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ESSAYS ON THE ECONOMICS OF FERTILITY, POPULATION
GROWTH AND PUBLIC INTERVENTION IN A DEVELOPING
COUNTRY: THE PHILIPPINES

by

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ABSTRACT

The issue of population growth and economic development is now close to a generation old. Population policy in most developing countries is, however, only slightly over a decade in duration and its impact is just beginning to be felt. Like an adolescent that is experiencing growing pains, the population program calls for renewed guidance in its future course. There is a need to clarify certain ambiguities among policymakers, scholars and the public in general about the relationships between population growth and socio-economic development. Likewise, there is a need to review the population program in terms of the underlying rationale of public intervention, as well as in terms of its performance during the past decade with a view to identifying what might be fruitful directions in the 1980s. The essays in this volume are designed to contribute to an enlightened discussion of issues surrounding the population and development concern in the Philippines and more generally in developing countries.

INTRODUCTION

It is now twelve years since the Philippine government adopted a national population policy. In this span of time, the population program, whose initial thrust was the promotion of family planning, has attained some level of respectability. In this same period, the fertility rate appears to have perceptibly declined. Although it is difficult to quantify precisely the relative contribution of the family planning program to this decline, available evidence strongly suggests that it has had an appreciable impact on contraceptive prevalence and, hence, on fertility.

In 1978, a Special Committee was created "to evaluate policies and programs related to population in the context of the overall development goals of the country, and to prepare, deliberate on and recommend program and policy directions in the population for the future" (Letter of Instructions No. 661). The recommendations of the Special Committee have provided the basis for the current thrust of the country's population policy.

Since 1978, more data and information on fertility and program performance have become available. A review of the population program's performance during the last decade, with attention to the more recent period, is thus possible with the aim of identifying what might be fruitful directions during the 1980s. In addition, there is a need to reassess the rationale and nature of government intervention in the sphere of human fertility in light of past experience so that the government's continuing commitment to the population concern may stand

on firmer ground. Finally, there is a need to clarify what seem to be lingering ambiguities among policymakers, scholars and the public in general about the relationships between population growth and socio-economic development. The essays in this volume are written in response to these needs.

In general, the Philippine family planning program was instituted in response to the perceived adverse consequences on economic development and national welfare of prolonged rapid population growth. Consequently, in these essays we review the developmental and welfare implications of rapid population growth and examine the welfare economics of government intervention. These are done in Parts I, II and III. Within the context of this perspective, we attempt to examine the performance of the population program. Specifically, we review the empirical evidence on the determinants of fertility in an attempt to indicate the relative effectiveness of family planning service programs versus more general development in influencing fertility behavior during the past decade. In addition, we review the trends in specific indicators of program performance in order to indicate the effectiveness of alternative family planning interventions in the Philippines. These are done in Part IV.

It is hoped that these essays can contribute towards an enlightened discussion of the rationale and nature of government intervention in the fertility decisions of couples, as well as of questions regarding the cost-effectiveness of alternative types of family planning interventions.

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Part I

ECONOMY-WIDE CONSEQUENCES OF RAPID POPULATION GROWTH

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Part I

ECONOMY-WIDE CONSEQUENCES OF RAPID POPULATION GROWTH

by

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Arithmetically, the rate of growth of GNP per capita is simply the difference between the rates of growth of population and GNP. At first glance, it seems obvious, therefore, that for a given rate of increase of GNP, a higher rate of population increase implies a lower growth rate of GNP per capita. As President Marcos said in his speech at the recent International Union for the Scientific Study of Population meeting in Manila regarding the undue strains that population-related problems were putting on the foundations of Philippine society:

"Of course, when your economic growth rate as reflected in your Gross National Product is, say, only five percent, and your population growth rate is three percent, well, you realize immediately what population planning means."

The relationship between population and economic growth is more complicated than the above illustrative argument. The complication arises because population growth can directly or indirectly stimulate or depress the growth of total output. For this reason, it is necessary to examine the nature of the processes through which population growth can influence the growth of aggregate output and examine their relevance to the current Philippine situation.

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1.1 A Review of the Macroeconomic and Demographic Interactions

The idea that population growth tends to slow down the growth of GNP per capita essentially rests on the following arguments:

1. As a larger stock of labor is applied to fixed factors such as land (natural resources), marginal productivity falls and hence, output per worker.
2. Assuming that the saving rate (defined as the ratio of savings to GNP) is unchanged, capital deepening slows down, i.e., growth of physical and human capital per worker will tend to be relatively slower with a more rapid growth of population.
3. The saving rate itself could fall as the proportion of resources required to feed, clothe, and educate the young increases with the rise in dependency ratio due to the combination of high fertility and low mortality.

An argument against the notion that population growth results in a relatively lower growth of GNP per capita centers on the hypothesis that the aggregate production might in fact be characterized by increasing returns to scale. This, for example, is the position of Colin Clark. That the aggregate production function may be characterized by increasing returns to scale in labor, capital and natural resources at least up to a certain point has long been discussed in the economics literature and is the basis of the traditional optimum population theory.

Economies of scale could arise from a number of sources. One is the indivisibility of certain types of overhead capital such as the transportation system, communication or information system, some defense systems and others. Production on a large scale may permit a more efficient utilization of underemployed factors inputs (Clark 1967; Phelps 1972; Kelley 1972). Economies of scale in the transport system in particular, improvements of which went hand in hand with growth of population size, appear to have played a very important role in the development of industrialized nations. Fishlow (1965), for example, stressed the importance of population growth on the development of the antebellum American railroad system, which in turn has contributed significantly to the US economic development. Kelley (1972) further claimed that the expansion of population size in the 19th century continued to facilitate the extension and improvement of the transport system and transport cost as market size expanded. In England, Habbakuk (1963) has pointed out that the population growth which led to the attainment of a certain density of population made it worthwhile to create and improve transport facilities, which in turn induced a more rapid rate of economic progress.

Another important source of scale economies is the increased diversification and specialization between firms which occur when the market reaches a certain substantial size. This process of vertical disintegration of industry, which has been highlighted by Stigler (1951) and earlier by Young (1926) is believed to have played an important

role in industrial development (Fabricant 1963; Kelley 1972; Habbakuk 1963; Rosenberg 1963). Kelley cited two interesting cases that relate market size and the development of the textile manufacturing and the machine tool industry.

Technical economies or increasing efficiency derived from increasing division of labor and specialization within firms provide yet another source of scale economies. In a case study of the iron and steel industry, Temin (1964) found that individual firms in 19th century America experienced substantial technical economies. It seems to be the consensus, however, that these economies are generally exhausted by firms of moderate size (Demery 1965a; Kelley 1972; Jewkes 1963).

Most economists have expressed strong doubts about the relevance of the assumption of increasing returns to population increases in LDCs, many of which including the Philippines are already densely populated and are short of complementary capital inputs. A mere increase in population in these countries, it can be plausibly argued, is not likely to result in market expansion because of their relatively low per capita incomes (Myint 1972; Jones and Selvaratnam 1972; King 1974; Demery 1965a). In this regard, Phelps (1972) has remarked in connection with the study of population and the American future that the assumption of constant returns to scale in capital and labor is evidently for a frontier economy in which land, water, air and other natural resources can be obtained freely or at least at a non-increasing cost. Since such a situation does not exist

(as is the case in the Philippines) and aggregate output is characterized by constant returns to scale in labor, capital and land (natural resources), then it is likely that growing amounts of labor and capital with fixed supply of natural resources will encounter diminishing returns. Putting it differently, additional new capital and labor to existing stocks will be devoted to exploiting poorer and less accessible natural resources and raw materials which may therefore be considered to be less productive than previous stocks. Consequently, this fixity of natural resources will be a drag on economic growth. As economic history shows, this drag can be overcome by natural resource augmenting technological progress. Technological progress, however, is not costless and is quite unpredictable. Significantly large amounts of economic resources have to be allocated to invention and innovation-producing activities to augment the amount of useful natural resources or maintain the environment. For these reasons, it does not seem wise to assume increasing returns to scale in analyzing the consequences of population growth.

The question, however, arises whether population growth might have a significant positive influence on technological progress.

One factor often cited to explain the rapid technological change in the West is population growth. There are a number of ways other than those relating to scale effects in production through which population growth has been linked with the pace of technological progress. Since it is generally agreed that technological change

accounts for a large proportion of the growth of output of industrialized countries in the past, the hypothesis that population growth may stimulate technological change is of utmost importance in discussing the effect of population growth on economic development.

Habbakuk (1963) contended that in the past the abundance of cheap labor supply provided by population expansion has stimulated capital widening in Europe and, hence, increased the opportunity of trying out new production methods. Consequently, population growth may have "led to a more rapid absorption of existing technical knowledge and, therefore, increased the chances of making further technical progress (Habbakuk 1963, p. 614). In neoclassical models of economic growth in which technical progress is partly embodied in new capital goods, the age distribution of the capital stock is an important determinant of its total productivity. Nelson (1964) has shown that the average age of capital stock, which approximates the rate of embodiment, is related to the rate of gross investment. In turn, Habbakuk and other economists have contended that the rate of gross investment is influenced by population growth. Tamin (1966), for instance, has claimed that the slow rate of gross capital formation, which has resulted in the disappointing pace of British per capita output growth in the latter part of the 19th and the beginning of the 20th century, was due in part to the slow rates of population growth.

Another linkage between technological progress and population change relates to the connection between demand, profitability and intensiveness of the search for better methods of production. Population

growth, insofar as it increases market potential and profitability of at least certain industries, may influence the rate and direction of inventive activity. Citing the historical experience of Europe, for example, Habbakuk (1963) has argued that though population growth "diminished the incentive to search for improvements which saved labor, it stimulated search for those which saved on natural resources" (p. 614). A number of studies suggest that inventive activity is influenced by profitability which is associated with variations in final demand. The view of stagnationists like Hansen regarding the consequences of declining population on capital widening is well known. In mature economies, population growth is said to have a formidable effect on investment insofar as it helps maintain an adequate flow of demand (see Cornwall 1972; Keynes 1936). In this connection, Kelley, (1972) after reviewing the pertinent literature, concluded that there is evidence to support the view that population growth may stimulate inventive activity by raising its profitability. He also concluded that the rate at which new techniques can be incorporated in production would tend to vary directly with the rate of population growth.

The crucial assumption behind the above discussion is that population growth expands aggregate demand. Many economists seriously doubt the relevance of this assumption to LDCs like the Philippines. A mere increase in population in these countries, as earlier pointed out, is not likely to result in a significant market expansion because

of their low per capita incomes (Myint 1972; Jones and Selvaratnam 1972; King 1974; Deweny 1965a). Population can increase very fast but effective demand may not increase correspondingly. Moreover, the size of the domestic demand is unlikely to be a very restrictive constraint in a small country, for as long as it has an open economy whose incentive structure does not unduly penalize the export sector. A good example of this is Singapore and Hongkong.

Population growth has also been linked to technological progress through the so-called "challenge and response" mechanisms. Clark and Boserup, claiming that population pressure may induce a favorable adaptive behavior, contended that population growth stimulates labor-intensive agricultural improvements and raises the productivity of land. Easterlin (1967), Kelley (1974), and Adams (1971) have emphasized the possibility that a larger number of dependents may press family members to look harder for ways of increasing income. To quote Easterlin, "population pressure arising from mortality reduction may provide the spur to work harder, search information, increase capital formation, and try new methods" (p. 104). Hirschman (1957) has advanced the hypothesis that a community reacting to defend its standard of living threatened by population growth is strongly motivated to control and improve its environment; a rapid population expansion may pressure government to be efficient, undertake the necessary socioeconomic reforms, formulate better plans and implement them more vigorously. Boserup's historical study tends to support her hypothesis. In this connection, Mueller (1973) observed that

the experience of a number of economies appears to be consistent with the Clark-Boserup hypothesis. Specifically, she said that "Japan fits this model in the sense that population pressure was a major reason why the government as well as individual farmers were highly motivated to develop, disseminate, and accept new methods of cultivation. For Taiwan and the Punjab the model is also applicable, but less consistently so, because they received important agricultural innovations from foreign countries" (p. 428). She also cited China as another case in which population pressure appears to have been the main engine of agricultural growth in the past.

Conclusions based on Boserup's study need some important qualifications. Population pressure may have resulted in an increase in output per acre but not necessarily output per capita. In this regard, Mueller observed that in none of the countries she cited were "labor-intensive investments sufficient to maintain the productivity of the rapidly growing supply of agricultural labor". Furthermore, she pointed out that nowadays the new and highly productive approaches to agricultural development require large amounts of purchased inputs, which means that it is now more important for farmers to economize on family expenditures than to have many household workers.

