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POPULATION POLICY AND INCOME DISTRIBUTION

by

Bryan L. Boulier
Princeton University

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Introduction

This paper analyzes ways in which population policies can and do affect income distribution in less developed countries. Population policies are designed to influence one or more demographic processes: fertility, nuptiality, mortality and migration. Policies to influence fertility are stressed, although relationships between mortality and fertility are examined. The paper is divided into the following sections:

- I. Demographic Characteristics of Less Developed Countries
- II. Population Change and Income Distribution in the Absence of Population Policy
- III. Welfare Analysis of Population Programs
- IV. Categories of Population Policy
- V. Population Policies and Income Distribution
- VI. The Politics of Population Policy
- VII. Summary

I. Demographic Characteristics of Less Developed Countries

As can be seen from Table I, demographic parameters vary considerably across countries. For instance, the expectation of life at birth is on average about 45 years in Africa but is over 60 years in many Latin American countries. The average number of children ever born to a woman through the childbearing ages varies from less than four to more than eight. Customs and practices affecting fertility and knowledge, attitudes, and practices of contraception differ among societies. The rates of growth of populations are on average 2.0 to 2.5 percent per annum although they exceed 3.5 percent in some countries. The consequence of high fertility is a very young age distribution with as much as 45 to 50 percent of the population less than age 15.

Besides variations in demographic parameters among countries, there are also differentials in mortality and fertility within countries. In general, fertility is higher in rural areas and is inversely correlated with the income and education of parents. For instance, in Thailand in 1969-1970 the number of children ever born per ever married woman age 40-44 was 6.89 in rural areas, 5.82 in provincial urban areas, and 5.32 in Bangkok-Thonburi. The reported numbers of living children for the three groups were 5.63, 5.21, and 4.95, respectively. In urban areas, ever married women age 35-44 with no schooling had 5.88 children ever born, with one to three years 5.36 children ever born, with four years 4.89, five to nine years 4.52, and with ten or more years, only 3.03. (Knodel and Pitaktesombati, 1973, pp. 235, 238.) Persons who come from low income families are also exposed to higher levels of mortality.

The discussion in this paper refers primarily to countries which have achieved some measure of mortality decline, have high fertility, and rapid rates of population growth. It should be remembered that not all countries or groups within countries have these characteristics and that population policies need to be tailored to the particular country.

II. Population Change and Income Distribution

In this section, the effects of population parameters on income distribution are examined on the assumption that there is no active population policy. Part 1 explores population change and the functional distribution of income and Part 2 outlines the effects of differential fertility and mortality on the size distribution of income.

II.I Population Growth and the Functional Distribution of Income

Economists have long been concerned with the relationship of population growth to the functional distribution of income. Malthus and Ricardo, for instance, argued that increases in population raised the share of rent in national income. The analysis of the effects of population change on functional shares is necessarily complex: since it depends *inter alia* on the effect of population growth on the rates of growth of other factors of production and the composition of final demand, the substitutability of factors for one another in production, the pricing mechanism, and the openness of the economy to international trade. A full analysis of this complex of factors cannot be undertaken in this paper. Only the most important relationships will be reviewed.

Numerous studies have explored the effects of population growth on capital accumulation. Early studies argued that rapid rates of population growth reduce the ratio of private savings to income by increasing the ratio of dependents to adult members of the labor force and thereby the ratio of consumption to income. (Coale and Hoover, 1958; Barlow, 1967; Enke, 1967.) More recent work has suggested that the magnitude of the dependency effect is less than might be supposed. Dependents are born into a family group so that an additional child's consumption is met partially by a reduction in the consumption of other family consumption not just savings. If incomes are so low that there are no savings, increased numbers of dependents can have little impact on household savings. Additional children may also induce other members to increase their work effort and to augment family income.¹

Another criticism of the dependency burden approach is that it is really a model of household savings and household savings comprise only 30 to 40 percent of total savings. Other important sources are business and government savings. The impact of population growth on these sectors has not been much explored. Bilsborrow (1973) suggests that an increase in the number of dependents may marginally reduce business and government savings. In his macro-economic model, an increase in the number of dependents reduces household expenditure on non-agricultural goods, diminishing business profits and savings and indirect taxes on business receipts. Government savings are also affected if government expenditures are sensitive to population growth. If educational expenditures or health expenditures per child were fixed, decreases in population growth rates would permit increases in government savings. It may, however, be the case that reductions in expenditures would result only in increased expenditures on other services. (Cassen, 1973.) Indeed, a benefit of reduced growth is that for the same volume of expenditures, a greater fraction of children could be educated or investments with more immediate returns could be undertaken.

Empirical work of the effect of dependency burden is hampered by inadequate data.² In a cross-national study, Lefi (1969) has shown that youth dependency depresses the ratio of savings to income, although Gupta (1971) shows that the relationship does not hold for countries with extremely low percapita incomes. For a more detailed analysis of the

1. Kelley (1972) concludes that additional children do stimulate work effort in an analysis of an 1889 survey of workers in the United States, but Bilsborrow (1974) concludes from a study of cross-country data that higher dependency rates have negative effects on female labor force participation.

2. For a review of empirical work on determinants of aggregate savings in LDC's, see Mikesell and Zinser (1973).

empirical relationship, see Kelley (1973b.)). On balance it would appear from available evidence that population growth does reduce savings. Empirical estimates of the magnitude of the effect are not very precise.

Thus far we have seen that population growth undoubtedly raises the ratio of labor to capital and of labor to land and reduces the ratio of capital to land. But as we have noted, the connection between these factor changes and income distribution is complex and can be examined fully only in the context of a general equilibrium model. Several models have been applied to the Mexican economy by John Isbister (1973). Isbister compares the growth path of the Mexican economy under two alternative population projections: (1) no change in fertility and (2) a decline in the general fertility ratio (the ratio of births to women 15--44) from .22 in 1970 to .10 in the year 2000.¹ His models are of the Lewis-Ranis-Fei type with three sectors (manufacturing, urban-traditional, and agriculture) with all savings from profits, and no investment in agriculture. When the economy is closed and the urban wage is a fixed multiple of the agricultural wage, reduced population growth lowers the relative price of food and money wages in the manufacturing sector, thereby stimulating increases in manufacturing employment, output, profits, and savings. In the longer run, the low fertility population has a smaller labor force and rural average earnings and the supply price of urban labor rise, with a tendency for profits and savings to decline.

By the year 2015, the high fertility population / numbers about 295 million and the low fertility only 170 million; the rates of growth are 3.95 percent per year and 1.88 percent, respectively. The ratio of profits to GNP is 45 percent in the low fertility projection compared to 42 percent in the high projection, but the ratio of profits to GNP has begun to decline because of upward pressure of wage rates. In this simulation at least, the effect of lower fertility is to increase profits share in GNP for at least a generation and to decrease the share of wages plus rent. However, per capita income in the low fertility population is 70 percent higher than in the high fertility population and food production per agricultural worker is 49 percent higher with low fertility.

To return to the classical question about the / consequences of population growth, it would appear that reductions in population growth rates are likely to reduce the share of rent in national income. First, smaller populations need not resort to inferior land to supply additional agricultural output. Second, with diminished population growth greater capital accumulation permits substitution of capital for land. Third, as a result of increased per capita income, the consumption bundle is less land intensive.

To sum up this section all that can be said is that the relationships between population change and functional income distribution are complex and that there are no general results.

II.2 Demographic Parameters and the Size Distribution of Income

It is generally the case within LDC's that fertility is inversely related to family income and education of the parents.^{2,3}

1. The expectation of life is assumed to increase from 63.1 years in 1970 to 68.0 years in 1980 in both projections.
2. Exceptions can occur if income levels are so low as to reduce food consumption to the point where fecundity is impaired. (Frisch and MacArthur, 1974). High mortality and rules restricting widow remarriage may lower fertility by (cont. on next page)

While the effects of differential mortality partially offset higher fertility to reduce the differentials in the number of surviving children per family, it is still generally the case that the number of surviving children per family is larger for low income and low education households. This pattern of differential fertility affects both the current distribution of consumption and the future distribution of income.

II.2.1 Current Distribution of Income

For a given size distribution of income of household heads, if those with lower incomes have larger families, the size distribution of consumption will be more unequal. For instance in Puerto Rico in 1953, the lower 60% of females received 30.3% of income and the upper 5% received 23.4% of income. Crudely adjusting the data for family size by re-estimating ordinal shares for individuals yields a share of only 26.8% for the lowest 60% of individuals and of a share of 26.8% for the top 5%.² (Kuznets, 1963, pp. 32-33).

Equalizing tendencies include economies of scale in consumption, the possibility that additional dependents stimulate additional work effort on the part of parents and contributions by older children in excess of their consumption requirements. There is no evidence for economies of scale in consumption in LDCs, although Espenshade (1973) has shown in the U.S. that the marginal monetary cost of a child declines when children are added to the family. There is no reason to suspect that this might not also be true for LDCs. There is also no evidence from LDCs that children stimulate increased work effort on the part of their parents. Indeed, additional children may reduce the labor supply of the wife.³ In any case, the marginal returns of additional effort are likely to be small and there is a decrease in utility from a

(cont. from previous page)

reducing the period of exposure to intercourse. (Ridley, et al, 1967)

3. In some developed countries, a U-shaped pattern has emerged, so that the highest and lowest income classes have the highest levels of fertility (Bernhardt, 1972.)
1. This is not always the case. For instance, in Sierra Leone a 1969-1970 survey revealed the following data for women age 40-44:

	Live Births	Number of Survivors	Percent Surviving
Freetown	5.8	4.1	71%
Towns	5.2	3.5	67%
Villages	8.3	3.9	47%

(Dow, 1971)

It should be noted that these data compare urban-rural differences in fertility and not, strictly speaking, differences by income class. In addition, the observed differences in percent surviving reflect differences not only in mortality but also in the timing of births. To the extent that village women had births at earlier ages, their children have had on average longer exposure to the risks of dying. On the other hand, to the extent that village women had larger numbers of births past age 35, their children have had less exposure to mortality. There are no data to indicate the direction and extent of bias in the percent surviving figure.

