in order

to arrive at an optimal mix of characteristics--the cost-benefit analysis. However, since we also hope to illustrate some specific shortcomings of this particular genre of the cost-benefit model, one with income per head as the sole welfare criterion, we shall follow very closely a recently-published exercise in evaluating bonus schemes (Enke and Hickman, 1973). Table 1 reproduces the Enke-Hickman summary of the model assumptions and ensuing results and serves as a handy point of reference for us.

The objectives of their exercise include: (1) consideration of the maximum bonus which could be paid to individuals to prevent births, and (2) calculation of the costs, in terms of economy's resources and government budget, of a country-wide program, (3) in the most efficient way possible. Now, given the hypothetical data for population and gross national product (and hence income per capita), and the annual government budget (in absolute terms and as a percentage of GNP) the analysis proceeds as follows:

TABLE 1

Population, P	10.0 million
Gross National Product, V	\$2000 million
V/P	\$200
Annual government budget, G	\$300 million
G/V	0.15
Worth of preventing a birth, W'	\$500
W':V/P	2.5
Worth to government of preventing a birth, W''	\$125
W''/W'	0.25
Average annual fertility of women aged 15-45 years, F	0.2
Annual cost of supplying contraceptive means per acceptor, C'	\$5
Ratio of bonus transfer payments to administrative resource costs, B/C''	5.0
Required number of acceptor-registrants	1.0 million
Assumed total programme resource cost, C	\$12.5 million
Assumed total bonus transfer payments, B	\$37.5 million
C/V	0.006
B/G	0.125
Births prevented in 1 year, N	200,000
Value of prevented births in year, NW'	\$100 million
NW'/C	8.0

Source: S. Enke and B. D. Hickman (1973, p. 342.)

Assuming that men and women aged 15-45 total 4 million and that a reduction of the birth rate from the currently assumed rate of 3% down to 1% requires that about 1 million men or women effectively contracept¹⁸, they ask the question "what could this all reasonably cost?". The answer, of course, requires that additional assumptions be made.

It is assumed that the total present value of preventing a birth is two and one-half times income per capita, or $\frac{W'}{V/P} = 2.5$. It is recognized, however, that most of this cost falls on the family (three-quarters is assumed), so that the net worth to the government arising from externalities is only \$125, and is the maximum amount of resource costs the government should bear. In fact, however, the government may want to "keep" some of the net social gains; assuming they wish to "keep" half, then resource costs totaling only \$62.50 could be paid. We also note that total resource costs (C) can be composed of cost of supplying contraceptive means (C') or administrative resource costs associated with a transfer scheme (C").

Having determined this maximum allowable total resource cost, attention is then focused on the allowable maximum bonus. They argue that it is approximated by the following:

"Suppose that the annual [resource] cost of registering and examining women at clinics (C') is \$5 per registrant. If average fertility is 0.2 live births per year for women aged 15-45 years, the government can afford to incur annual total costs per registrant (C' + C") of 0.2 times \$62.50, which is \$12.50. Thus,

if C' is \$5 and C" is \$7.50, the annual bonus payment for remaining non-pregnant can then be 5 times \$7.50, which is \$37.50....Over 20 years a woman would typically earn \$750 and have four fewer children." (Enke and Hickman, 1973, p. 343.)

The point we wish to emphasize to this point is that, for them, the constraint on the amount which can be paid to individuals as a pure transfer is some function of allowable resource costs: the formula is $\frac{B}{C''} [(.5W'' \times F) - C']$.

To complete the exercise, the total program resource and money costs are estimated for a country-wide program. Assuming that 1 million women do register and receive bonuses, the annual resource cost (C) will be \$12.5 million (which is .6 of 1% of GNP). Additionally, total bonus payments (B) are 1.9% of GNP and 12.5% of the government's annual budget (G). The annual number of prevented births (N) is 200,000. Now, they say:

"The total worth of preventing these births (NW') is \$100 million. However, as noted above, the total resource cost (C) is \$12.5 million a year. Hence the rate of return is NW' to C or 8.0 to 1. This is more than 50 times greater than the approximate 15% that can typically be earned on public investments in LDC's." (p. 343.)