Furthermore, Tangri (1970) has pointed out that, as it is, LDCs seem to have more than enough poverty and scarcity of resources to spur them into action; in many of these countries, the prospect may not be greater constructive action but greater despair or

alternatively greater turmoil. Ranis (1963) found Hirschman's arguments peculiarly unconvincing in labor surplus economies and considered Western (possibly, Latin American) challenge and response mechanisms inappropriate. On the contrary, he asserted that further increase in population growth may lead to apathy rather than creativity. Demeny (1965a) has also pointed out that even if one accepts that "some population pressure is useful, it does not follow that more population pressure is more useful" (p. 69).

Productivity is said to be influenced by the age distribution not only of physical capital but also of labor and human capital. It is claimed that the younger age and skill composition of the population brought about by a higher rate of growth tends to raise average productivity. The assumption is that young adults are more inclined to take risks, better able to absorb new knowledge and are more creative than the old. Leibenstein (1972) argued that:

If education and other forms of human capital are given only to the young prior to entry into the work force, and its quantity increases over time, then the greater the rate of population growth, other things being equal, the greater the rate at which human capital increases. In a stationary population, the increase in the economic quality of the labor force would depend only on the rate of increase of human capital given to each successive generation. But in a growing population, the entrants more than replace the retirements and the average economic quality of the population would be higher than in the stationary population. Of course, the significance of this factor would have to be determined empirically, but its existence should be taken into account in any list of counter balancing effects of a growing population (p. 60).

Leibenstein's analysis has been criticized for his assumption that the amount spent by a family on the per capita human capital of children is unaffected by family size. Hoover (1972) found this assumption dubious. In LDCs like the Philippines, it may well be that an increase in family size would result in relatively lower human capital per child. Government per capita expenditures on education and health may be depressed because of rapid population growth. Furthermore, very high fertility appears to be negatively related with the nutritional status, IQ, and school performance of children, a topic which will be discussed in greater detail in Part II of this study.

In an interesting study of the ages at which Nobel Prize winners did their prize-winning work, Sweezy and Owens (1974) found that the age distribution was Gaussian with a mean of 32.2 and a standard deviation of 7.6 years. Using the 1967 U.S. mortality tables to analyze the effect of changes in the age distribution of a hypothetical population growing at different rates (-1.0 percent to 3.0 percent per year) on creative scientific activity, they further found that "the relative per capita probability of Nobel-quality work in physics has a broad maximum from zero to 1.5 percent per year growth but falls off rapidly for growth less than -0.5 and more than 2.0 percent per year" (p. 49). They, therefore, concluded that there is no justification for fears that slow or zero population growth would have a stultifying effect on scientific creativity. "One reason for

the common misapprehension on this score," they pointed out, "is the failure to realize that a growing population is 'young' primarily because so many of its members are under twenty" and that "the proportion in the crucial age groups - crucial as indicated by Nobel Prize winners in physics is relatively insensitive to changes in growth rates from zero to 1.5 percent per year" (p. 49, underscoring supplied). Although this study was limited to physics only, they argued that there is a strong presumption that youth is more important in physics than in most other fields. In this regard they pointed out that the average ages of Nobel Prize-winning work progresses from younger to older as the research becomes more applied - physics (36), chemistry (38), medicine and physiology (41).

The relation between technological progress and population expansion has also been viewed from the supply side of inventors and innovators. This approach, which was popularized by Kuznets (1960), assumes that the rate of technical progress varies directly with the number of persons working on technological problems. Assuming that sufficient amount of resources for training and education is available and that the number of gifted individuals is some fixed proportion of the total population, Kuznets (1960) has argued that "population growth ... would produce an absolutely greater number of ... generally gifted contributors to knowledge" (p. 328) and hence, stimulate the pace of technological change. In qualifying his analysis, Phelps admitted that:

The supposition that the rate of labor augmentation is a constant overlooks the fact that technical progress requires people to create and implement it. There can be no doubt, I think, that a slowdown of population growth will reduce somewhat the rate of technical progress simply by reducing the sheer number of people engaged in producing technical change (Phelps 1972, p. 83).

Kuznets has further hypothesized and strongly asserted that there could be increasing returns in the production and application of knowledge in response to an expanding population base. The rationale for his hypothesis lies in the fact that knowledge is interrelated and creativity appears to vary directly with the density of the intellectual atmosphere presumably because of lower costs of communication in dense environments. Because of the interdependence of knowledge, a finding, invention or innovation generated by an enlarged number of people engaged in the production of technological improvements would increase the likelihood of further discoveries, i.e., an expanding knowledge base would tend to enhance the capacity of society to acquire further knowledge about nature. As Kuznets observed, "greater knowledge of physics and progress in both of these contributes to greater knowledge of physiological and biological functions ... even new devices in social engineering in one field (for example, corporate organization) facilitate new organizational devices in other fields (for example, credit instruments)" (Kuznets 1960, p. 328-329). The assumptions behind Kuznet's hypothesis are very restrictive. As Kuznets himself has pointed out, his arguments implied a theory of production of knowledge in which more intensive

training could not be substituted for a smaller number of persons. Furthermore, he assumed that the additions to population will be as well equipped, educated and trained as the population already existing. Kuznets doubted the relevance of this assumption in LDCs. But even for developed countries, Hoover (1972) considered this assumption difficult to accept. In particular, he said that, "perhaps most of the potential exceptional creative talent born into the world never comes to fruition because of insufficient support, and more effective investment in human resources per capita is likely to be more productive than is the imposition of a larger load on the capacities of our educational system".

We shall now examine the relationship between population growth and the rate of saving.

Discussions on the effect of demographic processes on the savings rate have centered on the dependency burden (see Demeny 1965a; Coale and Hoover 1958; Barlow 1967; Enke 1971). The argument that increased fertility would negatively affect the savings rate is usually illustrated by considering two countries with the same number of persons who are economically active and endowed with the same level of production and technology. It is then argued that the country with more dependents will have a lower average propensity to save because of its larger consumption needs. At the household level, given the same family income and number of economically active persons, families with a larger number of dependents to support will tend to

save less than families with fewer children (Coale and Hoover). In short, since additional children increase consumption needs without raising income, they would reduce society's potential for saving.

Demeny (1965a) has pointed out a number of circumstances under which the negative effect of higher dependency rate may be achieved or even offset. First, there may be economies of scale involved in supporting a larger family. Second, the potential savings from reduced consumption needs may be very small, and may not be realized at all because families may be merely substituting one form of consumption for another, e.g., "necessities" for "luxuries" (Sinha 1973; Bilsborrow 1973). Additional children may be born as a result of a couple's decision to have more offsprings in preference to other consumption possibilities (see Becker 1960; T.W. Schultz 1974). One can thus imagine a situation in which couples opt to have additional children but less leisure, and more work or working hours. In this case, the savings rate will possibly remain unaffected or may even increase (Kelley 1973a; 1973b).

Sinha (1973) and Bilsborrow (1973) argued that the actual effect of a decline in fertility on the aggregate savings rate may not be significantly large since the bulk of savings is accounted for by the top 1 or 2 percent of the population. Gupta (1971) hypothesized that the effect of dependency on savings will be felt only after a certain income threshold has been attained. Income

levels in LDCs may be so low that they barely provide for subsistence living and, hence, leave no margin for savings. This may be so even for those without dependents. Having more dependents under this situation simply means the sharing of poverty.

Since savings is partly the result of a decision to provide for future contingencies, a larger number of dependents may induce parents to save more. Demeny (1965a) has pointed out, however, that as savings is oriented towards meeting future expenses, savings and dissavings will tend to cancel out. Nevertheless, he recognized the possibility that "if the acts of saving and dissaving are separated by a substantial time period and if these acts are closely correlated with age, age distribution differences will affect the average savings ratio for the whole population" (Demeny 1965a, p. 15). In an analysis of households at various stages of their wealth accumulation and decumulation programs, Nordhaus and Tobin (1970) observed that the nation's savings rate will be decreased by fertility reduction insofar as it changes the age distribution of the population towards the early low-wealth years and the late low-wealth years.

It has been argued that since a decrease in population growth tends to increase labor's share in national income, the aggregate savings rate could fall (Kelley 1974; Kelley, Williamson and Cheetham 1972a, 1972b). Isbister (1973), however, has pointed out that while in the long run such might be the case, in the intermediate run, fertility reduction would tend to decrease food prices, depress industrial

wage, raise profit in the modern sector and, hence, increase the aggregate savings rate.

It is also argued that fertility reduction may positively affect the savings rate to the extent that government must increase its consumption expenditures to meet additional demands on health, education, administrative and other welfare services (Ruprecht 1967; Hoover and Perlman 1966; Jones and Selvaratnam 1972). The treatment of the relationship between population and government consumption varies. However, it is generally assumed that there is some kind of fixed relationship which is usually determined mechanically. Ruprecht (1967), for instance, in his economic-demographic model of the Philippines, assumed that there was a constant ratio of current government expenditures on health (education) to population (school-age children). Cassen (1973) argued that in principle, it is up to the government to allocate its resources as it sees fit and simply allow the gap between desirable and actual provision of services to widen. He, therefore, concluded that although population growth should lead to larger government expenditures to meet the needs of the people, the rate of increase may be slower or faster depending on such factors as availability of funds and perhaps more importantly on the orientation of the political leadership and the bureaucracy. Cassen also pointed out that, insofar as part of these social expenditures can be considered productive investments, estimates of the impact of population growth on savings and per capita income may be biased upwards.

Finally, Demeny (1965a) noted that, although fertility reduction may increase the nation's capacity to save, its actual savings rate may not rise because of low investment demand caused by various factors among which are demographic ones. Conversely, it has been argued that insofar as population growth increases the size of the market and, hence, investment opportunities and demand, fertility reduction may have some offsetting positive effects on the rate of capital formation. Furthermore, it has been noted that an enlargement in the number of dependents or a rise in the dependency rate not only increases consumption but also raises income. In this connection, it has been said that most analyses overestimate the impact of fertility reduction on the savings/income ratio because they ignore the positive effects of increased dependency on incomes (Kelley 1974, 1973b; Kuznets 1960, Adams 1971). In the light of our previous discussion, however, about the mechanisms through which population growth can stimulate economic growth, it would appear that these arguments are not very convincing for LDCs like the Philippines.

Good evidence on the effect of family size on savings rate is scarce, and empirical analysis of the impact of the dependency burden is hampered by inadequate data (Mikesell and Zinser, 1973). The limited results, however, of several empirical microeconomic studies, including two in the Philippines (which will be discussed in greater detail in Part II) tend to suggest that, controlling for income, the correlation between family size and savings is negative. Goldsmith,

Brady, and Menderhausen (1956) reported the elasticity of consumption with respect to family size to be about $1/6$. Eizenga (1961) found the negative impact of fertility on savings to be relatively small. Interestingly, he observed that savings appear to increase with one and two children. Henderson's (1949/50) study also showed that while the impact of family size on the composition of consumption is substantial, its effect on total expenditures is small, suggesting that families tend to simply substitute one form of consumption for another. Power (1971) and Mangahas (1974) revealed that family size does have a significant positive effect on household consumption in the Philippines. In an oft-cited cross-national study of 74 countries, Leff (1969) concluded on the basis of his regression estimates that youth dependency depresses the savings/income ratio. In a comment, however, on Leff's article, Gupta (1971) has raised the issue that in very low-income countries, the coefficient of the dependency ratio does not appear to be significant, a finding which he claimed was consistent with his "poverty-sharing" hypothesis discussed earlier. Incidentally, the Philippines does not belong to this set of very low income countries. Hence, the negative effect of dependency might be operative in the Philippines. It is quite possible, however, that Leff's estimates may be biased because dependency (fertility) and savings rates may be simultaneously related. It can be argued, for instance, that if saving in financial institutions becomes a cheaper way of providing for future needs, parents may raise their savings rate and reduce their reliance on children as old-age security. Consequently, they

may reduce their desired number of children. The correlation observed by Leff could therefore indicate a causation that goes from savings rate to fertility.

This consideration suggests that in analyzing the relationship between savings and fertility, both variables should be treated as endogenously determined. Such an approach is consistent with current developments in the theory of household behavior and may yield better insights, especially in LDCs where children are said to be a form of "social security" or "saving" for future contingencies.

In conclusion, it would appear from our review of the literature that while in principle there are mechanisms through which population growth can positively influence aggregate output, the proposition that rapid population growth is likely to be a drag on the growth of GNP per capita is more plausible under the present circumstances in the Philippines.

It would appear, however, that there is no simple correlation between growth rates of population and of income per capita. Easterlin (1967), Kuznets (1965) and Chesnais and Sauvy (1973) failed to find any statistical relation, whether positive or negative, in various samples of developing countries, while Conlisk and Huddle (1969), Hanson (1973) and Thirlwall (1972) reported a slight positive relation. This finding does not contradict the proposition that population growth tends to slow down economic growth. Considering that there are other important factors that determine economic growth of nations, a simple correlation analysis might not reveal the effect of

population growth. More importantly, the analysis is subject to severe simultaneity bias. The reason for this is that higher rates of growth of GNP per capita are likely to induce a more rapid rate of growth of population because, for example, of a more rapid decline in mortality rate. Studies have shown that life expectancy is highly correlated with GNP per capita. This could account for the slight positive correlation between the growth of population and of income per capita.