2. The distribution of lifetime income is likely to be somewhat worse than is implied by this crude adjustment. If income increases with age and then begins to decline at some more advanced age, then the lowest income group in a cross-section includes young persons who have not yet experienced fertility and retired persons whose children have left. The former group is larger and the more rapid is the rate of increase of the population.
3. See Bilsborrow (1974).

reduction in leisure. Children may, however, add to family incomes particularly in rural areas. In some LDC's as high as 20% of children less than 15 are in the labor force. In India in 1961, 11.1% of the rural and 5.3% of the urban male labor force were children age 7 to 15. (Sadie, 1965.) Whether they contribute income beyond their own consumption is unknown. To the extent that additional children force their older siblings into the labor force it may be at the cost of educational investment, depending upon the extent to which education is financed by the family and the overlap of the employment period with school.

While there have been no studies of the individual connections between family size and consumption, the net effect has been examined. In a study of pre-school children in Candelaria, Colombia in 1963 it was found that malnourishment increased with the number of living children. For families of women 30 or more years old, 48.7% of children from families with six or more living children were malnourished compared to only 35.2% of children from families with four or less. (Wray, 1971.) The relationship also holds when the literacy of the mother is held constant. Among lower classes in Great Britain, the height that children attain is inversely correlated with the number of siblings.¹ (Wray, 1971, p. 419.) And, holding constant social class there is a decrease in IQ of about 1.8 points for each additional sibling.² There is also substantial evidence to show that:

1. The incidence of contagious diseases increases with family size;
2. Maternal mortality and complications of pregnancy increase with parity;
3. Maternal mortality and complications of pregnancy are inversely related to birth intervals; and
4. Infant mortality, morbidity, and malnutrition are inversely related to birth intervals.³

In short, the bulk of the evidence suggests that differential fertility can contribute to a distribution of consumption worse than is implied by data on the distribution of family income.

II.2.2 The Future Distribution of Income

Besides influencing the current distribution of consumption and income, differential fertility may have adverse consequences for the long-run distribution of income. First, the consumption effects of differential fertility reduce the future income of children in large families, by reducing investment in such children and lowering the productivity of investment.⁴ Second, children born into large families receive a smaller share of an already small inheritance. Inheritance may be quite an important factor in the distribution of agricultural holdings over time. While a detailed analysis

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1. No association between height and the number^{of} siblings was found in the upper middle class.
 2. Calculated from Wray, 1971, p. 425.
 3. See Wray (1971) for an evaluation of evidence on these points. The word "Kwashkior" is an African tribal term meaning "the disease of the deposed baby when the next one is born." (Wray, 1971, p. 441.)
 4. See Selowsky (1973) for a study of the effects of malnutrition on income.

of inheritance and the long-run distribution is too complex for this paper, it is easily seen that the role of inheritance is dependent inter alia on the following factors:

1. the initial distributions of property and the returns to property,
2. the distribution of earned income,
3. the determinants of wealth accumulation, including what part of income is consumed and what part is transmitted to heirs,
4. taxation of inheritance,
5. inheritance patterns (e.g., primogeniture or equal division),
6. marriage patterns (e.g., no marriage between income classes or equal probability of marriage between classes),
7. the level of, and differentials in, fertility,
8. the level of, and differentials in, mortality.¹

Demographic factors play the following fairly obvious roles. The smaller the degree of inter-marriage between income classes, the greater is long-run inequality. Since low income families have larger family size, they accumulate less wealth and their wealth is split into more fragments. The mean length of generations of low income families is shorter, so that initial property is split more often.² Furthermore, given the level of mortality, the higher is the level of fertility the more rapid is the rate of growth of population. ^{As discussed earlier} this depresses the rate of growth of capital, raises the rates of labor to capital, raises the returns per unit of capital, and lowers the returns per unit of labor. If capital and the returns per unit of capital are more unequally distributed than labor earnings, the variance in the distribution of income will be larger.

Mortality affects the rate of growth of population and thus reductions in the level of mortality have a similar influence as does an increase in fertility. Mortality may also influence the distribution of income in that it determines the age at which property is transferred. High levels of mortality may also encourage consumption rather than investment by raising the discount rate for prospective investment.³ If mortality is higher for lower income groups, their accumulation of property is further depressed. Finally, as will be seen in the next section high levels of mortality are not independent of high levels of fertility in that high mortality induces parents to have larger numbers of births for old age security. Quantity of children is substituted for quality of children. If there exist differentials in mortality within countries, children born to families with low incomes and higher mortality will receive even smaller amounts of human capital.

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1. For analyses of (3), see Stiglitz (1969) and Meade (1966). For models with no differential fertility and an application to the United States, see Blinder (1973). Pryor (1973) examines the first seven factors in the context of a simulation model. His analysis may understate the consequences of differential fertility since the level of a couple's fertility in his / simulat depends upon relative rather than absolute income.
 2. Simulation analyses have overlooked the differential age patterns of fertility and nuptiality.
 3. See Boulier (1974) for an analysis of the effects of mortality on investment in human capital. Increased mortality reduces the average returns to investment in human capital and increases the risk or variance of returns.

It is likely that high fertility and high mortality and fertility and mortality differentials within countries imply a long-run worsening of the income distribution. Quantifying the various connections has not been attempted, but it appears that they are significant. If that is the case, programs to reduce fertility where mortality has begun to decline and to reduce fertility differentials may have great impact on the long-run distribution of income while at the same time improving the current distribution of consumption.

III. Welfare Analysis of Fertility Reduction Programs

Numerous studies have indicated that reductions in fertility would yield substantial increases in per capita income or per capita consumption. For instance, in the Isbister article cited earlier the reduction in fertility yielded a per capita income 70 percent higher than simulations without a reduction in fertility. Total GNP may also be higher with a reduction in fertility depending upon the productivity of labor and the extent of increased capital accumulation with lower fertility.¹ These figures suggest that a fertility reduction would be desirable if it occurred spontaneously. A more difficult problem is to evaluate the benefits and costs of projects to encourage a fertility reduction. Approaches to these problems are reviewed in this section.

III.1 Costs

Conceptually, calculating the costs of averting births in conventional family planning programs is relatively straightforward. In practice, insufficient data have precluded accurate estimation. Several estimates are discussed below.

Table II gives estimates of program costs per birth averted and costs per contraceptive acceptor for various programs. There is insufficient information about the cost data and the procedures for calculating births averted to compare the costs of the various programs. Estimates of the cost per birth averted from acceptor data are quite sensitive to the procedure used in deriving births averted.² Births averted per acceptor depend

1. In the short run (up to 15 years), the size of the labor force is essentially unaffected by the reduction in fertility. It may be slightly higher if female labor force participation increases. After 15 years, the size of the labor force is smaller with low fertility. In Isbister's simulation, GNP is the same or slightly higher with low fertility until the year 2010. Thereafter, total GNP is smaller in the low fertility population. In the year 2015, the labor force in the low fertility population is only 76% of the labor force in the high fertility population.
2. For discussions of procedures to calculate births averted by family planning programs, see Lee and Isbister (1966), Potter (1969), Wolfers (1969), Ridley (1974), Simmons (1971), Kelly (1971), and Ross and Forrest (Forthcoming).

upon the fertility of acceptors in the absence of the program and their fertility subsequent to acceptance. For instance, if acceptors are merely substituting publicly provided supplies for private supplies of similar contraceptive efficiency, the program has no effect on fertility. If program supplies do increase contraceptive usage, then births subsequent to acceptance depend upon the method chosen, the effectiveness with which it is used, and the age and fecundity of the acceptor.¹ For example, a tubal ligation of a 25 year old woman will prevent more births than the sterilization of a 40 year old woman.

The rank order of cost per birth averted by method in Singapore need not apply to other countries, since it depends upon the cost of distributing supplies and the characteristics of acceptors by method, both of which may vary considerably between countries.

Costs of incentive programs to avert births are more difficult to ascertain since any large incentive program could require tax increases sufficient to reduce the supply of effort or redistribute sufficient income to families with lower savings propensities to measurably affect savings, so that current and future output may be affected by the program.

III.2 Benefits

Calculations of the benefits of averting births is conceptually more difficult. A variety of methods have been suggested. In an analysis of a reduction in fertility in India, Julian Simon using Coale and Hoover's projections calculated the benefits of averting a birth by discounting the difference in GNP over a 25 year period attributable to fertility reduction by the discounted births averted.² The welfare comparison assumed that India is at least as well off without the program as it is with the project if GNP is at least as great with the program. At a 15% discount rate it was calculated that the economy as a whole would benefit up to Rs. 570 or \$114 per birth averted in 1952-53 prices. That is, the low fertility population could afford to transfer up to \$114 per birth averted and still be as well off as the high fertility population.

There are three important shortcomings of the Simon procedure. First, it concentrates only on changes in aggregate income, while per capita income may be a more relevant economic variable. Second, the real resource costs of the transfer payments are ignored. Third, the Simon procedure ignores some of the distributional aspects of population policy. The second point was discussed under the cost section. We now turn to the first and third points.

In the Coale-Hoover Model, the marginal product of labor is zero. If the marginal product of labor is not zero, aggregate GNP may well be larger

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1. Calculations are made more difficult for methods other than sterilization by the fact that users of one method may switch to other methods or other sources of supply with the passage of time.
 2. Births are discounted since the bonuses paid to avert births would occur in the future. Discounting the number of births is equivalent to discounting the bonus payments.

in the long-run with higher fertility. Unlike most investment projects which affect only aggregate output, population projects are fundamentally different in that they alter the size of the population receiving the product. Application of the Simon technique might not yield a very large payment per birth averted in the Isbister model since aggregate GNP is at most 3% higher with low fertility and is 2% lower at the end of 45 years, even though income per capita is 70% higher with low fertility. Demeny (1965) examines, for instance, the maximum amount of real resources which could be invested in a population program and leave the lower fertility population at least as well off in terms of per capita income. Needless to say, this approach yields a larger amount which could be invested per birth averted. If population projects are to be compared with other investment projects and per capita income is the decision criterion, then returns to alternative projects should be deflated by population. This procedure ignores the utility of children, however.