Well, having reviewed this exercise in some detail, let us now evaluate the kinds of results which obtain. First, there are the traditional difficulties, which they clearly recognize, associated with all such models--actual resource costs, the response function and expected number of prevented births, and the extent to which externalities pervade--and all require that simplifying assumptions be made. They recognize

these difficulties, and would agree that research must be conducted in the area of estimating the costs of providing these services (possible scale effects, method-specific differences in costs and effectiveness must naturally be studied) and in the area of determining how consumers can be expected to respond (relevant demand elasticities must, in other words, be estimated). Aside from these and other difficulties, however, there remain in this writer's view, a few truly puzzling conclusions to this exercise.

With respect to the maximum bonus which could be paid, for example, Enke and Hickman note that the government could pay a very substantial bonus, but ignore the question whether the government should pay the amount. On this point they seem to accept, in principle, the Krueger and Sjaastad comments that "the value of a prevented birth does nothing more than set the maximum amount of resource costs which society could conceivably be willing to pay..." And "...suppose that the payment made to a family with a permanently prevented birth is a pure transfer payment...In that case, there is conceptually no limit to the degree of subsidization that should be made in order to prevent a birth." (Krueger and Sjaastad, 1962, p. 425). However, they (Enke and Hickman) limit the size of the allowable transfer to an amount which generates administrative resource costs (associated with making the transfer and assuming no other resource costs are required to prevent the birth) which equals the net value to society

of preventing the birth.

Our view on this very important issue is that the amount the government "could" pay has no meaning, and that the amount the government "should" pay requires that the relevant social welfare function be specified. The point is that these bonuses are transfers, and, as such, imply an income redistribution criterion which is not specified by Enke and Hickman. Clearly, the Robinson approach to analysis of these matters would necessarily "lay this matter out" and is, in the writer's view, a necessary supplement to this mechanical cost-benefit analysis.

Our argument can be made in other ways too. It has been noted that the implementation of such a program implies an increase in the government budget of 12.5 percent. Now, such a percentage increase is considerable, and one could reasonably question the feasibility of such a "great leap forward." Even so, the redistributive effects of such an increase should be analyzed. For example, assume that the high fertility couples are mainly the poor, and that redistribution would be from the wealthy to the poor, who may have different saving propensities. Might the net effect of such redistribution simply result in reduced aggregate savings and hence, via the growth model logic, on this account hinder development?¹⁹

Mention should also be made of the curious desire of the government wanting to "keep" half of the net gains--in

their words "It is supposed that government wishes to retain half the potential gain for all the economy other than the particular family not having the birth." (p. 341.) In fact, it is not at all clear that the government would have much choice in the matter. If the social welfare function chosen desires only to equate social and private benefits and costs, then there is no reason to expect that the government could keep half of the net gains--the response function of the couples would seem to determine that.

A final conceptual problem remains to be discussed. Notice that they credit the program with all of the costs associated with the bearing of children in estimating the merits of bonus schemes vis-a-vis other possible development projects. That is, the value of a prevented birth, \$500, times the number of births prevented per year, 200,000, is viewed as the net benefits of the scheme. They then calculate that, by incurring 12.5 million dollars of resource costs to achieve the reduced fertility, the scheme yields a rate of return on cost of 8 to 1, or 53 times greater (800% divided by the opportunity cost of 15%) than alternative investment projects.

The proper calculation, however, would compare the 25 million dollars of net social benefits to resource costs (assuming the transfer was warranted by redistribution criteria, etc.). The reason is because, without the program, three-fourths of the costs of these children are offset by

accompanying benefits. In other words, assuming the fertility was desired, on a private basis these children are profitable to the parents! Thus, if we compare only the externalities and the cost of eliminating them, we find that the rate of return is 2 to 1 and compared to alternative investments is 13 times greater.

It is important to emphasize that we are not quibbling here over the numbers. Meaningful cost-benefit analysis may well yield results which indicate that bonus or incentive schemes are warranted. Our aim has been to show how easy it perhaps is to come up with the right (in general) answer and yet ignore crucial factors which affect the level of any reasonable index of social welfare. To repeat: the careful examination of the distribution of gains and losses to particular individuals, or easily-recognized groups of individuals, is requisite to implementing well-founded programs designed to increase the demand for smaller family size.

FOOTNOTES

¹This statement may appear to the reader to come perilously close to a reworded way of asking "what is the optimum size or rate of growth of population?" Hopefully, it is not, since that ultimate question is obviously intractable at this time, given the present level of sophistication of the social sciences. In fact, the question only asks whether lower fertility might not yield certain benefits to society which presumably can then be distributed among members of that society.

²Indeed, it will be seen that the net value of a prevented birth to society is the denominator in a cost/benefit analysis of an incentive program. For a detailed review of developments in the literature on the value of preventing a birth in the 1960's the reader is referred to the Robinson and Horlacher (1971) survey.