1.2 Some Aspects of the Macroeconomic Consequences of Fertility Reduction in the Philippines

It is difficult to directly test the effect of rapid population growth on the growth of GNP per capita in the Philippines. One can, however, make a strong case on the basis of bits and pieces of evidence and common sense that a policy for lowering rapid population growth through fertility control is likely to promote faster economic development.

Earlier, it was argued that, since the Philippines is already highly densely populated and has a very low per capita income, economies of scale from a much larger population is likely to be unimportant at present and in the near future. Empirical support of this contention can also be gleaned from the following aggregate production function which we estimated on the basis of time series data from 1956 to 1981:

$$(1) \quad \text{GNP} = 10.7564 + .1371 \ln \text{GKAP} + .6801 \ln \text{PKAP} +$$

(9.26) (11.74)

$$.2134 \ln \text{EMP}$$

(1.83)

$$\bar{R}^2 = .998$$

$$\text{DW} = 1.03$$

where GNP is gross national product in real terms GKAP is public capital stock (e.g., public infrastructure); PKAP is private capital stock and EMP is number of employed persons. It is interesting to note here that the sum of coefficients (excluding the intercept) is very close to unity, which suggests that the aggregate production function might well be characterized by constant returns to scale. Including another major input like energy could decrease the sum total of the coefficients of these three inputs. Since the sum of the output elasticities with respect to capital and labor is close to unity, we estimated a Cobb-Douglas production function with constant returns to scale:

$$(2) \quad \ln \text{GNP/EMP} = 1.4103 + .1416 \ln \text{GKAP/EMP} + .7096 \ln \text{PKAP/EMP}$$

(11.66) (30.06)

$$\bar{R}^2 = .991$$

$$\text{DW} = .998$$

From this equation, the rate of growth of GNP per worker can be expressed as:

$$(3) \quad R_1 = .1416 R_2 + .7096 R_3 - .8512 R_4$$

where R_j is the rate of growth of variable j (1 = output per worker, 2 = public capital stock, 3 = private capital stock and 4 = number of workers). The above equation suggests that ceteris paribus a percentage point decrease in the rate of growth of the employed labor force will result in .85 percentage point increase in the rate of growth of labor productivity measured by output per worker. This implies that a lower fertility will result in a relatively greater GNP per capita both in the short run and in the long run.

An analysis of Philippine time series data suggests that fertility reduction will likely raise the savings rate defined as the ratio of domestic savings to GNP. Using multiple regression analysis, the following results were obtained:

$$\begin{aligned}
 (4) \quad \ln \frac{SAV}{GNP} &= 4.638 + .2305 \ln \frac{TAX}{GNP} \\
 &\quad (2.34) \\
 &+ .7237 \ln \frac{GNP}{POP} - 1.5959 \ln DEP \\
 &\quad (4.69) \quad (2.86) \\
 \bar{R}^2 &= .969 \\
 DW &= 1.81
 \end{aligned}$$

where SAV = domestic savings, TAX = total taxes, POP = total population and DEP = persons 0-14 years old as a percentage of total population. The equation above implies that the saving rate increases with per capita income. Consequently, fertility reduction is likely to increase the savings rate as population growth slows down. Furthermore, equation 4 above suggests that as the

number of young dependents declines as a percentage of total population as a result of fertility reduction, the savings rate tends to rise.

With few exceptions, the major source of income of poor households is labor earnings either through wage employment and/or self-employment. Consequently, the level of poverty in a country critically depends on the condition of the labor market.

Although there are imperfections in the Philippine labor market, it is largely competitive and reasonably "well functioning," (see Lal 1979). Therefore, it is reasonable to assume that through a competitive process, the interaction of supply and demand for labor determines the level of employment and real wage.

In general, real wage tends to fall when ex-ante supply of labor increases faster than ex-ante demand. Between 1957 and 1976 the real wage rate declined by nearly 50 percent for both urban (Manila) and agricultural laborers (see Table 1.1). This suggests that ex-ante demand for labor tended to grow at a slower rate than ex-ante supply. In a situation of mass poverty and in the absence of a state-supported unemployment insurance system, the fall in real wage will induce some family members to cut short their search (or waiting) for better job opportunities and "force" them to accept low wage employment or low productivity self-employment such as retailing. In support of this hypothesis is the observation of the World Bank poverty report that, except in transport, labor productivity as measured by value added per worker in the service sector stagnated

Table 1.1 Real Wage Rate Index, 1957-78
(1972 = 100)

	Manila and suburbs		Agricultural laborers
	Skilled laborers	Unskilled laborers	
1957	135.7	113.4	145.7
1958	135.6	110.3	139.6
1959	139.5	112.2	143.9
1960	133.4	107.9	143.4
1961	131.2	108.8	130.9
1962	125.5	105.9	133.0
1963	122.3	105.6	119.1
1964	115.1	98.6	112.2
1965	115.2	102.7	121.7
1966	114.9	104.8	127.2
1967	113.1	103.2	124.3
1968	119.4	112.1	110.2
1969	123.3	115.2	112.3
1970	114.4	111.6	111.8
1971	105.1	104.1	97.9
1972	100.0	100.0	100.0
1973	92.4	90.0	n.a.
1974	75.6	72.8	91.2
1975	72.7	72.9	n.a.
1976	71.2	72.3	n.a.
1977	72.9	70.4	n.a.
1978	76.1	68.4	n.a.

Note: Real wage rate indexes have been derived by deflating money wage rates/indexes by the CPI for Manila and suburbs and the Philippine CPI for agricultural laborers.

Source: World Bank (1980) Table 3.2, from the Central Bank and Bureau of Agricultural Economics.

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during the period 1957-76 and even declined in the case of commerce and "other" services. Hence, although open unemployment rate appears to have declined over time, it does not necessarily mean the "tightening" of the labor market. Under a situation of low and falling real wage, the decline in open unemployment rate can indicate a deterioration in the labor market condition as argued above.

It is difficult for real wage to rise in the Philippines partly owing to the rapid growth of the labor force, which has been growing at 3.0 percent over the past decades, a percentage point higher than the average growth rate of 2.0 percent in developing countries. The growth rate of the labor force in the recent past, which parallels that of the working-age population, reflects the very high fertility prevailing in earlier years.

While a high rate of population growth significantly contributes to the difficulty of raising real wage rates, it is by no means the only factor. Past government policies have inhibited the growth of employment in the manufacturing and export sectors and tended to bias the incentives structure of the economy in favor of capital intensive industries and production techniques. Well known examples of these policies are tariff protection, licensing of imports, artificially low interest rates and fiscal incentives that favor the use of capital (see Bautista et al. 1979). Inflation is another factor that has contributed to the decline in the real wage rate.

That real wage rate depends on the rate of inflation as well as the competitive forces of supply and demand for labor can be gleaned from the following regression equation:

$$\begin{aligned}
 (4) \quad \ln RWAGE &= .0282 + 1.0386 \ln RWAGE_{-1} \\
 &\quad (27.0) \\
 &\quad + .9192 \ln \frac{FEMP}{LSP} - .0092 RINF_{-1} - .0021 RINF \\
 &\quad (3.49) \quad (-9.31) \quad (-2.21) \\
 \bar{R}^2 &= .984 \\
 DW &= 1.57
 \end{aligned}$$

where: $RWAGE$ = real wage rate index (the subscript (-1) means that the variable is lagged one year)

$RINF$ = the rate of inflation

$FEMP$ = demand for labor: the number of employed persons in full time equivalent.

LSP = labor force

As one might expect, the variable $\frac{FEMP}{LSP}$ has a significantly positive coefficient. This means that, holding rate of inflation constant, an increase in the demand for labor ($FEMP$) relative to supply (LSP) tends to raise the real wage rate.

Two of the likely determinants of poverty in the rural areas are farm size and the agricultural labor productivity. This is discussed in the World Bank poverty report and Part II of this paper. Since population growth is an important determinant of farm size and agricultural productivity, fertility reduction will most likely facilitate government efforts to reduce rural poverty.

A study of Pernia et al. (1981) of the determinants of provincial agricultural productivity in 1960 and 1971, measured by value added in agriculture per worker (Q/L), strongly suggested that ceteris paribus increases in labor force can depress output per worker. Tables 1.2 and 1.3 show that there is a significant positive correlation between Q/L and size of farm land per 100 workers (S/L). In addition, Q/L is also positively correlated with number of tractors per 10,000 workers.

The World Bank poverty study of the Philippines noted that out of the increase of 4.5 million persons in 1970-75, about 3.8 million were added to the rural population. As a result, the ratio of net cultivated land to agricultural population fell from .32 ha. in 1970 to .30 ha. in 1974. In 1960, the ratio stood at .37 ha. It further noted that the increase in population relative to arable land combined with inheritance customs might have resulted in continued subdivision of farms, probably increasing the percentage of population dependent on small farms.

The rise in the man-land ratio is expected to accelerate in the near future as room for expansion has become very limited. Most of the remaining uncultivated lands are those of poor quality located in upland and remote areas. Hence, the private and social costs of bringing these lands under cultivation are likely to become increasingly high and the returns low. A substantial part of the social cost of such an expansion will likely include increased deforestation, soil erosion, siltation and flooding.

Table 1.2

DETERMINANTS OF PROVINCIAL AGRICULTURAL
PRODUCTIVITY (Q/L), 1960

	R E G R E S S I O N R U N			
	1 ^a	2	3	4
Constant	-42.298	-27.299	-102.009	-65.834
S/L	2.054 (3.800)	2.080 (3.843)	2.164 (3.966)	2.118 (3.936)
PI	2.345 (1.983)	2.512 (2.267)	1.947 (1.593)	2.376 (2.143)
T/L	0.424 (3.261)	0.292 (2.431)	0.305 (2.539)	0.381 (3.382)
P6			0.044 (1.089)	
LOG R/H	53.352 (1.844)	47.804 (1.679)	48.449 (1.722)	55.390 (1.979)
URB		1.733 (1.319)	2.164 (1.579)	
SUC	-31.253 (-0.719)			
MUC	-18.824 (-0.493)			
RUC	-70.515 (-1.551)			-66.560 (-1.540)
BRUC	-10.781 (-0.146)			
R ²	0.499	0.486	0.499	0.492

Source: Pernia *et al.* (1982)a/ Regression run no. 1 is in double log form.b/ t-values are in parentheses underneath regression coefficients.c/ The following are the definitions of the notations used
in Tables 1.1 and 1.2

(Table 1.2 Continued)

$\frac{Q}{L}$	= agricultural output per worker (in pesos);
$\frac{S}{L}$	= size of land in hectares per 100 workers;
$\frac{R}{H}$	= weighted kilometers of roads per 10,000 hectares;
FI	= proportion of total farm area under irrigation;
$\frac{T}{L}$	= tractors per 10,000 workers (representing the degree of farm mechanization);
P6	= proportion of farms fragmented into 6 parcels or over;
URB	= level of urbanization (proportion urban) of the total provincial population;
SUC	= secondary urban center, 1 for presence and 0 for absence;
MUC	= major urban center, 1 for presence and 0 for absence;
RUC	= regional urban center, 1 for presence and 0 for absence;
BRUC	= broad regional urban center, 1 for presence and 0 for absence.

Table 1.3

DETERMINANTS OF PROVINCIAL AGRICULTURAL PRODUCTIVITY (Q/L), 1971

	R E G R E S S I O N				R U N	
	1	2	3	4		
Constant	-284.647	-5.235	11.860	-20.882		
S/L	5.868 (6.184)	5.263 (6.208)	5.177 (6.250)	5.419 (5.987)		
FI	3.649 (1.704)	3.249 (1.602)	2.802 (1.405)	3.330 (1.546)		
T/L	0.921 (3.76)	1.085 (5.280)	1.122 (5.449)	1.053 (4.604)		
F6	0.548 (1.986)	0.627 (2.399)	0.625 (2.388)	0.642 (2.372)		
LOB R/H	70.481 (1.421)					
SUC	-43.573 (-0.609)			-25.776 (-0.362)		
MUC	25.341 (0.391)			25.143 (0.383)		
RUC	114.980 (1.480)		123.645 (1.665)	134.433 (1.738)		
BRUC	32.536 (0.256)			77.878 (0.626)		
RUC/BRUC		113.955 (1.710)				
R ²	0.705	0.687	0.700	0.691		

Note: t-values are in parentheses underneath regression coefficients.

Finally, fertility reduction can also contribute towards the alleviation of urban poverty. This is suggested by the following regression equation:

$$\text{POVTY} = -.31.46 + 9.24 \text{ HH SIZE} + 1.08 \text{ DEPCY}$$

(1.89) (1.54)

$$\bar{R}^2 = .15 \qquad N = 39$$

where POVTY = percent of households below the poverty line; HH SIZE = household size measured as the ratio of population to total number of households; and DEPCY = dependency rate defined as the percent of population below 18 years old.