An alternative way of approaching the problem of fertility reduction projects is through conventional welfare analysis. If couples made their decisions about additional births by weighing the benefits and costs of those births and there were no externalities or market imperfections (including information) and individuals' preferences were to be counted in evaluating population programs, there would be no a priori reason for government intervention in the fertility decision-making process. Clearly, however, couples make fertility decisions in the absence of information about fertility control and there are important externalities.

III.2.1 Information

There is considerable evidence that couples in LDC's are unaware of contraceptive alternatives with the result that they choose suboptimal contraceptive methods, and have higher fertility than they might otherwise choose.¹ Direct questionnaires indicate that couples in many LDC's have little information about efficient contraceptive methods. Contraceptive information is inversely correlated with education and income. Numerous studies have also indicated that couples are unable to restrict fertility

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1. Coition and births are joint products. Contraceptive methods with lower psychic costs reduce the opportunity costs of birth prevention.

to desired levels.¹ The high incidence of abortion in some countries may also be an indicator of less than optimal fertility control.

Lack of knowledge about the benefits and costs of children may also be a source of nonoptimal fertility decisions. Publicity to inform couples about the costs and benefits of children may be desirable. Where mortality has been reduced, campaigns to acquaint prospective parents about the higher probability of child survival may be relevant, since part of the decision to have an additional birth is motivated by the actuarial decision to ensure a sufficient number of surviving children. On the other hand, Schultze's (1973) results for Taiwan and Schultze and Nerlove's (1970) result for Puerto Rico indicates that the lag between reduced mortality and reduced fertility may be as little as three years.

Finally, couples may falsely assume that society expects them to follow high fertility norms. Psychic costs to defying these norms may be reduced with propaganda promoting low fertility. (Demeny, 1971.)

III.2.2 Externalities

A second important reason why private decisions about fertility may be socially non-optimal is a divergence between private and social costs of children. If parents do not bear the full costs of childbearing, it

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1. Comparisons of actual and desired family sizes are difficult to interpret. -- See Ridker (1969). Several surveys have shown that the percent of women (and men) who have three or four living children and want no more children is often quite high and is larger than the number who are able to achieve that size.

KAP Surveys: Percent Wanting No More Children

Country, sex	Year	Number of Living Children		All Respondents
		3	4	
South Korea, female	1963	54	74	52
Mexico, female (Mexico City)	1963	49	65	65
Niger, female	1970			
urban		7	11	7
rural		9	15	9
Philippines, female	1963	56	68	50
Taiwan, female	1962-63	36	63	60
	1970	58	84	63
Thailand, rural	1969-70			
female		65	75	62
male		65	76	68

Source: Nortman (1973), pp. 82-83

may be presumed that fertility will be higher than is socially optimal. In this section, we will consider four types of externalities: (1) intra-family externalities, (2) public consumption externalities, (3) long-run externalities, and (4) political externalities.

III.2.2.1 Intra-Family Externalities

There are intra-family externalities if members of a family unit are affected by the decision to have an additional child but are not compensated for the losses they suffer. The most important externality is probably that existing children suffer diminished consumption, investment, and inheritance when a sibling is added.¹ (Demeny, 1971.) While the family unit may be thought to be an ideal unit to internalize these externalities, children do not have very great bargaining rights in these matters.

A similar intra-family externality occurs in extended families. If the present value of the marginal product of a birth is less than the present value of its share of income, others suffer a net loss.

III.2.2.2 Public Consumption Externalities

Public consumption externalities refer to consumption of publicly provided goods or transfer payments. If the present value of taxes paid by an additional child are less than the present value of public expenditures on the child, there is a net loss to the rest of society.² True public goods, where the marginal costs of extending the service to an additional person are zero are not relevant. Education and health expenditures are probably the most important sources of externalities in less developed countries. An evaluation of the costs and benefits of a post-partum family planning program in Jamaica yielded a benefit-cost ratio of 4.5 to 1 where costs included the capital and operating costs of the facility discounted at 10% and the benefits were the discounted private cost-savings by the avoided costs of child rearing and government savings in expenditures on health and education.³ (King, 1971.) If private resource savings are excluded from the calculation and tax payments are ignored, the benefit-cost ratio falls to 2.3 to 1. In general it may be expected that the present value of tax payments is low or even zero, if there are tax deductions for children or the marginal product of labor is low.⁴

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1. On the other hand, their share of old-age support for their parents is probably reduced.
 3. As King notes this procedure is conservative in the sense that it ignores the fact that the population size changes.
 4. If family consumption is switched from non-agricultural goods to agricultural goods as a result of high fertility and there are indirect business taxes on corporate profits, taxes may be further diminished. See Bilborrow (1973).
 2. This assumes, of course, that the size of one's family does not enter the utility function of others.

III.2.2.3 Long-Run Externalities

Long-run externalities refer to the costs imposed on others when the child enters the labor force. Suppose that labor markets were perfectly competitive with each person receiving his marginal product. An additional member of the labor force reduces the marginal product of labor and thus the wage rate. Recipients of labor income suffer a decline in income; owners of property receive increased income. If the marginal utility of income of wage earners is greater than that of property owners, there is a negative externality. Needless to say, the magnitude of this externality is not easily quantified, especially since it depends upon the weights of various members of society in the social welfare function.

III.2.2.4 Political Externalities

Political externalities refer to the proposition that political groups receive political power in proportion to their numbers. While all may benefit if fertility is generally lowered, it is not in the interest of any single group to do so.¹ Achievement of low fertility is afflicted with all the problems of public goods. (Demeny, 1971.) The failure of Lebanon to take a census in recent years is attributable to the fear of upsetting a delicate balance of power between Christians and Moslems, which was established when there were more Christians than Moslems. Higher Moslem fertility has presumably reversed the size ordering. Lincoln Day (1967) has shown that, *ceteris paribus*, the fertility of Catholics is inversely related to their population proportion. Opposition by family planning programs in the U.S. by some black leaders is also a reflection of this political externality. For further examples, see Weiner (1971).

III.2.3 Social and Private Risk

A final market imperfection leading to non-optimal fertility is a divergence between private and social risk. An important motive for having children is old age insurance.^{2,3} When mortality is high, each couple must have a large number of children to ensure a reasonable probability of having support from their children when they are old. Assuming that couples continue to have children until they have had enough to assure a .95 probability of having a son when the father reaches age 65, each woman surviving through the childbearing ages must have 4.96 births when the expectation of life at birth is 50 years. The intrinsic rate of natural increase for a population with these characteristics is .025 per annum.⁴

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1. It should be kept in mind that the argument is not as strong if political power depends upon factors other than sheer numbers.
 2. See Mueller (1972).
 3. Insurance of an adequate supply of family labor when morbidity is high is a related motive for having children. This point has been suggested by Mark Perlman.
 4. These data are taken from Heer and Smith (1969). Assumption of more complex behavior, namely that parents adjust their fertility in response to survival of children already born reduces total fertility and the rate increase. See Ohara (1972) and Enke and Brown (1972).

A substantial amount of evidence has been accumulated that suggests that fertility is a function of mortality.¹ It is also clear that the expected rate of return on births for old-age support is quite small, since the costs begin immediately and the returns, which must be discounted by the probability of parent and child survival, are received at a much later date. On the other hand, in the absence of alternative arrangements for old-age security, they may be the best available alternative.

Given that old-age security is an important motive for fertility, it is at once apparent that the level of fertility privately chosen is greater than the optimal number since private and social risk diverge. The social risk of having an inadequate number of the next generation for parental support is zero, while the risk to a low fertility family facing a high mortality schedule is large. The implication of this point is that policies to provide families with social security may be important in reducing fertility. Varying the level of social security payments with the level of fertility attained may be desirable.² Such policies are examined in the policy section of this paper.

III.3 Summary

One may conclude from the evidence thus far assembled that reductions in the level of fertility and in fertility differentials are likely to yield a more equal distribution of current and future income. No empirical estimates were attempted. In addition, the returns to investments in programs to reduce fertility appear to be quite large even on fairly conservative criteria, so that such investment is justifiable on efficiency grounds. In the next two sections specific policies and their distributional consequences are examined.

IV. Categories of Population Policy

Policies to influence fertility may be divided into three basic categories: persuasion, alterations of relative prices, and coercion.³ Persuasive policies attempt to affect preferences for children. Policies using the price system alter the direct and opportunity costs of, or returns to, fertility. Antenatal coercive policies provide legal sanctions against fertility or nuptiality; pronatal coercion includes legal restrictions on the purchase or sale of methods of fertility limitation. Table III lists examples of the different policies. The examples are primarily antenatal policies, but they could be used to promote fertility. For instance, a tax on births is an antenatal policy. The pronatal analogue is a birth subsidy.

1. See Schultz (1975) for a review of the literature.
2. It is plausible to argue that such schemes are essentially a procedure to cope with intra-family externalities, since social security is a bribe by the younger generation to induce the older generation to reduce the number of siblings with whom they must share income and inheritance. See Blandy (1974), for an elaboration of this point.
3. This division is taken from Demeny (1971 and 1972).

IV.1 Persuasion

It is difficult for economists to evaluate the role of persuasion or propaganda in a population program, accustomed as they are to assuming preferences as givens. Rationales for persuasive policies usually presume that the government or state should play a paternal role for its citizens and is in a superior position to determine what is best for the nation viewed as a collective. From that position it is easily argued that the state should take an advocacy position to counter institutional control over reproduction which amounts to "coercive pronatalist policy." (Blake, 1972) A campaign slogan saying "Two is Best" is a logical slogan in that framework. If, on the other hand, the state is viewed as a collection of individuals, each of whom is capable of evaluating his own welfare given sufficient information, the arguments for persuasive policies have little basis for support. Rather, provision of information, not exhortation, is a proper role of policy. "Children are Costly" is a logical slogan.

