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CROSS-PROGRAM EFFECTS, FAMILY BEHAVIOR AND DEVELOPMENT POLICY ¹

1. Introduction

There are at least three questions that need to be answered in setting public sector priorities to help the family and encourage development. This paper argues that they need to be considered together in conceptually evaluating social welfare programs targeted to families. They can now be empirically analyzed with standard data from household surveys matched to data on public inputs to community level education, health, and family planning programs. The first question is how to get the most benefit from a given expenditure on allied social welfare programs. This measure of efficiency should explicitly allow for the likely effects of one program on the outcomes of all other programs, or cross-program effects. The second question is how program benefits are distributed across types of individuals and families, such as the rich and poor, that may inform us about the equity of the program. The third question is how would the cost effectiveness of programs differ if they were in the private or public sectors. In many spheres the public sector finds it difficult to achieve the efficiency of the private sector, but the private sector may not be able to reach the same target groups that the public sector can, because of their different organizational structures. A final

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question arises in comparing the benefits from different functionally oriented programs, such as health and family planning. Much work remains to be done before it is possible to compare outcome measures, such as a prevented birth, a prevented death, or reduced morbidity, in comparable welfare units.

This paper presents in sections 2 and 3 a framework within which cross-program effects might be measured, and public/private program substitution possibilities can be explored. The personal distribution of benefits (or costs) are incorporated into this framework in section 4. The limitations of this approach are of two forms. First, the distribution of benefits across groups can be evaluated generally only when the groups are defined in terms of exogenous variables, or where group membership is not related to choices and allocational decisions made by the observed individual and family. The second limitation is that the spacial variation in programs and policies must be assumed random with respect to unobservables, notably the preferences of the population and productivity and healthiness of regional environments.² Some conclusions are drawn in section 5 about the need for widening the scope of public policy evaluation studies to encompass more than a single functional specialty, such as education, health, or family planning.

² To deal with the migration of individuals to regions that provide preferred social programs, or program placement in regions with distinctive populations or problems raises identification problems that are discussed elsewhere (Rosenzweig and Schultz, 1983; Rosenzweig and Wolpin, 1986).

2. Cross-Program Effects

Many hypotheses are advanced to explain how and why particular programs help a family modify its behavior in a manner that is beneficial to the family and to society. Two distinctive program designs with a shared objective may strengthen both programs in achieving their common goal, or one may weaken the independent impact of the other program. The former complementary effects are most frequently documented across different types of human capital investment programs. An explanation for this pattern of reinforcement is that one form of human capital enhances the returns to another form. For example, improvements in child nutrition/health permit children to learn more at school (Moock and Leslie, 1986; Gomes-Neto, et al, 1992), and healthier children can expect to live a longer healthier life during which to earn market returns from schooling (Floud, et al., 1990). The latter substitution effects between two social programs can be expected when the programs are directed to achieving the same end, but through alternative mechanisms or motivations or instruments.

These potential synergies between social programs, either positive or negative, may change with the scale of interventions, possibly reinforcing each other at low levels and then substituting for each other at higher levels, as the family demand for the service approaches saturation. For example, in a family planning program it may be useful to combine doctors and nurses into different types of programs, some stationary in hospitals and clinics, while others are mobile in outreach teams. Both types of

program personnel may be motivated to improve health and reduce the number of unwanted births, but they use different mixes of trained manpower and different organizational delivery systems. In some contexts the clinics and outreach programs may reinforce each other and in other cases they may substitute for each other, reducing the effectiveness of the other program. The empirical evaluation of these cross-program effects is needed to improve estimates of how effective public sector program efforts will be in different circumstances.

One simple way to estimate the sign and magnitude of cross-program effects is to add interaction variables between allied social programs to multivariate models of behavior or output determination. Thus, if F_i is the fertility of the i th woman in region j , that we expect to be a function of her characteristics, X_i , and the input of program efforts per woman in her residential region, I_{1j} and I_{2j} , that might be in either clinic or outreach activities, respectively. A linear approximation of the fertility equation would then include an interaction term between the two program effects:

$$F_i = a_1 + a_2 X_i + a_3 I_{1j} + a_4 I_{2j} + a_5 (I_{1j}I_{2j}) + a_6$$

According to the discussion above, the program's direct effect would be approximated by a_3 and a_4 , that are expected to be negative, and the cross program effect would be a_5 , which would be positive if the programs were substitutes, and negative if they

were complements. An example of this approach is found in Schultz (1971; 1988).

Estimates of such program interaction effects are more reliable if quadratic terms are also included for the two program effort variables, in which case the specification is simply interpreted as a second-order Taylor series approximation for any functional relationship between fertility and the program variables. With the inclusion of quadratic terms in each program activity, it is possible to infer how the returns to each program varies with the scale of program effort, and hence how the marginal returns to program inputs may differ from the average returns. The objective of public policy should be to achieve the same marginal return with an equal investment in each program, given that both programs have the same objective, in this case reducing fertility. It is a common pattern for the marginal return to program inputs to decline after some program scale is reached, and the demand for the good or service is gradually saturated (Schultz, 1971, 1988, 1989, 1991b).