The above equation has been estimated on the basis of provincial level data. Not all provinces were included as income data for some were not readily available. The income data were estimated from the 1975 NCSO family income survey, while the demographic variables were calculated on the basis of the 1975 Census. The equation above applies to the urban sector. It suggests that, holding dependency rate constant, a decrease in average household size is likely to be associated with a 9.24 percentage point reduction of provincial poverty rate. Dependency rate is also positively correlated with poverty rate, although it is only marginally significant. The above equation provides only suggestive evidence largely because of the problem of simultaneity. For various reasons, the observed correlation might only be capturing the effect of poverty on fertility behavior -- average family size is high because of poverty!

Another aspect that must be considered in reviewing the economic consequences of fertility reduction is its impact on the ability of government to provide public services. Two important examples that will be cited here are education and health services. According to the current 1983-1987 Philippine Development Plan, the government intends to provide health services worth ₱ 35.50 (in 1980 prices) per person. Table 1.4 shows the difference in total government health expenditures under the high, medium and low population projections of the development plan. Using these three alternative population projections, we also estimated the "required" public education expenditures. In making these projections, the following assumptions were made: (1) the enrolment rates estimated for 1981 will be maintained; (2) the proportion of students that will be absorbed by the public sector is 90 percent, 46 percent and 10 percent of the total elementary, high school and college enrollees, respectively; (3) in 1980 prices the public cost per student per year are ₱265, ₱465, and ₱2,660 for elementary, high school and college, respectively.

The projected values for education are likely to be underestimates. Government plans for education are likely to result in increases in real cost per student due to efforts to upgrade the quality of public education as well as accessibility of schools, which would probably result in high enrolment rates.

Table 1.4

PROJECTED GOVERNMENT EXPENDITURES FOR PUBLIC HEALTH AND EDUCATION: 1980-2000
(In millions, 1980 Prices)

Year	Total Government Expenditures on			Total Government Expenditures on			Savings/Difference Between High and Medium Projections		
	Education		Total	Education		Total	Health		Total
	High	Medium		High	Medium		Health	Education	
1980	1714	2287	4001	1714	2287	4001	-	-	-
1981	1757	2308	4065	1757	2308	4065	-	-	-
1982	1801	2333	4134	1800	2333	4133	1	-	-
1983	1846	2362	4208	1843	2362	4205	3	-	1
1984	1892	2397	4289	1886	2397	4283	6	-	3
1985	1938	2438	4376	1929	2438	4367	9	-	6
1986	1985	2486	4471	1971	2486	4457	14	-	9
1987	2032	2535	4567	2013	2535	4548	19	-	14
1988	2080	2579	4659	2055	2577	4632	25	2	19
1989	2128	2626	4754	2095	2618	4713	33	8	27
1990	2176	2673	4849	2135	2654	4789	41	19	41
1991	2224	2732	4956	2173	2684	4857	51	48	60
1992	2272	2778	5050	2211	2710	4921	61	68	99
1993	2320	2823	5143	2248	2729	4977	72	94	129
1994	2369	2866	5235	2284	2744	5028	85	122	207
1995	2418	2910	5328	2320	2754	5074	98	156	254
1996	2466	2949	5416	2354	2754	5108	112	195	307
1997	2515	2982	5497	2387	2747	5134	128	235	363
1998	2563	3013	5576	2419	2735	5154	144	278	422
1999	2612	3044	5656	2449	2718	5167	163	326	489
2000	2660	3071	5731	2479	2696	5175	181	375	556

*The data for single years age-specific population corresponding the high and medium population projections of the Philippine Development Plan 1993-1997 were provided by Dr. Luisa Engracia.

Stated in terms of present values (with 1982 as present), the total amount of difference in health and education expenditures in 1980 prices is equal to ¥847.0 million and ¥477.6 million at 10 percent and 15 percent rate of discount, respectively.

Obviously, government expenditures for health and education are not the only public cost that would rise with population increases. Expenditures for public safety will also have to increase. Similarly, general government expenditures will have to rise. It was mentioned earlier that all of the above costs need not automatically rise with population increases. That would certainly depend on the budgetary decisions of the government. However, if as a result of population growth rate and budgetary decisions, per capita public expenditures fall, it is likely to lead to a deterioration of public services for health, education, public safety, etc.

1.3 Concluding Remarks

The preceding analysis suggests that, should government decide to actively encourage couples to reduce their fertility for certain reasons (to be discussed in Part III of this study), such an effort, if successful, will likely facilitate the attainment of its objective of raising per capita income, reducing poverty and providing better public services. The arguments against such a view are less plausible. These arguments largely maintain that (1) population pressure is good for the economy because it challenges the human spirit to be more diligent, efficient and creative;

(2) population growth increases aggregate demand and, hence, stimulates production and investment. For purposes of public decisions, these hypotheses must be given little weight for the following reasons. First, given the mass poverty in the Philippines, the rising expectations and the urgent need to telescope the development process which historically took many decades, there is more than enough pressure on families and the public sector. Second, an increase in population per se does not necessarily result in the enlargement of effective aggregate demand in a low-income country. And, if indeed the lack of potential demand is a problem in the Philippines, government can effectively stimulate domestic aggregate demand through appropriate international trade, fiscal and monetary policies. It might be noted here that a major advantage of relying on these policies to stimulate demand rather than on population increases is that they are more flexible. When an unanticipated inflationary pressure develops, expansionary monetary and fiscal policies can be reversed relatively easily. In contrast, a policy that encourages population growth to maintain adequate aggregate demand does not have this flexibility. Population size is difficult to reduce once it has increased. The additional consumers cannot (and should not) be done away with, while the internal dynamics of demographic processes is expected to generate a momentum for population growth.

In a recent paper, T.W. Schultz (1979) has pointed out that the decline in mortality in LDCs, which has resulted in rapid population growth, contributes significantly to the national development of these countries. It is true that in itself mortality reduction represents a substantial increase in national welfare. It is also plausible that it encourages parents to spend more resources on human capital (quality) formation and promote better long-term planning.

These arguments, however, do not necessarily imply, as some might be tempted to infer, that a more rapid population growth per se is better for economic development. For, one can argue that more benefits from the reduction in mortality in the long run can be gained, if population growth adjusts downwards as a result of fertility reduction. Schultz did not contradict this view which is held by most economists and demographers, many of whom he correctly accused of being too pessimistic and wrong in their economic analysis of population growth in developing economies. In fact, the essence of his arguments against this pessimism is that eventually, as a rational response of parents to declining mortality and the resulting changes in the structure of incentives (e.g. regarding quantity vis-a-vis quality of children), fertility rate will tend to adjust downwards by itself. The issue, therefore, for population policy is not whether a decline in population growth rate will be beneficial for economic development. Rather, the issue is the need and extent of public intervention in the procreative decisions of couples.

In the preceding sections, we have argued that a "spontaneous" reduction of fertility in the Philippines will most probably raise per capita GNP both in the short run and in the long run. But we have not yet dealt with the question regarding the economic returns relative to public investment in fertility control. This issue, which has been addressed by Paqueo (1977), is difficult to answer as hard data on the effectiveness of public investment in birth control are not available. Consequently, the answer to this question can only be rough, tentative, and partial.

In that study, an estimate of the gains in per capita GNP relative to the per capita cost of birth control was derived through an economic-demographic model to which family planning sub-model was grafted. The results are presented in Table 1.5. They suggest that the gains can be very substantial especially in the long run.

It should be made clear, however, that a closer look at the nature of the payoffs from the family planning program reveals that the gains basically stem from the decrease in the number of persons sharing in national output and not from increased production and saving. This observation suggests that population control does not necessarily lead to more rapid economic growth defined as sustained increase in total output. This interpretation should, of course, be qualified by the fact that many causal processes whereby family planning could enhance productivity and capital (human and material) formation are not included in the model. Nevertheless, it clearly

Table 1.5

GAINS IN PER CAPITA OUTPUT
RELATIVE TO THE PER CAPITA COST OF POPULATION CONTROL*

	1971-75	1976-80	1981-85	1986-90	1991-95	1996-2000
1. Δy^*	0	11	44	75	98	118
2. FPC	5	3	3	3	3	3
3. $\Delta y^*/FPC$	0	3.67	14.67	25.0	32.67	39.33

Sources: V. Paqueo (1977)

Definitions of Symbols:

- (a) Δy^* is the difference between the average annual output per capita of projections a (with a "moderate" family planning program) and b (without the program).
- (b) FPC is the average annual family planning program expenditures per capita (projection b).

points to the fact that the family planning program is not a substitute for sustained economic development. Other measures are needed for such an objective to be attained. Nevertheless, the contribution of public investment in birth control to raising per capita GNP, wage rate, and family income is projected to be substantial and should not be ignored.

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Part II

MICRO-LEVEL IMPLICATIONS OF POPULATION GROWTH

by

*Ernesto M. Pernia**

If as yet there is insufficient awareness of the macro consequences of population growth, there seems to be even less sensitivity to its micro-level implications. Policy interest in the consequences of population growth on income distribution and poverty is relatively recent, perhaps because the issue used to be considered as a concern of households that is outside the sphere of public intervention. There is increasing recognition, however, of the view that if human resource development is not only an objective in itself but also an essential instrument for other policy objectives, then governments must look into how demographic change impinges on it.

There is a growing body of empirical research regarding the effects of demographic change on income distribution and poverty. The evidence that has accumulated thus far tends to be supportive of the hypothesis that population growth in the context of today's developing countries is antithetical to, or at least retardant of, both the natural and deliberate process of income distribution and poverty alleviation.

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The purpose of this paper is to discuss the ways in which continued rapid population growth in the Philippines affects welfare at the family level, and then point out what might be useful implications for policy. We first present a brief theoretical review of the subject, followed by a discussion of empirical evidence from the international literature and from Philippine materials. We then take a look at the regions to see how high fertility would tend to exacerbate the situation of the disadvantaged areas and socioeconomic groups. In the concluding section, we try to draw what might be some food for thought for policy.

Income Distribution and Poverty

In LDCs some parents are so poor and with practically no formal education to speak of that their fecundity is impaired on account of inadequate nutrition. The more general case, however, is that low-income families are larger than high-income ones, even allowing for higher mortality among the former. The natural result is a distribution of consumption that is worse than the distribution of family incomes (Boulier 1977). There may be attenuating forces such as economies of scale in household consumption, additional work effort on the part of parents, and productive contribution of children net of their consumption needs. But these countervailing effects of family size do not seem to be large enough to matter (Cassen 1976). Moreover, if small families are in a better position to take advantage of such

income-improving avenues as education, migration and labor-market mobility, large families would be in a worse relative income position.

The extended family system that is quite common among poor households especially in rural areas may work for or against better income distribution.¹ If the arrangement enables the family to earn in excess of its requirements and thus accumulate physical wealth and capital, it can be better off. But, if the opposite is the case, the institutional arrangement can lead to a further deterioration of income distribution. Casual evidence seems to bear out the latter more than the former case.

The simple intergenerational effect of family size is via parents' income which is a key determinant of an individual's income. Since poor parents have more children than the rich, unequal distribution of income is transmitted intergenerationally by differential fertility. Cassen (1976) adds: "There are more complex intergenerational effects, such as those that operate through property inheritance -- if several children can inherit property, then those with more children will divide their property into smaller fractions; and if they have less property to start with, or worse, if their property is diminished by

¹In the Philippines, nuclear families seem to be the norm in rural areas in terms of living arrangements, but the extended family system insofar as economic arrangements are concerned are prevalent.

sale in their lifetimes while that of the rich increases by purchase, there will be a tendency for the distribution of property to become more unequal over time -- and therefore probably, the distribution of income also" (p. 811).

Population growth can also cause significant changes in the functional distribution of income by raising rents and profits relative to wages. Such alterations in turn invariably worsen personal and household income distributions, given the preponderance of wage-earners (Sirageldin 1975, Boulier 1977). Then, too, persistent excess labor supply over demand necessarily keeps wages from rising in absolute terms. In the Philippines there has been a sustained decline in real wage rates by as much as 40 percent for skilled, unskilled and agricultural workers from the late 50s through the late 70s (Table 1). Moreover, as land becomes scarce in agriculture, those with land ownership become increasingly wealthy relative to those who merely provide labor. Through investment in physical and human capital, the wealthy are further allowed upward social mobility.²

Finally, the pure demographic effect is worth noting. An increase in the proportion of low-earning young people, given an age-earning pattern, necessarily results in a higher measure of unequal income distribution (Sirageldin 1975).

²For evidence on the Philippines, see, e.g., Roumasset and Smith (1981).

Family Size and Welfare

Poverty incidence tends to rise with family size, and there is evidence on this relationship in the Philippines which appears to be monotonic (Tables 2 and 3).³ For instance, in 1971 only 8 percent of one-person families were below the poverty line, but the proportion poor was 25 percent for four-person families, 41 percent for six-person families, and 58 percent for 10-or-more-person families.