While some population programs have attempted to persuade couples that fewer than three or fewer than four children are ideal family sizes, little is known about the effectiveness of purely persuasive policies in reducing fertility, although it is fairly certain that pronatal persuasive policies in developed countries have had small impact on behavior.

IV. 2 Price Policies

In Section III, it was shown that market imperfections and externalities yield private decisions about fertility which are socially nonoptimal. Raising the private direct or opportunity costs of births, reducing the money and psychic costs of birth prevention, and correcting for divergence between private and social risk can be accomplished by altering prices. The effectiveness of such policies and their effects on income distribution will be examined in considerable detail in Section V.

It should be noted that a variety of government policies particularly policies which are intended to redistribute income, could have pronatal consequences, although their impact may be small. Free education, maternal and child welfare care benefits, and provisions for providing public housing based on family size fall into this category. Analysis of European family allowance indicates that they have had little impact on fertility. (Berelson, 1974a)

IV.3 Coercive Policies

Coercive policies consist of laws prohibiting individuals from undertaking certain activities. Penalties may be imposed for breaking the law. In some ways, coercive policies are analogous to price policies in that they have price effects. For instance, a law prohibiting marriage of women below age fifteen, if enforced, raises the price of legal marriages for fourteen year olds to infinity. The relative price of consensual marriages falls. The average price of marrying for fourteen year olds increases thereby diminishing the quantity demanded although there is substitutability of extra-legal for legal marriage. Laws penalizing abortions raise the money price and psychic costs of abortions, thereby discouraging their

purchase and sale. The extent to which the number of abortions decreases is a function of the price increase (itself a function of law enforcement) and the price elasticity of demand.

The use of coercive policies depends upon the seriousness with which population problems are viewed, the population's approval of the policy, and the administrative expense of enforcing the policy. For instance, required abortions for illegitimate pregnancies or pregnancies after the Nth live birth would find little support in any nation and would (partially for that reason) be expensive to administer.

The examples of laws affecting requirements for entry into marriage and abortion were not chosen capriciously. Policies to reduce the rate of population growth by raising the age of marriage or otherwise reducing marriage rates have been proposed by some authors as has liberalization of abortion laws.¹ In this section, these two policy measures are discussed briefly.

Lestaeghe (1971) has demonstrated that changing patterns of marriage could have significant impact on the rate of growth of populations in less developed countries. In a simulation analysis of Middle Eastern countries, he showed that the gradual acceptance of a European pattern of marriage² over a thirty year transitional period would reduce the crude birth rate from 46 per thousand to about 34 per thousand at the end of seventy-five years assuming no change in age-specific marital fertility rates. A reduction of age-specific fertility rates of about 40% over a transitional period of 40 years was required to yield a similar reduction in crude birth rates assuming no change in age patterns of marriage.³ Unfortunately we have only a few examples of the application of nuptiality policies which might serve as guides to the formulation of a marriage policy. Three examples which have been studied are the People's Republic of China, India and Bavaria in the nineteenth century.

Shortly after coming to power in China, the Communists set the minimum legal age of marriage at 18 for women and 20 for men. Attempts to raise the minimum age have been defeated, but the 'optimal age' was set at 30 for men and 22 for women by the Party in 1963. The government has used administrative powers to enforce the 'optimal age' by restricting access to education and assigning "non-compliants to unpromising jobs or to inhospitable frontiers or rural areas." (Chen, 1970) Chen (1970) suggests that the sanctions primarily affect urban educated youth and are not applied in rural areas. There are no data to evaluate the effects of the policies on the age at marriage or in turn on fertility.

In India, where the average age of marriage for women is perhaps the lowest in the world, laws setting the minimum legal age of marriage for women at 14 were passed in 1929 and the age was raised to 16 in 1956. While the laws appear to have had some effect in raising the age at marriage, there is considerable controversy over the effects on fertility. First, there is a delay between marriage and consummation (or 'return marriage').

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1. See Davis (1967) and Berelson (1969) for discussion.
 2. The French schedule for 1966 was assumed.
 3. The reduction in nuptiality had a slight advantage in that birth rates declined at a somewhat faster pace.

This period is inversely related to the age at marriage. For instance for marriages from 1930 to 1939, the delay averaged 27.6 months for women married below age fifteen but only 3.2 months for those married at age fifteen or older. (Majumdar and Das Gupta, 1969) Second, pregnancy at very young ages may result in later subfecundity.

The final example of limits on marriage were restrictive laws passed in German provinces in the 1830's. Knodel (1967) has concluded that increased illegitimacy offset between fifty and ninety percent of the legitimate births prevented by the legislation.

The second example of coercive policy is prohibition of abortion. Very few less developed countries permit abortion on request of a woman or a woman and her spouse.¹ While data on abortions are unreliable, given social and legal sanctions against abortions, induced abortion rates in many less developed countries appear to be quite high.² Indeed, high abortion rates have been partly responsible for the adoption of family planning programs in countries such as Chile and Mexico.

Aside from the lack of reliable data on the extent of illegal abortion in less developed countries, we know very little about the costs of incorporating abortion in a family planning program or the costs of restrictive abortion laws. Costs of incorporating abortion in a family planning program/ ^{In less developed} country have not been estimated. Data from countries which have liberalized abortion laws should permit calculation of these costs. ~~Restrictive abortion laws are not a substitute for contraception since it requires more than one abortion to prevent a birth.~~ The costs of restrictive abortion laws are the costs associated with increased birth rates and increased maternal morbidity and mortality. Table IV gives illustrative annual rates of pregnancies and deaths associated with pregnancy, contraception, and induced abortion in developed countries. No estimates for less developed countries are available. The costs associated with treating illegal abortions may also be quite large. An interview study of women in three Latin American cities estimated that 26.7 to 40 percent of induced abortions resulted in hospitalization. (Armijo and Monreal, 1965), and Omran (1971, p. 506) estimates that each hospitalized post-abortion case in Chile required 3.21 bed days.

Little is known about the income distribution impact of including abortion in family planning programs. Table V shows estimates of induced and spontaneous abortions by socio-economic class for several countries. The two types of abortions cannot be separated. It is likely that larger

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1. Liberal abortion laws have been passed in the following countries: India (1971), Korea (1973), People's Republic of China (1957), Singapore (1969), Tunisia (1965, 1973), Turkey (1965), and Zambia (1972). For the provisions of the laws of these and other countries, see the excellent survey by Moore-Cavar (1974). The Iranian Parliament also passed a declaration in 1973 permitting abortion for social as well as medical reasons. (Dean and Piotrow, 1974.)
 2. See Moore-Cavar (1974) for a compilation of data and a discussion of the difficulties of estimating induced abortion.
 3. Trussell () has estimated for Great Britain that the discounted costs of providing a woman with abortion services over a fifteen year period in a family planning clinic are very similar to the costs of providing the same patient with condoms, diaphragms, or orals (about £25 in 1972 prices at a discount rate of 15%), are cheaper than spermicides (£40) and are more

expensive than the IUD (£13) or vasectomizing her husband (£11). He calculates, that the minimum monetary cost of achieving a given level of desired effectiveness includes a combination of abortion and coitus interruptus.

proportions of women from lower socio-economic classes have had spontaneous abortions since they have higher fertility, poorer nutrition, and less access to medical care. Thus, higher income classes may well have greater demand for induced abortion. In addition, if provision for abortion is tied to the existing distribution of medical manpower and institutions (see below), resources used for abortion will be positively related to income class. Study of Tunisian data should permit further examination of this point.

Although legal restrictions on abortion result in higher birth rates and maternal mortality, the decision to whether or not to legalize abortion involves complex ethical issues. However, since some countries have liberalized abortion laws or are contemplating liberalization, further research on the role of abortion in family planning programs is desirable. Finally, if less developed countries do choose to include abortion in their program mix, restrictions on aide programs which prohibit funding of such activities seem unwarranted.

V. Population Policy and Income Distribution

In Sections II and III, it was shown that in the long-run, reductions in population growth may yield considerable improvements in per capita income and the real standard of living of workers. The interactions between income distribution and fertility reductions in the absence of policy were also outlined in that part of the paper. In this portion, we are concerned with the distributional consequences of specific population programs. In particular, who have been the beneficiaries of conventional family planning programs? What change in them would spread benefits more widely? What are the distributional consequences of tax and incentive schemes?

Traditional family planning programs are examined in V.1. Levels of expenditures by source of funds are examined first. Then the distribution of direct services among users is presented. Section V.2 evaluates the likely success and distribution consequences of tax and incentive programs.

V.1 Family Planning Programs

Traditional family planning programs have concentrated on providing information about contraception and supplying contraception services including sterilization at or below market cost. The information aspects of such programs are undoubtedly redistribution to middle and low income groups since high income groups already possess knowledge. The provision of subsidized services involves some direct redistribution of income. The amount of redistribution depends upon the sources of program finance and the characteristics of users.

V.1.1 Expenditures and Sources of Funds

The sources of funds for family planning programs include foreign aid, domestic taxes, and user fees. Table VI shows a breakdown of total and per capita funds for major family planning programs for several LDC's for the most recent year for which data are available. As can be seen from the table, expenditures per capita and sources of funds vary considerably among countries. Generalizations are:

(1) Foreign contributions to program expenditures are large relative to other government programs. International funding for population research and program funding has increased from \$2 million in 1960 to \$124 million in 1970 and perhaps \$250 million in 1972. (Berelson, 1974, p. 40) In 1971, official population assistance by Western countries was less than two percent of official development assistance. In that year, about 2.9% of U.S. development assistance (\$96 million) was allocated for population activities. (Berelson, 1974, p. 41)

(2) Government expenditures on family planning expenditures are ordinarily less than 0.2% of total government expenditures. Exceptions are: Fiji (0.27% in 1972), India (3.7% in FY 1972)¹, Indonesia (0.6% in FY 1971), Mauritius (1.1% in FY 1972), and the Philippines (0.63% in 1972).