In those instances where the objectives of allied social welfare programs differ, such as with education and family planning, the task of comparing returns is not straightforward, but the magnitude of cross-program effects may be substantial. A basic feature of many social welfare programs is that they may influence the costs and benefits of having children (or avoiding unwanted births) while changing the net benefit streams from investments in the education and training of those children (Rosenzweig and

Wolpin, 1980,1982). The most direct route by which public policy may influence fertility is through the provision of information and related services for evaluation and use of modern birth control. If these program help parents avoid more unwanted births, the evidence from a number of studies suggests that parents reallocate some of their gains to investing more in their children's schooling (Schultz, 1991b). If the income effects associated with the benefits of these types of social programs were negligible, then household demand theory predicts that the estimated (uncompensated) cross-program effects should be symmetric, or of the same sign and equal in magnitude.

In the earlier fertility equation if the two programs were family planning (I_{1j}) and school subsidies (I_{2j}), the anticipated cross-program effect, a_5 , would be negative. A synergistic effect is therefore expected between schooling subsidies and birth control subsidies. If it were negative, it would imply that family planning had higher payoff in regions with greater school subsidies, other things being equal.

3. PUBLIC AND PRIVATE PROGRAMS INTERACTIONS

It has long been realized that public family planning programs provide a service that some couples might otherwise have obtained through private markets. It should be expected that when public subsidies are provided for a good or service that is also available in the private market, some consumers will switch because of the public subsidy, without necessarily changing their behavior, e.g.

fertility. Consequently, the supply of contraceptives distributed by the public program is likely to overstate the added contraceptive protection provided to the population by the program. Some contraceptors will merely shift their source of supply without improving their contraceptive efficiency. Here is another case where parallel programs may exist with approximately the same objective. The only way to assess accurately the effect on contraceptive use of a subsidy to either program is to analyze both markets together and probably focus on the final outcome of fertility rather than the intermediate input of contraceptive behavior.

In a study of birth rates in 1976-1981 in Thailand, the fertility effects are estimated of government subsidies to the public sector health and family planning program and to the private nonprofit family planning program. The study finds that both the private and public sector family planning subsidies are associated with lower levels of fertility, holding constant for the age, education, and household income of women. The much larger public sector subsidies are associated with diminishing returns to program scale. In other words, the marginal returns in terms of preventing births is lower than the average returns to government expenditures per woman. This was evident as early as 1969 in the pioneering Taiwan program (Schultz, 1971, 1988). In Thailand the public and private family planning program subsidies are shown to be substitutes for each other, as might have been expected (Schultz 1989, 1991b).

4. Who Benefits from Social Welfare Programs

To assess how social program effects are distributed, it is convenient to add additional interaction variables to our illustrative fertility equation. Let us hypothesize that family planning provides information and assistance on how to adopt more effective modern means of birth control that is most difficult or costly to obtain for the least educated women in a given population. Public subsidies for local family planning should then have their greatest impact on the fertility of the least educated women. An analogous problem arises where public sector extension activity promotes adoption by farmers of new technological inputs and management practices. These extension activities have been shown to raise the profits of less educated farmers by a greater proportion than those of more educated farmers (Evenson, 1986).

An interaction variable is defined in this case as the product of the program subsidy (I_j) and the individual woman's education (X_i) that is probably already linearly held constant in the fertility determining equation. If the local input of family planning activity had a greater beneficial effect in helping women with lower levels of education avoid unwanted births, then the estimated coefficient on this interaction variable would be positive, while the direct effects of the program and women's education would both be negative. This pattern is observed in Colombia in 1973 (e.g. Rosenzweig and Schultz, 1982), and is generally consistent with the larger gaps recorded between desired and actual fertility among the least educated women in Latin

America and South East and East Asia in the World Fertility Surveys (Schultz, 1991a). An earlier investigation suggested that those regions of Taiwan that reported an unexplained higher fertility level in 1965 (i.e. positive residuals) were most affected in the next five years by the local level of public support of family planning services (Schultz, 1974). The first phase of the In Depth Fertility Surveys from three regions of China, collected in 1985, indicate that the partial effect of a local family planning worker in the community on the fertility of older women is larger for less educated women. As in the other studies, both the woman's education and the family planning worker contribute to lower levels of fertility, and to narrowing the fertility differentials by women's education (Schultz and Zeng, 1991).

5. Conclusions

Household survey data from individuals on fertility, child health, child schooling, adult education, sources of income and household expenditures can be merged with regional data on public expenditures on social welfare programs. These data should be systematically studied to assess the success of social welfare programs to help families cope with the challenges of economic and demographic change in the low income world. Putting to effective use modern technologies to control their reproduction, protect their family's health, and educate their children are closely related achievements that do not proceed independently. If public objectives can be achieved by both subsidies to private and public

sector providers of family planning, health, and schooling services, the comparative evaluation of both public and private providers is long overdue. In some parts of the world the public sector may not be the most cost effective or equitable provider of basic services, even those that are traditionally associated with the public sector. The prices and quality of services in the public and private sectors must be analyzed together with the traditional household demand data on expenditures, time allocation, wages, prices, and nonearned income.

The personal distribution of the benefits from social programs are rarely estimated but should become an essential ingredient in deciding what goods and services the public sector should provide and to what segments of the population they should be subsidized. Subsidies for some public sector services may benefit predominantly the poor and help them overcome their disadvantages. These subsidies should be associated with families achieving for themselves greater intergenerational mobility, through their improved control of unwanted births, and the increased health and education of their children. Other public sector services may benefit predominantly urban middle and upper classes, such as urban hospital care and university education in South Asia and Africa. These public services may become inequitable income transfers, without being associated with any notable effects on fertility, mortality or schooling. Identifying which public services should become self-financing may help sustain government assistance where it remains a cost effective and equitable family welfare policy.

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