Poverty incidence was (and continues to be) more pervasive in rural than in urban areas, and there was a general increase in incidence for all family sizes from 1971 to 1975 (Tables 2 and 3). In 1975, poverty incidence was estimated at 9 percent for one-member families, 34 percent for four-member families, 52 percent for six-member, and about 65 percent for 10-or-more member families.

In 1971 and 1975, poverty incidence was below the average for up to five-person families and above the average for larger-size families.⁴ In 1975, families with six or more members accounted for just over one-half (52 percent) of all families, more than two-thirds (68 percent) of poor families, and roughly 80 percent of the poor population.

The fact that large families are generally poor has obvious implications for family welfare. Studies on the effects of high

³ Poverty incidence refers to the percentage of the population below the poverty line which is based on two criteria: the consumption basket of the "representative poor" and the "least-cost" consumption basket necessary to meet specified minimum needs. Per capita poverty line was estimated to be ₱500 for 1971 and ₱912 for 1975 (see World Bank 1980).

⁴ Average poverty incidence was 36 percent for 1971 and 45 percent for 1975.

fertility at the household level, though still sparse, document the adverse consequences for the family as a whole, for the mother and the child.

Household budget studies in LDCs typically show that the consumption basket tends to be heavily weighted by items that satisfy such basic human needs as food, clothing and shelter. For the average Filipino family about 78 percent of total expenditures are accounted for by these basic necessities, with food alone claiming over half of the total (Tan and Tecson 1974, Caballero 1978). The food share is higher in rural than in urban areas, and is also larger the poorer and bigger is the household (Valenzona 1976). Controlling for income, large families generally spend more than small ones -- putting into question the scale economies argument. The studies suggest that a smaller number of children would raise the saving propensity of low-income and rural families; alternatively, with less children a household could improve its consumption. Thus, increases in household consumption and savings are two important opportunity costs of children (Mueller 1972).

Two specifications on the relationship of family size to family expenditures were tested with FIES 1957, 1961 and 1965 data (Power 1971),

$$FC = f(FY, S)$$

and

$$FC/FY = f(FY/S, S)$$

where: FC = family expenditure, FY = family income, and
S = family size.

Regressions were run on data classified by family size, with categories 1, 2, ..., 9, 10 or more members, thus allowing 10 observations per regression. Separate runs were made for rural, urban, metropolitan and national. The second specification gave implausible results with negative income parameters.

The results of the first specification appear plausible, as shown in Table A. The marginal expenditure per person added to a family is about ₱ 107.5 (1965 prices), representing 4.3 percent of mean family income at the national level. This marginal expenditure is about 5.8 percent in rural areas, 2.5 percent in urban places, and

Table A. Family Expenditures as a Function of Family Income and Family Size

	1965 FIES: $FC = c + d FY + e S$						
	c	d	e	R^2	Means		e/mean
					FC	FY	FY
National	327.9 (11.2)	0.763 (11.2)	107.5 (6.6)	0.99	2818.5	2490.6	4.29%
Rural	249.6 (5.4)	0.748 (5.4)	102.4 (4.8)	0.98	2122.1	1750.4	5.82%
Urban	768.7 (10.7)	0.731 (10.7)	107.7 (4.4)	0.96	4452.0	4229.6	2.53%
Manila and Suburbs	1575.9 (8.6)	0.646 (8.6)	144.7 (2.6)	0.89	6560.6	6480.6	2.23%

Note: Figures in parentheses are t-values.

Source: Power (1971: 53 and 55).

2.2 percent in the metropolis. In effect, Power underscores the finding of Tan and Tecson (1974) by illustrating that the potential effect of reduced fertility on saving rate is more than double in rural areas.

To examine two processes by which family size affects family consumption level, Mangahas (1974) expanded on Power's effort. He omitted the open-ended (10 and over) family-size class, the numerical value of which Power did not specify. The nine-observation regressions result in smaller income coefficients and larger family size coefficients. An experiment was also done with the number of equivalent adults as a more refined measure of the scale of family consumption. Adult-equivalent family size is defined, in a similar manner as in the GE-TEMPO model, as

$$SAE = 0.75 S_1 + 1.00 S_2 + 0.50 S_3$$

where: S_1 = number of members below age 15, S_2 = number aged 15-64, and S_3 = number aged 65 and over. After adjusting for the FIES underestimation of income, the following regressions were run

$$FC = f(FY, S)$$

and

$$FC = f(FY, FY^2, S)$$

with the notations as defined above. The first specification gives generally better results. Marginal propensity to consume (MPC) is

estimated to be 0.71 in urban areas as against 0.96 in rural areas (compared with Power's 0.73 and 0.75, respectively). The family size effect is ₦105 in urban and ₦83 in rural areas (Power showed ₦108 and ₦102, respectively).

On the basis of his results, Mangahas argues that "increases in family size lead to increases in the family labor force and in turn in the number of working members of the family. The number of working members, in combination with the age of the household head, the education of the wife, and (in urban areas) the labor force participation of the wife, then determines family income. Obviously it takes 15 years for an increase in S on account of an infant to generate an increase in S_{15} , hence the timing of this process is quite different from that of the second process" (pp. 256-257). In the second process, "family size determines the number of equivalent adult members in the family. In combination with family income, this in turn determines the consumption level of the family... In about half of the trials, it was found that the marginal effect of family workers on family income may decline with the number of family workers" (p. 257).

Using benefit-cost analysis, Osteria (1972) estimates the value (in 1970-71 pesos) of a birth averted by the Philippine family planning program to range from ₱320 to ₱540. What this means is that for every 1,000 births prevented, some ₱320,000-540,000 worth of savings could be used to improve the health, nutrition and education services for those already born or invested in productive development projects. The benefit-cost ratio is in the order 3.3 at 10 percent rate of discount and 3.8 at 15 percent discount rate. The benefits are in the form of avoided expenses for food consumption, medical, educational, housing, clothing and other expenses, with food alone making up over 70 percent of the total and education accounting for 12 percent. The costs are in terms of foregone production and the provision of family planning services. The pitfalls inherent in benefit-cost studies must, however, be borne in mind in interpreting these estimates.

A large number of children in a family means frequent and narrowly-spaced pregnancies for the mother. Studies have shown that such a pattern of pregnancies, including the need to care for several children, is deleterious to the health of the mother especially if she belongs to a low-income family (see, e.g., Wray 1971, Birdsall 1977).

The effects of family size on children are also very important to consider. Studies in both developed and developing countries report the ill effects of large family size on children. For example,

infant and child mortality are positively correlated with family size while height of children for given ages seems negatively correlated with it; likewise, a large number of siblings along with close spacing of births result in low child intelligence (Birdsall 1977).

In Thailand and Colombia it was found that there is a greater likelihood for children in larger families to be malnourished (Wray 1971). In the Philippines, protein calorie malnutrition is most serious among infants and young children, with more than one-third (close to nine million ca. 1975) of preschoolers either moderately or severely undernourished. Three out of every four children are anemic, and about the same number, deficient in vitamin A. The damage to their physical and mental development would already be difficult to reverse (Paqueo 1976, 1979). It is very likely that the severity of malnutrition among children is further aggravated by the tendency of deprivation to fall more heavily on children as large families try to cope with economic hardships (Birdsall 1980).

Improvements in income and education, and lowering of fertility could reduce the prevalence of malnutrition among children, it is estimated, from about 31 percent in 1975 to 1.3 percent in the year 2000. These improvements could also reduce the cases of illness among the population. On account of population growth, however, the volume of monthly cases of illness could increase by roughly 60 percent

from 12 million in 1975 to 19.6 million in 2000 (Paqueo 1979). Young children aged 0-5 usually account for much of household total and acute cases of illness (Layo 1977).

A study on rural households in the Philippines shows that, on the average, the intake of children is adequate only with respect to iron (131 percent) but diet rating is as low as 55 percent (Valenzuela 1978). Sex differences in intake are significant only for protein and diet rating, with males doing better than females. Adults have the highest diet rating (61 percent) and adolescents the lowest (52 percent).

Another study on rural households focused on the determinants of nutritional status of preschoolers (Battad 1978). Education and income are found to be highly significant determinants, as would be expected. But mother's nutritional status also has a significant bearing on the nutritional status of children aged 6-23 months. By contrast, additional children aged zero to six years cause marked reductions in the weight rating of children two years old or over. Females appear more malnourished than males, and the working status of mothers is associated with lower nutritional status of preschool children.

Apart from family welfare aspects, the consequences of family size on children are also important in the social context because they

necessarily bear on the future of the economy and society. As Birdsall (1977) points out: "the loss of individual potential due to malnutrition or lack of educational opportunity can be translated into losses for a nation because of lower aggregate levels of labor productivity and lower stocks of entrepreneurial ability and technological innovativeness. Some of these losses are impossible to quantify; we can only note the contribution such factors have probably made to growth in the West."

Economic considerations are found to be prominent among the values and disvalues of children (Bulatao 1975). Three economic benefits appear salient, namely, assistance in old age, help in housework, and contribution to family income.⁵ Rural respondents usually allude to economic help while urban respondents tend to mention happiness for the parent or for the family. As regards economic costs, financial burden seems to be the most salient and central, and appears to be the strongest reason for limiting family size.⁶ However, on the whole, slightly more advantages than disadvantages of children were cited by the respondents in the survey -- an observation which may provide some explanation for the propensity to have many children.

⁵ Though salient, these benefits do not seem central. Salience connotes frequency of reference to the value, e.g., in conversation and the media; centrality has to do with closeness to a person's basic concerns.

⁶ "Emotional difficulties" (a vague concept) are also considered an important disadvantage in having children.

A more recent survey on fertility and value of children in Manila indicate that lower-income parents are more concerned about the financial costs of raising children than about the other disadvantages (Romero and Yapchiongeo 1982). By contrast, upper-income parents are less bothered about financial costs than about emotional costs and the restrictions children impose on their jobs, freedom and flexibility. In addition, all the mothers interviewed admitted to the practice of family planning to put an end to child-bearing, but only 55 percent use modern contraceptives while the rest resort to natural methods.

Time allocation studies are also revealing regarding the time costs of children. In Philippine rural households mothers are reported to spend, on the average, about 72 hours a week (10 hours a day) on both home and market production activities, with 80 percent devoted to home production and the residual going into market production (Jayme-Ho 1979). The presence of a young child (0-6 years old) in the family causes an increase not only in the mother's child care time but also in the time for food preparation and other home activities. Market production time decreases only slightly, but with a child 0-11 months, the increase in home production time and the decrease in market time are more marked. Having an infant entails an increase in mother's care time by over three hours per day (King-Quizon 1978). Older children (10 years or over) act as substitutes for the mother in the care of younger children and in other

home production work, but not in food preparation. Thus, it seems that age composition rather than number of children impinges more directly on the mother's time budget (Jayme-Ho 1979).

Another study using the same rural data set shows that the time cost is highest during the first two years of the child, decreasing sharply when the child becomes three-and-a-half years old, thereafter diminishing further till age 12 (Realubit-Mavera 1978). At ages 3-5 the child appears to start contributing economic time to the household although in negligible amounts only until age 10-11. By age 16-18, the child appears to have paid for his cumulated time costs and begins to contribute a net amount of four hours per day (see also Cabañero 1978). Children in the poorest income group contribute large amounts of economic time benefits relative to those in higher income households. Children in poor and large families spend more time in income-earning activities and less in home activities than their richer counterparts. Poorer children also invest less time in schooling than do richer ones.

An additional noteworthy finding of the studies on rural households concerns the relationship between mother's education and home production time (Realubit-Mavera 1978, Boulier 1976, Popkin 1976). An increase in education raises mother's home production especially child care time. This is probably the result of better knowledge about, and greater appreciation for, home management and child care --

facilitated by a higher wage for the husband (an effect of higher husband's education which is usually correlated with that of the wife).

Backward Regions and Social Groups

In the course of economic development it is inevitable that some regions and population groups lag behind others. According to one view, these disparities tend to widen first and then narrow after some time as the various regions and groups become increasingly interconnected and integrated into the national economy (e.g., Williamson 1965). The other view predicts the imbalances to become more pronounced and persist indefinitely as a result of backward and polarization effects (e.g., Myrdal 1957). Unfortunately, neither one nor the other view takes explicitly into account the population factor.

Because of rapid population growth in LDCs, the choice of which view to follow does not seem to be crucial to development policy. On the one hand, it would be unrealistic for policy to wait for the downward turn of the inverted U-shaped curve of the first view which could well be further delayed on account of population growth. On the other hand, with respect to the second view, policy intervention is likewise called for since population growth could further hasten

the perpetuation of inequality. In other words, policy has to confront in either case the upward slope of the inequality curve as well as the bearing population growth may have on it.