(3) Government family planning expenditures are generally less than 5.3% of expenditures on health. Exceptions are: Indonesia (24.2% in FY 1972), Iran (5.7% in FY 1971), South Korea (1% in 1972), Mauritius (9.1% in FY 1972), Philippines (10.5% in 1972), and Taiwan (9.3% in FY 1973).²

(4) Expenditures per capita are small. In only one country (Mauritius) are expenditures of funds from all sources as great as \$1.00 per capita.

There are no data to show the extent of private payments for contraceptive services and supplies. Fees for services are common, especially for oral contraceptives, condoms, and diaphragms, although in the majority of countries fees are reduced or waived for those unable to pay. (Nortman, 1973, pp. 55-57) When incentives are offered on a large scale, payments are made only for male or female sterilization except for India where a payment for IUD insertion is given in some states. Cash payments as large as \$8.00 have been offered at some vasectomy camps and \$2.00 has been paid for female sterilization. In Pakistan (1972), there were payments of \$1.50 for male sterilization and \$2.00 for female sterilization. An indirect incentive also exists in countries where health care may be provided free with visits to family planning clinics. Experimental incentive programs will be discussed in the next section.

Besides government programs and expenditures for fertility reduction, there is a considerable private market for contraceptive services. As much as 40% of total expenditures for contraceptive supplies are private expenditures. (Sollens and Belsky, 1970) Table VII shows the percent of women using public and privately provided contraceptive supplies for various countries. There are practically no data to show the use of privately marketed supplies by income class although some evidence in the next section indicates that high income couples use private sector supplies even when family planning clinics are available, and current or ever use of contraception varies positively with education in countries with no programs.

V.1.2 Distribution of Benefits

Traditional family planning programs provide information and services. In this section, data on the distribution of benefits of family planning

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1. The figures cited for India in the text appear to be federal level expenditures.
 2. For India, the figure is 156%. This figure refers to federal level expenditures and many health programs are carried out at the state level.

programs are analyzed. The evidence supports the conclusion that on balance the benefits are larger the lower is income, except that the very lowest income and education groups are underrepresented among users. Two reasons for the underrepresentation are lack of demand for services and the tendency for program facilities to be located in urban and higher income areas.

Information. A Priori, one expects the informational benefits to be progressive, ~~regressive~~, since high income and education groups already possess relatively more contraceptive information. Over time, for instance, in Taiwan and Korea, there have been substantial increases in knowledge and practice of contraception among lower education and income groups.¹

Over long periods it is difficult to measure the extent to which a family planning program has contributed to changes in information although there have been attempts to measure increases in knowledge in short campaigns. In West Bengal, following an intensive campaign of newspaper advertisements, radio broadcasts, slides and films, exhibitions and street posters, the greatest gains in knowledge of at least one contraceptive method "were among women with primary school or lower education and among the lowest income groups." (Balakrishnan and Matthal, 1967, p. 7) On the other hand, following a radio campaign in Cali, Colombia, "increases in knowledge of where to go for service were greater among the better educated than among the less educated." (Ross, et al, 1972, p. 22) It would appear that increases in knowledge of contraception depends upon where and by what means communications are made.² Finders fees and user incentives can have considerable impact on the diffusion of contraceptive information. (Rogers, 1971)

Use. More important than changes in knowledge is the use of program services. There are only a few studies which compare the population of acceptors with the population at risk. Table VIII summarizes five studies from various parts of the world. The ~~Philippines~~ Philippines study compare users with the national population, the Indian study compares users with eligibles in Howrah district, and the Nigerian study is only for Lagos. Excepting Nigeria, it appears that users of services are drawn predominately from the middle and lower middle education groups, with the highest income and education groups underrepresented. The highest income groups are underrepresented because they rely on privately provided services. In the Philippines the lowest education groups are underrepresented because the clinic-population ratio falls off in rural areas. Location of clinics may also partially explain the Nigerian findings although it would also appear that the underlying demand for services by low income groups is also small. The Costa Rica example compares users with the populations served by six clinics scattered over the country. The lowest income groups are as likely (or more likely) to use the clinic services.

1. Taiwan: Married Women 22-39 years, 1965-1970

<u>Education</u>	<u>Percent Ever Used Contraception</u>	
	<u>1965</u>	<u>1970</u>
None	19.4	50.9
Primary	31.9	53.7
Junior High	51.4	71.4
Senior High or More	60.2	79.2

2. For a bibliography and summary of family planning communications impacts, see Ross, et al, 1972, pp. 17-23, 43-44.

The evidence of these studies suggests that the benefits of family planning programs typically are received by middle and lower middle income and education segments of the population, but that in many populations the lowest income and education groups would participate more heavily in programs if clinics and service dispensaries were dispersed more widely. Part of the reason why programs have been concentrated in urban rather than rural areas is that programs have restricted the dispensing of IUD's and oral pills to physicians, who tend to be located in urban areas. While access to medical care is desirable in the event of complications, there is no reason why dispensing these contraceptives requires a physician. Several programs have trained and employed paramedical personnel, including midwives, to distribute IUD's and orals.

1. In 1966 Pakistan began training local family planning visitors. By 1969, paramedical personnel were performing 70-80 percent of all IUD insertions. (Ross, et al, 1972, p. 26)

2. Fifteen percent of all IUD first insertions (6 percent urban and 20 percent rural) in South Korea in 1968 were performed by midwives, nurses, and family planning workers. (Ross, et al, 1972, p. 26)

3. In Barbados, starting in 1965, nurse-midwives were used as primary insertors of IUD's. (Ross, et al, 1972, p. 26)

4. In Malaysia over 90 percent of acceptors use orals and the majority of prescriptions are given by lay personnel.

5. And in Thailand, permitting midwives to dispense orals in mid-1970 increased the number of health clinics with family planning services from 300 to 3,000. Whereas there were only 26,000 acceptors in rural health centers in 1968, there were 137,000 acceptors in 1970. In 1970, there were 133,000 pill users and in 1971 there were 294,000 users. (Rosenfield, et al, 1971; Henachudha, et al, 1972)

Studies in Pakistan, India, South Korea, Barbados, and Nigeria indicate that there is little difference between IUD insertions by physicians or paramedical personnel in terms of complications or continuance rates (Ross, et al, 1972, pp. 26-27) And Rosenfield has found that paramedics do a satisfactory job of screening potential pill acceptors in Malaysia and Thailand. (Ross, et al, 1972, pp. 26-27) The International Planned Parenthood Central Medical has concluded with respect to orals that "the health benefits almost certainly outweigh the risks of use in almost all cases....(and that)...(i)t has been found that the complications that do occur are difficult to predict by examination prior to use, but that access to follow-up facilities can be important, especially in enhancing continuation....(W)hoever normally meets the health needs of the community, whether doctor, nurse, traditional midwife, pharmacist or storekeeper, can be an appropriate person to distribute oral contraceptives."¹ Research on nonmedical distribution of orals should be undertaken. An important part of any such program should be provision of access to trained medical personnel for women who have complications or who require assurance.² While taking of orals appears to be much safer than risks imposed by the probability of additional pregnancies, (see Table IX),

1. Text of IPPF Central Medical Committee (April 1973) reprinted in Plotrow and Lee (1974), p. A-22

2. Ibid.

unsatisfactory experiences by women taking the pill may reduce acceptance by others.¹

Increased emphasis should be placed upon commercial distribution of condoms and other conventional contraceptives. The Indian Nirodh program (launched in September 1963) which uses the distribution network of the six largest consumer goods marketing companies and makes condoms available to consumers at less than 20 percent of the usual market price seems to have considerable success in increasing the use of condoms and in widening the distribution to smaller towns. Estimated monthly purchases of Nirodh condoms were 1,585 thousand in June 1969 and 5,494 thousand in the period April 1971 to March 1972; monthly purchases of other brands declined from 705 thousand to 509 thousand over the same period. Twenty percent of Nirodh condoms were sold in towns of less than 20,000 population compared to only six percent of other brands. (Jain, 1973, p. 187) The Indian data also indicate, however, that condoms are more likely to be used by couples of higher socio-economic status than users of terminal methods of contraception (i.e., sterilization).² Whether the same pattern

1. At present, in 45 less developed countries responding to a postal survey, no prescription for orals was required in nineteen countries. The survey also revealed that "even in countries without a prescription law, commercial pill distribution is still largely confined to licensed pharmacies." (Black, 1974, p. 253) Given the number and distribution of licensed pharmacies in less developed countries (Black, 1974, p. 251), the distribution network for orals is severely limited.
2. The Indian data from the 1971 All-India Survey of Family Planning Practices show the following?

	Current Users		
	Terminal Methods	Condoms	All Couples
Wife's Education			
Illiterate	66	40	79
Primary	16	19	11
Secondary	17	35	9
College	1	6	1
Family Income (rupees)			
Below 100	32	11	39
101 - 200	31	29	36
201 - 500	26	38	19
501 - 1000	8	14	4
1000 or more	3	8	2

Source: Jain, 1973, Table 7, p. 189.

would be found in other countries is open to question since the Indian family planning program has concentrated primarily on terminal methods, so that the observed structure of method use does not necessarily represent the underlying preference structure.

In any case, it is important to stress that family planning programs should not concentrate solely on a single method. First, discontinuation rates of methods such as the pill and IUD are often quite high. Evidence from Taiwan and Korea shows that a high proportion of those who discontinue one method do switch to other methods if they are available. Second, couples differ in their preferences among contraceptive alternatives. For instance, couples desiring to space children would find sterilization unacceptable. Expanding the alternatives may well increase demand.

V.1.3 Distributional Consequences of Family Planning

Examining only the distribution of expenditures, one may conclude that middle and lower middle income and educational groups have benefitted most from conventional family planning programs, with high income groups consuming private sector services and the location of facilities and in some cases lack of demand inhibiting distribution of services to the very lowest income groups. We have discussed ways in which programs can be modified to distribute benefits more widely. How successful they will be depends in part upon the demand for services by low income groups. In the next section, tax and incentive schemes, which are designed to encourage reduced fertility, are discussed.