³A social welfare function is defined as "an ordinal index of society's welfare and is a function of the utility levels of all individuals." (Henderson and Quandt, 1958, p. 217.) Notice that, since it is a function of the utility levels of all individuals, it is not unique, but will instead depend upon the value judgments of those for whom it is desirable.

⁴Actually, the fundamental weighting problem is implicitly recognized by writers discussing population policy. Other suggested readings on the ethical aspects of incentives include Berelson (1969), Pohlman (1971) and Spengler (1973).

⁵See Robinson (1973) or Spengler (1973) for a discussion of particular micro and macro benefits and costs.

⁶Some quantitative estimates of the magnitude of these net benefits range from 1.25 to 10 or more times income per capita, depending on the assumptions of the model (Enke, 1960a, 1966; Demeny, 1965, Ridker, 1969a; Simon, 1968; Zaidan, 1969).

⁷Again, we should not review these matters in detail here. The interested reader is again referred to Robinson and Horlacher (1971) for extended treatment of these matters.

⁸Recent work by Simon, for example, shows that a formidable case can be made to show that the effect of reduced fertility on economic growth is inhibiting (Simon, 1973). For more on this the reader is referred to discussion papers prepared for an earlier SEADAG Population Panel Seminar, and summaries (SEADAG Reports, 1973).

⁹It has also been noted that the current milieu may actually be pro-natalist in effect (Davis, 1967; Enke, 1969; Pohlman, 1971; Finnegan, 1972).

¹⁰Since there is no unique social welfare function, the implicit one "chosen for the purpose of solving the problem of allocation depends upon the institutional framework within which society decides upon such matters" (Henderson and Quandt, *op. cit.*, p. 223). Economists have tried to judge alternative positions in terms of "compensation principles"--the ability of the gainers to compensate the losers and the inability of the losers to bribe the gainers into not undertaking the reallocation.

¹¹Unqualified support for this conclusion cannot, of course, be given due to the problematic and speculative nature of the analysis, especially in consideration of welfare-maximizing criteria other than income per capita.

¹²Other possible definitions would include piece-rate types of remuneration to medical and other personnel "in helping parents to lower fertility levels" (Pohlman, 1971, p. 5), or to all clinic or program personnel exclusive of physicians and paramedical personnel (Kangas, 1970). Sirageldin and Hopkins (1972) include as incentives any partially-subsidized family planning supplies, as do we, although Berelson might exclude them.

¹³Issues surrounding these aspects of incentives occasioned great debate when Enke first proposed that individuals be paid not to have children. To date, they appear not to have been settled and we shall have occasion to discuss them in greater detail in a later section of this paper.

¹⁴For details on these programs in the countries the reader is referred to the following: for India (Repetto, 1968; Ridker, 1971; Krishnakumar, 1972; Thakor and Patel, 1972), Ghana (Perkins, 1970; Rogers, 1971), Mauritius (Titmus and Abel-Smith, 1968), United Arab Republic (Rogers, 1971), Pakistan (Rogers, 1971), Taiwan (Finnigan and Sun, 1972; Wang and Chen, 1973; Keeny, 1973, 1974), Singapore (Hall, 1972; Keeny, 1973, 1974), South Korea (Kenny, 1973, 1974), and the Philippines (Keeny, 1973, 1974).

¹⁵A few noteworthy examples include plans discussed by Finnigan (1972), Pohlman (1971) and Ridker and Muscat (1973).

¹⁶Berelson (1969) and Rogers (1971) provide alternative taxonomies.

¹⁷The fundamental distinction to be made is between public, or social, and private goods. In the case of private goods the exclusion principle applies: those who are not willing and able to buy the good in the marketplace are excluded from sharing in the satisfactions which the commodity yields. Because of the very nature of public goods, however, the exclusion principle does not hold. Individuals can decline to pay for the good but still enjoy using it--hence the term "free rider."

¹⁸The significance of the 1% birth rate is that "the performance of population programmes suggests that even the more successful ones have acceptance rates that are only a fifth or so of what is needed to reduce population growth rates to the 1% a year that permits significant improvements in income per head." (Enke and Hickman, 1973, p. 329.)

¹⁹Actually, this point has been made before by Demeny (1961), Simon (1968) and Ridker (1968). Enke responded by indicating that, initially, perhaps the "middle class" will be attracted and, anyway, perhaps the transfer could be in the form of useful tools.

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