In the Philippines, certain regions have been lagging behind the rest for most of the postwar period (see Pernia, Paderanga, Hermoso et al., forthcoming). These backward regions by most socioeconomic indicators include Ilocos, Bicol and all three Visayas regions, to name only the most persistent ones. They have also been experiencing high rates of natural increase which would have substantially increased the pressure on their resource-poor lands if not for the safety valve of outmigration to the other regions, principally to the National Capital Region and the Mindanao regions. For instance, during the 1970-75 interval, net outmigration rates from the Ilocos, Bicol and Central Visayas represented from about one-third to nearly one-half of their natural increase; putting it differently, these regions would have grown by approximately 50 to 100 percent more if there were no outmigration (Table 4).

But outmigration and backwardness appear to have become a vicious circle -- people leave the regions because of depressed conditions and the regions remain depressed because of persistent outmigration particularly of the young and educated, who would presumably have been the more able and ingenious members of the communities which

they left.⁷ Given its selective nature, outmigration does not seem to have effectively eased the population pressure in the backward regions. Instead, gross population density and farm density have been rising in these regions (Table 5) because their fertility rates were high and have declined relatively slowly (Table 6). For instance, while fertility fell by as much as 39 percent in Metropolitan Manila, 30 percent in Central Luzon and 25 percent in Southern Luzon over the period 1960-1975, it dropped by only 13 percent in Bicol, 15 percent in Eastern Visayas and 20-22 percent in Western and Central Visayas.

Poverty incidence was above the national average and particularly striking in Bicol, the Visayas regions and Northern Mindanao in 1971 and 1975 (Tables 7-8).⁸ For example, in 1975 the percentage poor ranged from 48 percent in Western Visayas to about 73 percent in Northern Mindanao, and it was higher in rural than in urban areas in most regions. The largest concentration of poor people were in the heavily settled regions of Southern Luzon, Western and Central Visayas, all together constituting over one-third of the total poor.

⁷To illustrate broadly this point, during the period 1965-73 alone it is estimated that some 6.6 million "person-years of schooling" (PYS) were lost by the rural sector, of which about 2.6 million PYS were lost to the metro sector alone. Such a drain occurred on two counts: (a) because the volumes of rural-to-urban and rural-to-metro migration were more than double the reverse flows, and (b) because the average educational level of the rural out-migrants was markedly higher than that of the rural in-migrants, and even higher than that of the rural stayers (Pernia 1977).

⁸The very high poverty incidence in Northern Mindanao is probably less associated with natural increase than with heavy immigration since it is an attractive newly developing area.

High levels of fertility and poverty in the regions are associated with low survival rates of infants and high malnutrition of children (Table 9). While infant mortality rates are high in all regions, they are particularly notable in the poorer regions of the Visayas and Cagayan Valley. Similarly, the proportions of preschoolers malnourished are significant in these areas. Other more general indicators of well-being such as nutritional adequacy and life expectancy confirm the disadvantaged position of the regions with onerous population pressure. Finally, poverty is closely correlated with education, as manifested by the monotonic negative relationship of poverty incidence with level of schooling of household head in both urban and rural areas (Table 10). It is difficult to imagine what the impact of both poverty and low education of parents would be on the future of their children.

As regards socioeconomic groups, tenant farmers and farm laborers appear to be among the poorest of the poor, with poverty incidence estimated at 52-59 percent compared to 48 percent for farm owners (Table 11). Tenant farmers and farm laborers together account for roughly a third of the total poor while farm owners make up another one-fifth. The poverty incidence of these groups is particularly pronounced in the poorer regions already mentioned. It is apparently as high as 90 percent among tenant farmers and farm workers in Central Visayas, over 80 percent among unspecified farmers in Western Mindanao, Central and Eastern Visayas, over 80 percent among farm workers in Bicol, over 70 percent

among tenant farmers in Eastern Visayas and Northern Mindanao, and about 87 percent among fishermen in Central Visayas (World Bank 1980).

In terms of specific crops, rice and corn farmers manifest the highest poverty incidence in practically all the regions (Table 12). Close to half of all poor families in the country depend on these two crops for their livelihood. As regards the location of the poor rice, corn and coconut farmers, Eastern and Central Visayas and Northern Mindanao again stand out. It may be noted further that hawking, peddling and domestic services in urban areas appear better off than rice, corn and coconut farming. This helps explain why farm tenants and laborers seem willing enough to leave the countryside for even these lowly activities in the city.

Some Qualifications on Income Data

Before concluding this paper, two qualifications on the extent of poverty in the Philippines are in order. First, income and expenditure surveys are never perfect and this is true of both the 1971 and 1975 FIES. However, imperfections are thought to be more serious in the 1975 FIES due to under-reporting of incomes. This explains in part the marked upward trend in poverty from 1971 to 1975.

The second qualification is that family income estimates are often based on the standard narrow definition of income as the proceeds

of products and services sold in the market. Such a measure of income ignores the value of such productive nonmarket activities as home production of food, clothing and shelter, which are frequently used by the poor to make up for low market incomes. A recent study by Kumanic and DeVanzo (1980) shows that measures of income that do not include nonmarket sources underestimate the well-being of the poor in developing countries. For instance, broadening the definition of income for Malaysia raises average household income by 59 percent; likewise, the income share of the poorest 20 percent of the population doubles. However, home production entails additional hours of work at the expense of leisure -- an implicit cost that moderates the supposed relative well-being of the poor.

The above qualifications would naturally tend to lower the measures of poverty incidence in the Philippines. But this seems little comfort for policymakers and administrators because the figures, especially for certain regions and population groups, would still be objectionably high.

Concluding Remarks

A question that is frequently asked is: are families poor because they are large, or are they large because they are poor? In all likelihood the causation goes both ways between family size and welfare. Poverty may prod parents to have many children because of their economic value besides their non-economic benefits, and a large

number of children may cause economic hardships for the family because of their direct and indirect costs. It is not entirely clear, however, which is the more dominant of the two -- the stream of benefits or the stream of costs. The international literature suggests that the benefits are not at all preponderant if everything is taken into account.

In the Philippines, what seems to emerge from time allocation studies is that children cost considerable amounts of time and energy on the part of the mother and other siblings, in addition to direct financial outlays which also figure prominently. But these costs appear to be compensated for by economic and non-economic benefits. Moreover, the time costs of children are moderated to the extent that mother's time has a low opportunity cost, given lack of marketable skills or sheer absence of employment opportunities. Nevertheless, it is at the expense of investment in human capital (in terms of education and health) that economic benefits from child labor are forthcoming. Since neither unemployment of the mother nor child labor is something desirable, it would seem that economic benefits from children are in fact costly.

The mental and physical development of the child tends to be impaired due to deficient health, nutrition and education inputs inasmuch as family resources and parental care have to be spread so thinly among the many competing demands of the large family. Likewise, not only is the mother's health prejudiced on account of frequent

and closely-spaced pregnancies, she is also effectively prevented from actual or potential participation in development. It is to these less immediate and not directly observable disadvantages of a large family that parents must be sensitized so that they would realize the need to limit family size. It is in this sense that, from the social viewpoint, the population program may be seen as a strategy for human resource development. For it is not realistic to talk about quality of human resources if a rapidly expanding population makes it all the more difficult for that quality to be attained.

The challenge to policymakers has become formidable. Because of rapidly increasing population, the need to telescope the reduction of income inequality and poverty has become urgent. Yet, continuing population growth tends to nullify whatever advances are made toward the distributional objective. It would seem obvious that the task of poverty alleviation and income inequality reduction can be appreciably facilitated by a slowing-down of population growth coupled with serious distributional policies.

Population and development policy should be directed to the poor in rural areas in general, but more specifically to the rural poor in the backward regions of the Visayas, Bicol, Ilocos and Northern Mindanao (the last being a heavy immigration region in contrast to the outmigration character of the former ones). In these

backward regions, it seems that tenant farmers and farm laborers, especially those engaged in rice and corn and coconut farming, are the ones who need the most attention. Given the extreme poverty of these groups, the family planning program would seem to require complementary development inputs, such as health, nutrition and education. In the first place, these services are already sorely needed and providing them is probably a matter of moral obligation for the state. In the second place, the family planning program would most likely be more effective if it is combined with the other inputs that help create the demand for family planning services.

As regards the comparatively better-off regions and social groups, a less expensive strategy may suffice; that is, the family planning program may require less of the complementary development inputs. This is because the demand for family planning services is either already there or requires less stimulation. Hence, an essentially supply-side approach may be expected to further push the incipient decline in fertility. There is good reason to believe that a demand-cum-supply strategy for the very poor and a supply approach for the relatively less poor may go a long way toward the deceleration of population growth and alleviation of poverty in the country.

Table 1. Real Wage Rate Index, 1957-78
(1972 = 100)

	Manila and suburbs		Agricultural laborers
	Skilled laborers	Unskilled laborers	
1957	135.7	113.4	145.7
1958	135.6	110.3	139.6
1959	139.5	112.2	143.9
1960	133.4	107.9	143.4
1961	131.2	106.8	130.9
1962	125.5	105.9	133.0
1963	122.3	105.6	119.1
1964	115.1	98.6	112.2
1965	115.2	102.7	121.7
1966	114.9	104.8	127.2
1967	113.1	103.2	124.3
1968	119.4	112.1	110.2
1969	123.3	115.2	112.3
1970	114.4	111.6	111.8
1971	105.1	104.1	97.9
1972	100.0	100.0	100.0
1973	92.4	90.0	n.a.
1974	75.6	72.8	91.2
1975	72.7	72.9	n.a.
1976	71.2	72.3	n.a.
1977	72.9	70.4	n.a.
1978	76.1	68.4	n.a.

Note: Real wage rate indexes have been derived by deflating money wage rates/indexes by the CPI for Manila and suburbs and the Philippine CPI for agricultural laborers.

Source: World Bank (1980) Table 3.2, from the Central Bank and Bureau of Agricultural Economics.

Table 2. Incidence of Poverty by Size of Family, 1971^a

Number of Persons in Family						
	1	2	3	4	5	6
<u>Rural Poverty Line P 453.8 Per Capita</u>						
Rural	7.9 (6.56) 83	15.6 (50.39) 323	23.8 (122.81) 516	30.4 (197.30) 649	40.2 (264.92) 659	45.9 (266.22) 580
<u>Urban Poverty Line P 605.0 Per Capita</u>						
Urban	7.8 (2.50) 32	8.4 (9.83) 117	11.5 (25.41) 221	12.5 (37.0) 296	19.8 (53.46) 270	29.0 (79.75) 275
Total	(7.9) (9.06) 115	13.7 (60.22) 439	20.1 (148.22) 737	24.8 (234.3) 945	34.3 (318.38) 929	40.5 (345.97) 855

Number of Persons in Family					
	7	8	9	10 or more	All families
Rural	51.0 (259.59) 509	56.2 (283.81) 505	59.9 (146.76) 245	62.2 (227.03) 365	41.2 (1825.4) 4434
Urban	30.0 (67.8) 226	34.6 (67.12) 194	34.4 (36.81) 107	50.2 (87.35) 174	24.4 (466.8) 1913
Total	44.5 (327.39) 735	50.2 (350.93) 699	(52.0) (183.57) 353	58.3 (314.38) 539	36.1 (2292.2) 6347

/a In each cell the first figure shows the (%) incidence of poverty, the second in parenthesis shows the number of poor families (in thousands), and the third figure the total number of families (in thousands).

Source: World Bank (1980) Table I.4, from NCSO, Family Income and Expenditure Survey, 1971.

Table 3. Incidence of Poverty by Size of Family, 1975

	Number of Persons in Family						
	1	2	3	4	5	6	7
<u>Rural Poverty Line P 827.4 Per Capita</u>							
<u>Urban Poverty Line P 1,103.2 Per Capita</u>							
Rural	11.7 (7.84) 67	15.6 (43.37) 278	26.8 (148.20) 553	36.3 (237.40) 654	40.6 (283.39) 698	55.3 (380.46) 688	60.1 (331.75) 552
Urban	5.1 (1.78) 35	10.5 (13.96) 133	20.4 (48.35) 237	30.6 (99.45) 325	37.5 (123.37) 290	44.6 (129.34) 233	51.7 (120.46) 193
Total	9.4 (9.62) 102	13.9 (57.33) 412	24.9 (196.55) 790	34.4 (336.85) 979	39.6 (406.76) 1,027	52.1 (509.8) 979	57.6 (452.21) 785
	Number of Persons in Family						All families
	8	9	10	11	12 or more		
Rural	63.2 (300.2) 475	66.2 (229.05) 346	65.2 (142.14) 218	69.7 (82.25) 118	65.5 (76.64) 117		47.5 (2,262.8) 4,764
Urban	54.6 (105.38) 193	61.8 (77.25) 125	62.7 (53.92) 86	64.1 (34.61) 54	61.0 (34.16) 56		40.2 (842.1) 2,096
Total	60.8 (405.58) 667	65.2 (306.3) 470	64.5 (196.06) 304	67.9 (116.86) 172	64.0 (110.8) 173		45.3 (3,104.9) 6,860

Source: World Bank (1980) Table I.6, from NCSO, Family Income and Expenditure Survey, 1975.