V.2 Tax and Incentive Schemes

Recognition of the benefits of reduced fertility for achievement of increases in per capita income and dissatisfaction with the response of fertility to family planning programs have prompted some to advocate tax and incentive policies to penalize high fertility or reward low fertility. And, since externalities are associated with births, tax or subsidy programs to internalize the external costs of fertility appear economically justifiable.

This section is divided into three parts. The first part examines the success of programs which have attempted to use tax and incentive schemes. The second and third parts examine the distributional consequences of such programs.

V.2.1 Evaluation of the Success of Tax and Incentive Schemes

Table X gives examples of programs which have moved "beyond family planning."¹ The actions taken in Singapore and the Philippines are too recent for any evaluation of their effects on fertility. It is also too soon to evaluate the short-term effects of the Taiwanese educational

1. This phrase is due to Berelson (1969).

scheme on fertility, although 67% of eligible couples joined the plan and a recent survey has shown some increase in contraceptive use.¹

The Gujarat and Ernakulam campaigns were exceedingly successful. The Ernakulam camp (1971) paid 114 Rs. in cash and in kind to vasectomy patients and 135 Rs. for female sterilization. With the bonuses, there were 63,418 vasectomy acceptors compared to 10,662 in 1968-69 and 15,005 in November and December 1971.² The reported median age of the wives of acceptors was 30.8 years and the mean number of children ever born was 4.1 compared to an average of 4.2 in the district. The crude birth rate was estimated to have dropped three points as a result of the campaign. The Gujarat campaign paid 65-75 Rs. per vasectomy acceptor and 232,000 vasectomies were performed in a two month period. Sixty-five percent of the acceptors were illiterate.³ No comparison with the population at risk has been made. The success of these two campaigns has sometimes been attributed to the incentive payments. Lack of an experimental design makes quantitative evaluation difficult.

In the Tata experiment two groups of firms were chosen "Starting to examine the effects of vasectomy bonuses." in September 1967, a total of 3,988 workers in four factories were offered incentives of 210-220 rupees (about \$27 U.S.). A total of 3,872 workers in five other nearby firms (presumably the two sets of factories were chosen randomly from the same set) were offered 10-20 rupees (three factories) and 35-55 rupees (two factories). For the lowest paid Tata workers, the incentive of 210-220 rupees represented well more than a month's pay." (Simon, 1974, pp. 99-100) In the first six months 2.58% of workers in the high incentive factories adopted sterilization and 0.71% in the low incentive factories. By March 1970, the cumulative percent adopters was 8.99% of 5.84% in high and low incentive factories, respectively. (Simon, 1974, p. 102) Table XI indicates that low income workers were more likely to adopt sterilization when the large incentive was paid.

The final incentive experiment has been carried out on ten estates in India. This experiment has been financed by the estates. For each month of non-pregnancy, each woman receives 10 Rs. per month deposited in

1. Wang and Chen (1973). Social and economic variables were not predictors of enrollment.
2. Total costs per acceptor (including incentives) were estimated to be 145 Rs. per vasectomy and 166 Rs. per female sterilized. Benefits were estimated at 950 Rs. per birth averted and a benefit-cost ratio of 9 to 1 has been cited for the project. There are insufficient data to evaluate these estimates.
3. The reported income distribution of acceptors was:

Less than 500 Rs.	14.8%
500-999 Rs.	30.0%
1000-1499 Rs.	19.7%
1500-1999 Rs.	15.4%
2000-2499 Rs.	10.2%
More than 2500 Rs.	10.8%
Not available	.1%

a blocked savings account. The woman is to receive the accumulated savings at age 50. For each birth occurring to a woman who has zero, one, or two children no payments are made for one year. For a woman who has three or more children, an additional birth results in a loss of payments for one year and a deduction of up to 880 rupees from the account. The firm pays maternity costs and hospital care and contributes approximately 100 rupees per year for food, schooling, and clothing for children less than age 12 and approximately 15 rupees for medical care for children ages 13 to 17. Discounting costs at .065 per year yields a present value of 1000 rupees per child. Ten rupees per month for 13 years discounted at the same rate, yields 1000 rupees. Since, however, two, three, or four would be averted the firm gains substantially if the program is successful but suffers no losses if it is not successful. The program had no difficulty in gaining acceptance by workers and appears to be successful in reducing fertility.

Too few data exist at present to evaluate the success of incentive schemes, although the tea estate plan shows considerable promise. More experimentation should be undertaken to evaluate the costs of such schemes. It should be noted that the payments made in schemes have thus far been far smaller than the value per birth averted estimated in various macro-models.

V.2.2 The Distribution of Consequences of Tax and Penalty Programs

Taxes on births, withdrawal of family allowances or maternity benefits, or limiting tax deductions to N children raise the cost of children. There are several difficulties with such programs. Taxes on births or limitations on tax deductions could not be applied in some countries because only a small part of the population is subject to the income tax. Birth taxes would be difficult to administer in any case. Withdrawal of family allowances or maternity benefits could only have a large impact on fertility in countries where such benefits were paid to more than a small part of the population.

In countries where such policies could be pursued they are likely to have adverse distributional consequences. Taxes on children or births are likely to be regressive since low income families have higher fertility, although taxes varying with income could be devised. In addition, taxes, reduced allowances, or limits on the amount of education available to each nuclear family further reduces the welfare of children who already suffer with the addition of a sibling. No tax or negative incentive can surmount this obstacle.

V.3 The Distributional Consequences of Incentives

In this section, incentives are defined as positive payments in money or in-kind to couples for avoidance of births, for periods of non-pregnancy, or for contraceptive acceptance. Incentive payments to persons who find clients or payments to suppliers of contraceptive services are not discussed, although they have played an important role in many programs. (Rogers, 1971; Ross, *et al*, 1972)

The effects of taxation or penalty schemes and positive incentive schemes are related, since both transfer income from those who have high

fertility to those who achieve low fertility. There is some presumption therefore that positive incentive schemes may well worsen income distribution. Whether this is so depends upon the incidence of taxes to finance the scheme, the nature of the incentive, and the characteristics of those who receive the incentive. For example, if taxes are progressive and lower income couples are more responsive to the incentive scheme, there may be some redistribution to lower income groups. The Tata industrial program is an example where low income workers accepted vasectomies at higher rates.

There are numerous variations in incentive schemes. Payments can be made for contraceptive acceptance, periods of non-pregnancy, or varying social security benefits with number of children ever born. Payment for contraceptive acceptance is probably only feasible for sterilization, since other forms of contraception are subject to "non-use". Payments can also vary with age of acceptor (for sterilization) or perhaps parity. Payments can be made concurrent with either sterilization or a period of non-pregnancy or can be postponed to the end of the childbearing period or retirement. They might also have an annuity feature.

Payments for periods of non-pregnancy are likely to be expensive to administer since they require periodic examinations (say two per year) and are subject to the difficulty that couples can receive benefits for several years, stop, have a child, and then resume receiving payments. Varying payments with the length of period since the time of last pregnancy may be devised to lengthen the interval between births. The longer is the interval, even if children ever born per woman does not change, increases the mean length of generation and reduces the growth rate. Large payments for four or five years with reduced payments thereafter may increase intervals between births, although payments which are reduced significantly may induce couples to have an additional birth so as to begin receiving the large payments again. Large payments immediately after birth also contain a significant amount of rent since fecundability is lower in the first year (or more with breast feeding) after the last birth.

Varying social security payments with number of children ever born presents administrative difficulties in phasing in each generation and is subject to abuse when there is inadequate birth registration. In addition, such schemes do not have the immediacy as would payments earlier in life.

Payments for sterilization would seem to be a possible complement to existing family planning programs in countries where sterilization is acceptable.¹ Ethical acceptance can be gained by presenting payments at the time of sterilization as compensation for the time and inconvenience involved and deferred payment as old-age security, compensation for not having children for old-age support.² Ridker (1969) has worked out various schemes for India involving payments of a Rs. 1000 bond for sterilization after three children and Rs. 1500 for sterilization after two children.

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1. This section draws heavily from Ridker (1969).
 2. The choice between current and deferred payment depends upon the confidence which couples have that they will be paid in the future. Large current payments are "more costly, open to misuse, and open to the charge that it smacks of bribery." (Ridker, 1969, p. 14.)

Assume that India's birth rate drops only to 31.2 by 1991 without the scheme. The population size of India would be 953 million at that date. If 50 percent of women accept the three child scheme, the birth rate would drop to 25.3 by 1991 and the population would be only 836 million at that date. If payments of 50 rupees are made at the time of sterilization, the cost of the program would have been Rs. 94 million in 1966 and would be less than Rs. 150 million by 1981. When significant numbers of women reach age 50 the current outlay increases to about Rs. 2000 million per year in 1986. One-hundred percent acceptance of the three child scheme would reduce the birth rate to 17.5 per thousand by 1991 yielding a population of 720 million at that time.

All things considered, incentive schemes deserve consideration as adjuncts to family planning programs. By compensating individuals for having smaller families (if children have positive present values) incentives stimulate demand for contraception and may have positive effects on income distribution. Only by experimenting with alternative schemes will we know the effects on income distribution, fertility, and the costs of alternative programs.

VI. The Politics of Population Policy

In recent years there has been a significant expansion in the number of countries which have official policies to reduce population growth rates or support family planning activities for other than demographic reasons. Table XII shows positions taken by governments of developing countries by region. Part of the increase in interest in population policy may be the result of increased funds available for population programs and pressure by aid donors. For the most part, however, the adoption of policies has come about for more fundamental reasons:

1. New estimates of exceedingly high rates of population growth,
2. Surveys showing that substantial numbers of women (and men) want more information about controlling fertility and want to limit their family size,
3. High abortion rates,
4. Increased awareness that development plans have been frustrated by rapid rates of population growth, and
5. Demonstration effects of other countries adoption of population programs.

There are still countries without policies and in countries with policies the level of resources devoted to population programs is less than might be desirable. Opposition to, or lack of support for, population policies arises from many motives. Among them are:

1. Equation of population size with power,
2. A belief that in some countries that uninhabited areas "offer limitless opportunities for colonization -- and that one of the major obstacles to taking advantage of these conditions is the shortage of people." (Clinton, 1972, p. 99),
3. A belief that development must proceed and will induce reductions in population growth,
4. Religious conviction that fertility control is immoral,
5. Fear of charges of genocide by internal opposition,
6. Nationalism, and
7. Ideology.

Nationalism as a source of opposition to population limitation assumes many forms. First, in some countries there is concern with populating boundary areas against encroachment by neighbors. (Clinton, 1972, p. 100). Second, some individuals are persuaded that developed countries, particularly the United States' concern about population growth, is construed to be an attempt to preserve the LDC's natural resources for their (the developed countries') own use. And in Latin American countries, some "do not want to believe that they have a population problem precisely because the United States is foremost in insisting that they have one." (Clinton, 1972, p. 100)

There is also ideological opposition from the left. Some contend, as did Marx, that concern with population is merely a ploy to disguise the true sources of under-development and social ills. Others believe that a revolutionary transformation of society is a prerequisite for development and that population pressure will hasten the revolution.

Given the sensitivity to population questions in some countries, donors should beware of overselling population policy. For the same reason, it is probably desirable to funnel aid for population policy through multi-lateral agencies. Involvement of personnel from LDC's with active population policies is also desirable. Where there is opposition to family planning programs, donors might concentrate aid in infra-structure which might be used for population programs, especially those pertaining to maternal and child health. Assessing demographic parameters and training indigenous demographic researchers is also part of long-run formulation and promotion of population policy.

VII. Summary

This paper has attempted to summarize existing knowledge on the relationships between population policy and income distribution. It has been argued that high rates of fertility and patterns of differential fertility prevalent in LDC's tend to lead to less equal size distributions of current and future incomes. Rapid rates of population growth also impede the attainment of higher levels of per capita (and perhaps aggregate) income and frustrate the accomplishment of almost all other goals such as improvements in nutrition, education and health of the population.

Examination of the benefits and costs of fertility limitation programs indicates that benefits significantly exceed costs when income distribution aspects of such programs are ignored. Analysis of traditional family planning programs supports the conclusion that on balance the benefits are larger the lower is income except that the very lowest income and education groups are underrepresented among consumers of family planning services. Two reasons for the underrepresentation are lack of demand by low income groups and the tendencies for program facilities to be located in urban and higher income areas. Greater use of paramedical personnel in programs and more reliance on commercial channels may widen the population served by family planning programs. As a possible alternative, tax and positive incentive schemes were examined. Although only limited evidence is available for positive incentive schemes, it appears that they may be successful in inducing increased demand for fertility limitation by low income groups and distribute income towards them. Tax schemes or negative incentives are likely to be

difficult to administer and may have adverse distributional consequences.

Although this paper has concentrated on programs immediately directed towards fertility limitation, it must not be forgotten that determinants of fertility involve a whole complex of factors not included in family planning or incentive programs. Education, health care, female employment, and social insurance are also important. While there is no catalogue of necessary and sufficient conditions for fertility decline, all of these factors are to some degree related to fertility and are important in attaining a sustained fertility decline. In short, a population program is no substitute for development, but it should be an important component of a development program.

Table I. Demographic Characteristics of Selected
Less Developed Countries

	Date	Crude Birth Rate*	Crude Death Rate*	Growth Rate*	Date	Expectation of Life
<u>Africa</u>						
Total	1965-71	47	21	26	1965-71	43
Algeria	1965-70	49	17	32	1965-70	51
Cameroon	1971	50	26	24	1965-70	41
Ghana	1965-70	47	18	29	1965-70	41
Kenya	1971	50	17	33	1969	49
Nigeria	1971	55	25	30	1965-66	37
United Arab Republic	1971	35	13	22	1961	54
<u>Asia</u>						
Total	1965-71	38	11	27	1965-71	50
India	1965-70	43	17	26	1951-60	41
Iran	1971	48	16	32	1965-70	52
Korea (South)	1971	31	9	22	1965-70	62
Phillipines	1971	47	16	31		
Singapore	1972	23	5	18	1965-70	68
Taiwan	1971	24	5	19	1965-70	50
Thailand	1971	41	11	30	1960	55
<u>Latin America</u>						
Total	1965-71	38	10	28	1965-71	60
Brazil	1971	41	11	30	1965-70	61
Chile	1971	27	9	18	1969-70	63
Colombia	1971	43	11	32	1969-70	63
Costa Rica	1972	32	6	26	1962-64	63
Mexico	1971	44	11	33	1965-70	62
Peru	1971	44	15	29	1965-70	54

SOURCES: United Nations (1973), Table 3, pp. 133-139.

Nortman (1973), Table 1, p. 19, and Table 4, pp. 22-31.

* Measured as births, deaths, and natural increase per 1,000 population.

TABLE II Costs per Birth Averted and Costs per Contraceptive Acceptor
in Various Family Planning Programs

1. India (1969-70):

Average for all States: Rs. 153.66
Range: Rs. 83.55 - Rs. 288] Cost per Birth Averted

2. Philippines (1967-71):

Cost per Acceptor \$9.55
Cost per Birth Averted \$7.72

3. Singapore (1971):

Recurrent Cost per Birth Averted (in 1971 US\$)

Oral \$37.23
Condom \$14.70
IUD \$17.64
Other \$22.86
All \$29.72

4. Cost per Acceptor - Various Countries (in 1970 US\$)

Korea (1961) \$ 6.70
Singapore (1963) \$ 3.61
Taiwan (1963) \$ 4.00
Mauritius (1969) \$20.47
Hong Kong (1950) \$ 8.47
Iran (1967) \$ 5.93
Thailand (1968) \$10.60
Colombia (1968) \$12.70
Tunisia (1969) \$39.00
Ceylon (1966) \$10.15
Philippines (1970) \$14.50

5. Cost per Acceptor: (in 1969 US\$)

Korea (1969) \$ 8.25
Taiwan (1969) \$ 5.00

SOURCE: Various sources.

Table III. Population Policies

A. Persuasive Policies

1. Propaganda to encourage couples to reduce fertility or promoting small family ideals
2. Promotion of female labor force participation
3. Encouragement of breast-feeding

B. Price Policies

1. Provision of contraceptive information
2. Subsidies for contraceptive devices, sterilization, or abortion
3. Payments for the practice of contraception (e.g., vasectomy bonuses)
4. Payments for periods of non-pregnancy or for child-sparing
5. Withdrawal of maternity benefits after N children
6. Withdrawal of family allowances after N children
7. Taxes on births or removal of tax deductions for children
8. Provision of only N years of free schooling to each nuclear family
9. Contributions to pensions varying inversely with family size

C. Coercive Policies

1. Minimum legal age of marriage
2. Required abortion for illegitimate pregnancies
3. Legal sanctions against abortion, sale of contraceptive devices, or provision of contraceptive information
4. Restrictions on the import of contraceptive materials

Table IV Hypothetical Annual Rates of Pregnancy and Death Risks with Contraception and Legal Abortion per 100,000 Women of Reproductive Age in Fertile Unions*

	Pregnancies	Deaths
1. No contraception, no abortion	40,000-60,000	8-12
2. No contraception, all pregnancies aborted	100,000	3
3. Highly effective contraception, no abortion	100	3
4. Moderately effective contraception, no abortion	11,800-13,000	2.5
5. Moderately effective contraception, all pregnancies aborted	14,300	0.4

SOURCE: Tietze and Davison, 1973, p. 47.

* Assumes low maternal mortality.

Table V. Percent of Women Who Have Had One or More Abortions by Socio-Economic Status

Country or Sub-National Area	Year of Survey	Socio-Economic Indicator	% Women With Abortion Experience	
1. Chile: Santiago, Quinta Normal district ¹	1962-63	<u>Education:</u>		
		Illiterate	27	
		-	33	
		-	41	
		-	24	
		4 years secondary or more	26	
2. Korea, Republic of: Seoul, Sung Dong Gu ²	1963	<u>Education:</u>		
		No school	17	(16)*
		-	23	(31)*
		-	30	(39)*
		-	35	(60)*
		College or more	37	(80)*
3. Korea, Republic of: Yongi Gun (rural) ³	1965	<u>Education:</u>		
		No school	4	
		-	6	
		Middle school or more	8	
4. Peru: Lima ⁴	1964	<u>Class:</u>		
		Lower	45	
		-	33	
		Upper	35	
5. Taiwan ⁵ :	1966	<u>Education:</u>		
		Low	9	
		-	14	
		High	18	

Country or Sub-National Area	Year of Survey	Socio-Economic Indicator	% Women With Abortion Experience
6. Taiwan:			
Taichung ⁶	1962-63	<u>Education:</u>	
		No school	8
		-	17
		-	18
		-	17
		Graduate senior or more	28

Source: Moore-Cavar (1974), 387-389

* By completion of childbearing, age 40-44

1. 448 working class women of fertile age
2. 3,204 currently married women 20-44
3. 2,084 currently married women age 20-44; random sample
4. 500 Peruvian-born upper-class women; area cluster sample
5. 4,989 married women 20-44, random probability sample
6. 2,432 women 35-39

Table VI Total and Per Capita Funds for Family Planning Programs by Major Source of Funds