Table 4. In-Migration, Out-Migration and Net Migration Rates, 1970-75
(per thousand)

	Region	In-Migration		Out-Migration		Net Migration	
		Rate	Rank	Rate	Rank	Rate	Rank
I.	Ilocos	12.2	9	29.1	2	-16.9	13
II.	Cagayan Valley	13.3	8	15.6	12	-2.3	7
III.	Central Luzon	21.8	4	15.9	11	5.9	5
IV.	Metro Manila	34.0	3	25.3	4	8.7	4
IV-A.	Southern Tagalog	64.5	1	50.5	1	14.0	2
V.	Bicol	11.5	10	21.8	7	-10.3	10
VI.	Western Visayas	10.3	11	14.4	13	-4.1	8
VII.	Central Visayas	15.9	6	28.0	3	-12.1	12
VIII.	Eastern Visayas	17.9	5	19.9	9	-2.0	6
IX.	Western Mindanao	9.2	12	20.9	8	-11.7	11
X.	Northern Mindanao	34.0	3	19.0	10	15.0	1
XI.	Southern Mindanao	35.5	2	22.9	6	12.6	3
XII.	Central Mindanao	14.6	7	23.9	5	-9.3	9

Source: NCSO, Census, Place-of-Residence data, 1975 (unpublished).

Table 5 Population Density and Farm Density by Region

	Population Density ^a				Farm Density ^b	
	1948	1960	1970	1975	1960	1971
I. Ilocos	94.1	112.5	138.6	151.6	3.01	3.57
II. Cagayan Valley	21.3	33.0	46.5	53.1	1.65	2.06
III. Central Luzon	101.7	140.8	203.7	239.2	1.95	2.15
IV. Metro Manila ^c	851.9	1,334.2	2,146.9	2,690.9	2.48	2.84
IV-A. Southern Tagalog	43.4	63.7	91.0	103.2	1.44	1.66
V. Bicol	94.5	134.0	168.3	181.1	1.44	1.70
VI. Western Visayas	125.1	152.2	178.9	205.0	1.56	1.86
VII. Central Visayas	141.8	168.7	202.8	226.5	2.89	2.82
VIII. Eastern Visayas	82.3	95.2	111.1	121.3	1.68	1.88
IX. Western Mindanao	40.8	72.3	100.0	109.6	1.27	1.68
X. Northern Mindanao	32.5	45.8	68.9	81.7	1.25	1.60
XI. Southern Mindanao	18.2	42.7	69.4	85.6	1.31	1.45
XII. Central Mindanao	29.2	59.4	83.3	88.9	1.16	1.85
PHILIPPINES	64.1	90.3	122.3	140.2		

^a Persons per square kilometer.

^b Farm population per hectare of farm land.

^c Includes Rizal for population density.

Sources: Census of Population, various years, for population density; Census of Agriculture, 1960 and 1971 for farm density.

Table 4. In-Migration, Out-Migration and Net Migration Rates, 1970-75
(per thousand)

	Region	In-Migration		Out-Migration		Net Migration	
		Rate	Rank	Rate	Rank	Rate	Rank
I.	Ilocos	12.2	9	29.1	2	-16.9	13
II.	Cagayan Valley	13.3	8	15.6	12	-2.3	7
III.	Central Luzon	21.8	4	15.9	11	5.9	5
IV.	Metro Manila	34.0	3	25.3	4	8.7	4
IV-A.	Southern Tagalog	64.5	1	50.5	1	14.0	2
V.	Bicol	11.5	10	21.8	7	-10.3	10
VI.	Western Visayas	10.3	11	14.4	13	-4.1	8
VII.	Central Visayas	15.9	6	28.0	3	-12.1	12
VIII.	Eastern Visayas	17.9	5	19.9	9	-2.0	6
IX.	Western Mindanao	9.2	12	20.9	8	-11.7	11
X.	Northern Mindanao	34.0	3	19.0	10	15.0	1
XI.	Southern Mindanao	35.5	2	22.9	6	12.6	3
XII.	Central Mindanao	14.6	7	23.9	5	-9.3	9

Source: NCSO, Census, Place-of-Residence data, 1975 (unpublished).

Table 5 Population Density and Farm Density by Region

	Population Density ^a				Farm Density ^b	
	1948	1960	1970	1975	1960	1971
I. Ilocos	94.1	112.5	138.6	151.6	3.01	3.57
II. Cagayan Valley	21.3	33.0	46.5	53.1	1.65	2.06
III. Central Luzon	101.7	140.8	203.7	239.2	1.95	2.15
IV. Metro Manila ^c	851.9	1,334.2	2,146.9	2,690.9	2.48	2.84
IV-A. Southern Tagalog	43.4	63.7	91.0	103.2	1.44	1.66
V. Bicol	94.5	134.0	168.3	181.1	1.44	1.70
VI. Western Visayas	125.1	152.2	178.9	205.0	1.56	1.86
VII. Central Visayas	141.8	168.7	202.8	226.5	2.89	2.82
VIII. Eastern Visayas	82.3	95.2	111.1	121.3	1.68	1.88
IX. Western Mindanao	40.8	72.3	100.0	109.6	1.27	1.68
X. Northern Mindanao	32.5	45.8	68.9	81.7	1.25	1.60
XI. Southern Mindanao	18.2	42.7	69.4	85.6	1.31	1.45
XII. Central Mindanao	29.2	59.4	83.3	88.9	1.16	1.85
PHILIPPINES	64.1	90.3	122.3	140.2		

^a Persons per square kilometer.

^b Farm population per hectare of farm land.

^c Includes Rizal for population density.

Sources: Census of Population, various years, for population density; Census of Agriculture, 1960 and 1971 for farm density.

Table 6. Total Fertility Rate by Region, 1960-75

	<u>1958-62</u>	<u>1963-67</u>	<u>1968-72</u>	<u>1973-77</u>	<u>1960-75</u> (percent decrease)
I. Ilocos	6.36	5.84	5.48	4.90	-23.0
II. Cagayan Valley	7.10	7.78	6.56	5.41	-23.8
III. Central Luzon	6.40	6.24	5.76	4.47	-30.2
IV. National Capital Region	5.07	4.30	3.98	3.11	-38.6
IV-A. Southern Tagalog	6.38	6.49	5.74	4.79	-24.9
V. Bicol	6.94	6.98	6.22	6.03	-13.1
VI. Western Visayas	6.32	5.82	5.80	5.04	-20.2
VII. Central Visayas	6.01	5.82	5.63	4.70	-21.8
VIII. Eastern Visayas	6.87	7.40	7.68	5.81	-15.4
IX. Western Mindanao	7.94	6.93	6.68	5.10*	-35.8
X. Northern Mindanao	7.36	7.68	7.40	5.76	-21.7
XI. Southern Mindanao	7.35	7.34	6.94	5.44	-26.0
PHILIPPINES	<u>6.46</u>	<u>6.30</u>	<u>5.89</u>	<u>5.20</u>	<u>-19.5</u>

*5.10 is the mean of 4.99 for Western Mindanao and 5.22 for Central Mindanao. These two regions were previously combined as Western Mindanao.

Source: de Guzman, UPPI/PREPF 1977 (p. 65) for 1960-70 figures, and RFFS for 1973-77 figures.

Table 7. Poverty Incidence by Region and Rural/Urban Area, 1971^a

Region I Ilocos	Region II Cagayan Valley	Region III Central Luzon	Region IV Metropolitan Manila	Region V Tagalog	Region VI Visayas	Region VII Mindanao	Region VIII Samar	Region IX Mindanao	Region X Mindanao	Region XI Mindanao	Region XII Mindanao	All Regions
Rural	42.2 (136.1) 441	38.5 (133.0) 265	20.8 (86.1) 119	1.7 (0.3) 10	30.0 (212.3) 333	34.6 (730.0) 408	45.8 (220.1) 352	42.5 (115.7) 272	49.2 (131.4) 261	21.9 (85.2) 245	42.8 (2,118.2) 4,434	
Urban	38.6 (18.6) 100	31.3 (11.5) 40	11.2 (22.0) 196	8.4 (41.5) 450	22.5 (51.1) 219	15.6 (13.6) 67	30.6 (39.1) 127	32.0 (33.3) 79	42.1 (27.8) 96	6.4 (5.0) 47	17.8 (136.1) 1,011	
Total	41.7 (225.3) 541	34.7 (144.9) 305	17.6 (107.8) 613	9.1 (41.3) 670	33.1 (264.3) 754	48.0 (742.1) 496	66.7 (355.5) 549	38.1 (120.8) 317	39.7 (163.4) 362	20.4 (67.9) 132	34.7 (2,456.0) 6,347	
Overall Poverty Line P 500 Per Capita												
Rural Poverty Line P 453.4 Per Capita												
Urban Poverty Line P 603.0 Per Capita												
Rural	35.4 (137.3) 341	31.8 (137.3) 365	15.3 (64.3) 619	0.8 (0.3) 20	32.8 (174.5) 535	49.5 (102.1) 608	38.3 (184.0) 480	52.9 (203.9) 352	41.1 (110.4) 287	18.2 (51.9) 245	41.2 (1,821.9) 4,434	
Urban	46.0 (46.0) 100	44.7 (17.7) 40	17.2 (39.7) 196	15.3 (99.2) 650	30.1 (63.9) 219	21.6 (18.0) 87	34.9 (40.6) 127	38.0 (30.0) 74	21.6 (20.7) 96	10.5 (4.9) 47	24.4 (466.8) 1,011	
Total	37.4 (225.3) 541	38.8 (155.0) 305	15.9 (98.0) 615	14.9 (99.3) 670	31.4 (140.5) 754	44.6 (220.9) 496	60.6 (355.5) 549	54.3 (237.2) 431	36.1 (131.4) 362	17.3 (67.9) 132	34.1 (2,456.0) 6,347	

^a In each cell the first figure gives the (%) incidence of poverty, the second in parentheses shows the number of poor families (in thousands), and the third shows the total number of families (in thousands).

Source: World Bank (1980) Table I.3, from NCSO, Family Income and Expenditure Survey, 1971.

Table 8. Poverty Incidence by Region and Rural/Urban Area, 1975^a

	Region I Ilocos	Region II Cagayan Valley	Region III Central Luzon	Region IV Metropolitan Manila	Region IV-A Southern Tagalog	Region V Bicol	Region VI Western Visayas
Rural Poverty Line P 827 Per Capita Urban Poverty Line P 1,103 Per Capita							
Rural	37.6 (173.0)	44.9 (131.2)	26.9 (128.7)	(0) (0)	47.0 (301.0)	56.4 (242.5)	49.4 (255.4)
Urban	42.9 (42.1)	50.5 (19.2)	33.9 (62.7)	30.9 (237.8)	43.1 (107.3)	50.4 (43.9)	43.4 (70.4)
Total	38.5 (215.1)	45.6 (150.4)	28.9 (191.4)	30.9 (237.8)	43.9 (408.3)	55.4 (286.4)	48.0 (325.8)
	Region VII Central Visayas	Region VIII Eastern Visayas	Region IX Western Mindanao	Region X Northern Mindanao	Region XI Southern Mindanao	Region XII Central Mindanao	All Regions
Rural	62.6 (274.6)	56.0 (202.8)	46.0 (125.5)	75.3 (228.3)	41.2 (130.6)	28.4 (72.0)	47.5 (2,262.8)
Urban	52.5 (81.8)	56.1 (44.9)	45.4 (18.6)	61.1 (40.9)	42.4 (49.2)	49.9 (23.4)	40.2 (842.1)
Total	59.9 (356.4)	56.0 (247.7)	45.9 (144.1)	72.8 (269.2)	41.5 (179.8)	31.7 (95.4)	45.3 (3,104.9)

^a In each cell, the first figure shows the (%) incidence of poverty and the second in parentheses shows the number of poor families (in thousands).

Source: World Bank (1980) Table 1.2, from NCSO, Family Income and Expenditure Survey, 1975.

Table 9. Infant Mortality, Percentage of Pre-Schoolers Affected by Second and Third Degree Malnutrition, and Life Expectancy

<u>Region</u>	<u>Infant Mortality per 000 Live Births (1974)</u>	<u>Percent Malnourished Preschoolers^a (1976)</u>	<u>Life Expectancy (1973)</u>
<u>Philippines</u>	<u>60.6</u>	<u>30.6</u>	<u>60.0</u>
<u>Luzon</u>	<u>59.9</u>	<u>30.5</u>	<u>60.4</u>
I. Ilocos	54.2	31.0	61.2
II. Cagayan Valley	72.6	29.2	56.7
III. Central Luzon	51.1	32.5	61.6
IV. Metropolitan Manila	63.0	31.3	64.0
IV-A. Southern Tagalog	59.6	28.6	61.0
V. Bicol	58.7	30.7	60.5
<u>The Visayas</u>	<u>71.9</u>	<u>33.6</u>	<u>58.9</u>
VI. Western Visayas	79.7	38.8	62.3
VII. Central Visayas	59.6	27.0	58.8
VIII. Eastern Visayas	76.3	34.5	58.6
<u>Mindanao</u>	<u>50.0</u>	<u>26.9</u>	<u>60.0</u>
IX. Western Mindanao	59.7	29.3	60.5
X. Northern Mindanao	52.1	28.4	58.2
XI. Southern Mindanao	42.2	24.8	62.1
XII. Central Mindanao	48.0	27.7	60.6

^a Moderately and severely malnourished in selected depressed areas.