Country and Year	Amount of Funds (in \$1,000)					Annual Per Capita Budget (U.S. cents)	
	Government	International Agency	Foreign Government	Private Organization	All Sources	Government	All Source
Bangladesh (Fy 1972)	3,200	800	0	0	4,000	4	5
Dominican Republic (1972)	80	u	24.6	74	178	1.9	4.1
Fiji (1971)	157	u	u	u	157	29	29
Ghana (Fy 1972)	391	6	u	165	562	4	7
Guatemala (1973)	34	517	0	105	656	0.60	12
Hong Kong (1972)	249	133	u	73	455	6.0	11.1
India (Fy 1972)	86,590	u	u	u	u	15.3	u
Indonesia (Fy 1972)	5,663	4,000 ^a	- ^a	u	9,663	4.6	7.9
Iran (1972)	9,000	1,600	u	96	10,696	29	35
Jamaica (Fy 1971)	1,090	u	u	u	u	56	u
Kenya, South (1972)	3,470	550	1,112	450	5,582	10.4	16.7
Lesotho (1972)	u	6	500	28	534	u	17
Malaysia, West (1973)	1,060	u	u	u	u	11.1	u
Mauritius (Fy 1972)	673	215 ^a	- ^a	0	888	81	107
Morocco (1972)	347	u	u	u	u	2.2	u
Nepal (1970)	85	u	305	u	390	1.8	2.6
Pakistan (Fy 1969)	u	u	u	u	22,405	u	17.2
Philippines (1972)	1,331	0	4,500	160	5,991	3.4	15.6
Qatar (1973)	1,012	0	0	225	1,237	6.6	8.1
Sri Lanka (1973) ^c	1,900	1,400	1,000	700	5,000	4.8	14.0
Tanzania (1973)	278 ^d	819	543	u	1,640	5.2	30
Turkey (1972)	u	u	u	u	1,797	u	4.8

Source: Nortman (1973), Table 17, pp. 89-91

- Notes:
- Any foreign government allocation is included under international agencies
 - Prior to independence of Bangladesh
 - Includes an estimate of personnel and facilities contributions of the health network to the family planning program
 - Includes only the direct monetary costs of the program. Does not include contributions of health program into which the family planning program is integrated
 - Unavailable

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Table VII Users of Family Planning Services by Source of Supplies^a

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Country and Year	All Sources		Program Supplies and Services		Private Sector Supplies and Services	
	Number of Users (1,000's)	Users as a Percent of Married Women Aged 15-44	Number of Users (1,000's)	Users as a Percent of Married Women Aged 15-44	Number of users (1,000's)	Users as a Percent of Married Women Aged 15-44
Egypt (1973)	1,015	20.7	776	15.8	239	4.9
Fiji (1973)	26.8	33.4	23.2	28.9	3.6	4.4
Guatemala (1973)	44	3.8	31.9	2.7	12	1
Hong Kong (1973)	235	52	113	25.2	122	27.1
India (1973)	u	u	13,861	13.6	u	u
Indonesia (1972)	u	u	850	3.3	u	u
Iran (1971) ^b	>403	>9.5	328	7.6	u	u
Kenya (1971)	45.4	2.2	45.4	2.2	u	u
Malaysia, West (1973)	u	u	123.5	9.3	u	u
Mauritius (1972)	24.6	21.2	19.5	16.8	5.0	4.3
Mexico (1973)	910	13.1	66.5	1.0	843.5	12.2
Morocco (1973)	126.5	5.6	48.0	2.1	78.5	3.5
Nepal (1971)	u	u	59.9	2.5	u	u
Pakistan (1971) ^c	2600	12	2,600	12	u	u
Philippines (1973) ^d	563	11	563	11	u	u
Singapore (1973) ^e	49.9	18.3	49.9	18.3	0.0	0.0
Taiwan (1973)	1,120	58	530	27	590	30
Thailand (1973)	1,284	25.7	883	17.7	401	8.0
Tunisia (1973)	u	u	45	6.4	u	u
Turkey (1973)	u	u	160	2.5	u	u

Source: Nortman (1973), Table 16, pp. 85-88

- Notes:
- a. Includes Sterilization
 - b. Includes only IUD's and oral pills
 - c. Prior to the independence of Bangladesh
 - d. Most private supplies and services are provided by clinics that receive financial support from the government, and acceptors at these clinics are reported in the program data. Private use through other channels is considered too low to affect the total.
 - e. Includes only oral pills and sterilization
 - u. Information unavailable

Table VII Distribution of Benefits of Family Planning Programs

1. Philippines (Jan.-June, 1970):

<u>Education</u>	<u>Acceptors</u>	<u>Married Women 15-44</u>
None	1.4%	13.2%
Grades 1-4	17.0	32.0
Grades 5-7	36.8	32.6
High School 1+	26.8	14.7
College 1+	18.0	7.5
<u>Occupation of Husband</u>		
White Collar	18.9	14.8
Blue Collar	50.2	12.5
Farmer-Fisherman	24.6	60.9
Other	6.3	11.8

2. Lagos, Nigeria (1971)

	<u>No Formal</u>	<u>Education Primary only</u>	<u>Secondary and More</u>
Acceptors	38.7%	37.6%	23.7%
KAP Survey	56.9	28.5	14.6

3. Howrah District, India (1968-70):

<u>Education</u>	<u>Urban</u>		<u>Area</u>		<u>Rural</u>	
	<u>Clinic</u>	<u>Eligible</u>	<u>Clinic</u>	<u>Eligible</u>	<u>Clinic</u>	<u>Eligible</u>
Illiterate	23.9%	41.0%	68.3%	46.4%	59.7%	70.4%
Literate but below primary	32.4	11.7	10.5	14.6	19.9	8.8
Primary	26.7	30.8	11.3	18.6	14.7	15.7
Middle ⁺	16.4	16.4	9.9	20.4	5.9	5.0

4. Costa Rica (1970):

<u>Income</u>	<u>Attended Clinic</u>	<u>Did not attend Clinic</u>
<100	65.8%	34.2%
100-399	65.4	34.6
400-699	53.7	46.3
700-999	48.1	51.9
1000 ⁺	35.1	62.5

Sources:

1. Philippines: Laing (1971).
2. Nigeria: Morgan (1972)
3. India: Majumdar, et al. (1972)
4. Costa Rica: Michielutte, et al. (1973)

TABLE IX Contraception and Maternal Mortality per 1,000,000 at Risk by
Level of Health Care

	No Contra- ception ^a	Condom/ Diaphragm	IUD	Oral Con- traception
A. Maternal Mortality of 250 per 1,000,000 Births				
1. Pregnancies in any year	600,000	150,000	35,000	20,000
2. Deaths				
Due to pregnancy	150	38	9	5
Due to method	0	0	10	30
Total deaths	150	38	19	35
	No Contra- ception ^a	Other Methods ^b	IUD	Oral Con- traception
B. Maternal Mortality of 5,000 per 1,000,000 Births				
1. Pregnancies in any year	400,000	112,000	22,000	26,000
2. Deaths				
Due to pregnancy	2,000	560	110	130
Due to method	0	0	10	30
Total deaths	2,000	560	120	160

SOURCE: Atkinson, *et al.*, 1974, Table 1, p. 244.

- NOTES: a. Pregnancy rates with no contraception assume prolonged breast-feeding in countries with maternal mortality of 5,000 per 1,000,000 births.
- b. "Other Methods" include condom (70 percent), spermicides, diaphragms, and a small number of Depo-Provera acceptors.
- c. These figures are approximations and the differences between IUDs and oral contraceptives are not of statistical significance.

Table X Tax and Incentive Programs

1. Singapore: elimination of priority for large families in the allocation of subsidized housing, limitation of paid maternity leave to two children, scaling of delivery fee by parity, and reduction of income tax relief from five to three children, lower priority for choice of primary school admission for children of fourth birth order or higher, and waiver of delivery fees if the husband or wife elects sterilization after the last birth. (August 1973)
2. Philippines: tax relief for dependents restricted to four persons (March 1972), paid maternity leave which employers must grant to women employed for more than one-half year is limited to the first four deliveries (March 1973).
3. Taiwan: experimental program in one township establishing free bank deposits earmarked for redeemable education certificates. Enrolled women with no more than three living children receive annual deposits to the account. Entries plus interest can total \$385 after 14 years for couples with two or fewer children or \$192 for couples with three children. Couples with four children are dropped from the plan. (September 1971).
4. India:
 - a. vasectomy and female sterilization bonuses in sterilization campaigns in Gujarat and Ernakulem.
 - b. payment of vasectomy bonus to workers in Tata industrial firms. (September 1967-March 1970).
 - c. an experiment on a tea estate with payments into individual savings accounts for periods of nonpregnancy, to be paid out when the woman reaches age 45. The payment is viewed as a form of social security in place of children.

Table XI The Tata Incentive Program

<u>Percent of Factory Workers Adopting Sterilization</u>		
<u>Monthly Income</u> (Rupees)	<u>High Incentive</u> (3988 workers)	<u>Low Incentive</u> (3872 workers)
Less than 200	10.6%	3.3%
201-500	9.3	6.2
501-1000	6.4	7.6
More than 1000	4.0	5.9

Source: Simon (1974), Figure 18, p. 103.

Table XII

Number of countries and distribution of the population in the major regions of the developing world, by government position on population growth and family planning activities: 1972

Government position ^a	All developing countries	Africa	Latin America ^b	Asia and Oceania ^c
All positions	118	47	29	42
Official policy to reduce the population growth rate	31	7	6	18
Official support of family planning activities for other than demographic reasons	28	9	14	5
Balance: no policy to reduce the growth rate and no support of family planning activities	59	31	9	19
	1972 population (in millions)			
All positions	2,678	363	273	2,042
Official policy to reduce the population growth rate	1,970	79	34	1,857
Official support of family planning activities for other than demographic reasons	341	146	121	74
Balance: no policy to reduce the growth rate and no support of family planning activities	367	138	118	111
	Percent distribution of population			
All positions	100	100	100	100
Official policy to reduce the population growth rate	74	22	12	91
Official support of family planning activities for other than demographic reasons	13	40	44	4
Balance: no policy to reduce the growth rate and no support of family planning activities	13	38	44	5

Source: Nortman (1973), Table 3, p. 21

Notes:

- a. Government positions are based on the latest information available, and population data are estimates for 1972. For a full description of the criteria used to classify government positions and the problems encountered, see Nortman, (1973).
- b. Includes the Caribbean area plus Central and South America, but excludes Argentina (24 million) and Uruguay (3 million), both of which have low fertility.
- c. Excludes Japan (106 million) and Israel (3 million), which have low fertility. Includes Melanesia, Polynesia, and Micronesia in Oceania (4 million).

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