Source: World Bank (1980) Tables 2.3 and 3.4, from National Economic and Development Authority, Regional Development Information, 1978.

Table 10. Poverty Incidence by Education of Household Head, 1971^a
(Poverty Line: ₱500 per Capita)

	Elementary school			High school			
	Grades I to III	Grades IV and V	Grades VI and VII	1st year	2nd year	3rd year	4th year
Philippines	52.7 (570.5) 1,083	51.3 (675.4) 1,316	42.1 (518.7) 1,231	35.4 (69.1) 195	29.6 (79.5) 269	26.0 (41.0) 158	16.8 (93.7) 557
Urban	35.7 (55.3) 155	31.8 (69.3) 218	25.9 (88.7) 342	24.2 (17.2) 71	19.2 (21.7) 113	14.4 (10.1) 70	9.3 (29.9) 320
Rural	55.5 (514.9) 928	55.2 (605.6) 1,098	48.3 (429.3) 889	42.4 (52.2) 123	36.8 (57.4) 136	34.2 (30.1) 88	27.0 (64.3) 238

	College						No grade completed or reported	All edu- cational cate- gories
	1st year	2nd year	3rd year	4th year	5th year	6th year or higher		
Philippines	20.1 (11.9) 59	8.9 (14.7) 165	4.6 (3.4) 73	2.6 (9.5) 367	3.6 (1.5) 41	1.3 (0.8) 65	47.9 (367.3) 767	38.7 (2,456.0) 6,347
Urban	18.0 (6.3) 35	3.3 (3.8) 115	3.3 (1.7) 51	1.9 (4.8) 259	1.5 (0.4) 28	0.5 (0.3) 51	33.0 (28.4) 86	17.6 (336.3) 1,913
Rural	26.1 (6.3) 24	22.5 (11.3) 50	7.3 (1.6) 22	4.3 (4.7) 109	5.0 (0.6) 13	3.3 (0.5) 14	49.8 (339.2) 681	47.8 (2,119.2) 4,434

/a In each cell, the first figure shows the (%) incidence of poverty, the second in parentheses shows the number of poor families (in thousands), and the third shows the total number of families (in thousands).

Source: World Bank (1980) Table 2.6, from NCSO, Family Income and Expenditure Survey, 1971.

Table 11. Poverty Incidence by Occupation and Region, 1971^a
(Poverty Line ¥500 per capita)

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[illegible]

In each cell, the first figure shows the (E) incidence of poverty, the second in parentheses shows the number of poor families (in thousands), and the third shows the total number of families (in thousands).

¹⁰ Another sample size effect may result for statistically valid inference.

Table 12. Poverty Incidence by Industrial Sector and Region, 1971^a
(Poverty Line ¥ 500 per Capita)

	Region I Tlaxcala	Region II Oaxaca	Region III Chiapas	Region IV-A Guerrero Hidalgo	Region IV-B Guerrero Tlaxcala	Region V Veracruz	Region VI Puebla	Region VII Quintana Roo	Region VIII Yucatán	Region IX Baja California	Region X Sonora	Region XI Nayarit	Region XII Jalisco	Region XIII Colima	Region XIV Michoacán	Region XV Guanajuato	Region XVI Querétaro	Region XVII San Luis Potosí	Region XVIII Zacatecas	Region XIX Coahuila	Region XX Durango	Region XXI Aguascalientes	Region XXII Nuevo León	Region XXIII Tamaulipas	Region XXIV Veracruz	Region XXV Puebla	Region XXVI Oaxaca	Region XXVII Chiapas	Region XXVIII Guerrero	Region XXIX Hidalgo	Region XXX Mexico
Grain: wheat	44.4 (17.0)	83.4 (125.3)	23.7 (44.7)	4 (7.0)	41.1 (48.5)	80.9 (102.7)	51.0 (104.1)	84.5 (144.2)	33.3 (137.2)	55.8 (111.2)	85.4 (135.8)	58.1 (111.7)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	
Grain: corn	44.4 (17.0)	83.4 (125.3)	23.7 (44.7)	4 (7.0)	41.1 (48.5)	80.9 (102.7)	51.0 (104.1)	84.5 (144.2)	33.3 (137.2)	55.8 (111.2)	85.4 (135.8)	58.1 (111.7)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	
Grain: sorghum	44.4 (17.0)	83.4 (125.3)	23.7 (44.7)	4 (7.0)	41.1 (48.5)	80.9 (102.7)	51.0 (104.1)	84.5 (144.2)	33.3 (137.2)	55.8 (111.2)	85.4 (135.8)	58.1 (111.7)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	
Grain: millet	44.4 (17.0)	83.4 (125.3)	23.7 (44.7)	4 (7.0)	41.1 (48.5)	80.9 (102.7)	51.0 (104.1)	84.5 (144.2)	33.3 (137.2)	55.8 (111.2)	85.4 (135.8)	58.1 (111.7)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	
Grain: rice	44.4 (17.0)	83.4 (125.3)	23.7 (44.7)	4 (7.0)	41.1 (48.5)	80.9 (102.7)	51.0 (104.1)	84.5 (144.2)	33.3 (137.2)	55.8 (111.2)	85.4 (135.8)	58.1 (111.7)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	
Grain: barley	44.4 (17.0)	83.4 (125.3)	23.7 (44.7)	4 (7.0)	41.1 (48.5)	80.9 (102.7)	51.0 (104.1)	84.5 (144.2)	33.3 (137.2)	55.8 (111.2)	85.4 (135.8)	58.1 (111.7)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	
Grain: rye	44.4 (17.0)	83.4 (125.3)	23.7 (44.7)	4 (7.0)	41.1 (48.5)	80.9 (102.7)	51.0 (104.1)	84.5 (144.2)	33.3 (137.2)	55.8 (111.2)	85.4 (135.8)	58.1 (111.7)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	
Grain: oats	44.4 (17.0)	83.4 (125.3)	23.7 (44.7)	4 (7.0)	41.1 (48.5)	80.9 (102.7)	51.0 (104.1)	84.5 (144.2)	33.3 (137.2)	55.8 (111.2)	85.4 (135.8)	58.1 (111.7)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	
Grain: other	44.4 (17.0)	83.4 (125.3)	23.7 (44.7)	4 (7.0)	41.1 (48.5)	80.9 (102.7)	51.0 (104.1)	84.5 (144.2)	33.3 (137.2)	55.8 (111.2)	85.4 (135.8)	58.1 (111.7)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	
Grain: total	44.4 (17.0)	83.4 (125.3)	23.7 (44.7)	4 (7.0)	41.1 (48.5)	80.9 (102.7)	51.0 (104.1)	84.5 (144.2)	33.3 (137.2)	55.8 (111.2)	85.4 (135.8)	58.1 (111.7)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	
Grain: other	44.4 (17.0)	83.4 (125.3)	23.7 (44.7)	4 (7.0)	41.1 (48.5)	80.9 (102.7)	51.0 (104.1)	84.5 (144.2)	33.3 (137.2)	55.8 (111.2)	85.4 (135.8)	58.1 (111.7)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	
Grain: total	44.4 (17.0)	83.4 (125.3)	23.7 (44.7)	4 (7.0)	41.1 (48.5)	80.9 (102.7)	51.0 (104.1)	84.5 (144.2)	33.3 (137.2)	55.8 (111.2)	85.4 (135.8)	58.1 (111.7)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	
Grain: other	44.4 (17.0)	83.4 (125.3)	23.7 (44.7)	4 (7.0)	41.1 (48.5)	80.9 (102.7)	51.0 (104.1)	84.5 (144.2)	33.3 (137.2)	55.8 (111.2)	85.4 (135.8)	58.1 (111.7)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	
Grain: total	44.4 (17.0)	83.4 (125.3)	23.7 (44.7)	4 (7.0)	41.1 (48.5)	80.9 (102.7)	51.0 (104.1)	84.5 (144.2)	33.3 (137.2)	55.8 (111.2)	85.4 (135.8)	58.1 (111.7)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	
Grain: other	44.4 (17.0)	83.4 (125.3)	23.7 (44.7)	4 (7.0)	41.1 (48.5)	80.9 (102.7)	51.0 (104.1)	84.5 (144.2)	33.3 (137.2)	55.8 (111.2)	85.4 (135.8)	58.1 (111.7)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	
Grain: total	44.4 (17.0)	83.4 (125.3)	23.7 (44.7)	4 (7.0)	41.1 (48.5)	80.9 (102.7)	51.0 (104.1)	84.5 (144.2)	33.3 (137.2)	55.8 (111.2)	85.4 (135.8)	58.1 (111.7)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	
Grain: other	44.4 (17.0)	83.4 (125.3)	23.7 (44.7)	4 (7.0)	41.1 (48.5)	80.9 (102.7)	51.0 (104.1)	84.5 (144.2)	33.3 (137.2)	55.8 (111.2)	85.4 (135.8)	58.1 (111.7)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	
Grain: total	44.4 (17.0)	83.4 (125.3)	23.7 (44.7)	4 (7.0)	41.1 (48.5)	80.9 (102.7)	51.0 (104.1)	84.5 (144.2)	33.3 (137.2)	55.8 (111.2)	85.4 (135.8)	58.1 (111.7)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	
Grain: other	44.4 (17.0)	83.4 (125.3)	23.7 (44.7)	4 (7.0)	41.1 (48.5)	80.9 (102.7)	51.0 (104.1)	84.5 (144.2)	33.3 (137.2)	55.8 (111.2)	85.4 (135.8)	58.1 (111.7)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	
Grain: total	44.4 (17.0)	83.4 (125.3)	23.7 (44.7)	4 (7.0)	41.1 (48.5)	80.9 (102.7)	51.0 (104.1)	84.5 (144.2)	33.3 (137.2)	55.8 (111.2)	85.4 (135.8)	58.1 (111.7)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	
Grain: other	44.4 (17.0)	83.4 (125.3)	23.7 (44.7)	4 (7.0)	41.1 (48.5)	80.9 (102.7)	51.0 (104.1)	84.5 (144.2)	33.3 (137.2)	55.8 (111.2)	85.4 (135.8)	58.1 (111.7)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	
Grain: total	44.4 (17.0)	83.4 (125.3)	23.7 (44.7)	4 (7.0)	41.1 (48.5)	80.9 (102.7)	51.0 (104.1)	84.5 (144.2)	33.3 (137.2)	55.8 (111.2)	85.4 (135.8)	58.1 (111.7)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	
Grain: other	44.4 (17.0)	83.4 (125.3)	23.7 (44.7)	4 (7.0)	41.1 (48.5)	80.9 (102.7)	51.0 (104.1)	84.5 (144.2)	33.3 (137.2)	55.8 (111.2)	85.4 (135.8)	58.1 (111.7)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	
Grain: total	44.4 (17.0)	83.4 (125.3)	23.7 (44.7)	4 (7.0)	41.1 (48.5)	80.9 (102.7)	51.0 (104.1)	84.5 (144.2)	33.3 (137.2)	55.8 (111.2)	85.4 (135.8)	58.1 (111.7)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	24.8 (11.5)	
Grain: other	44.4 (17.0)	83.4 (125.3)																													

* Deviation applies also to small (for statistically valid inference)

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Part III

FERTILITY AND THE ECONOMICS OF GOVERNMENT INTERVENTION

The Provision of Information and Birth Control Services: The Case of No Externalities	III-2
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Part III
FERTILITY AND THE ECONOMICS OF GOVERNMENT INTERVENTION

by
Vicente B. Paqueo*

The discussions in Parts I and II strongly suggest that a "spontaneous" reduction in fertility is likely to facilitate the attainment of a number of government objectives and, hence, should be welcomed by development planners and policymakers. Such a proposition, however, is not sufficient for government to intervene and adopt active fertility reduction measures.

Suppose, for example, that fertility decisions of parents have no externalities, i.e., all their consequences, both beneficial and detrimental, are confined within the boundaries of the family. Suppose further that parents have all the information relevant to fertility decisions, that there are no market failures and imperfections, and that the existing income distribution is regarded as fair. Under this situation, the proposition that free individual decisions can add up to a social optimum can reasonably be argued. Hence, a reasonable policy to adopt is to allow parents to freely decide and do what they think is best, including their level of fertility. In this case, the government must accept the results of

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