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IN THIS ISSUE . . .

An Economic Approach to Family Size: A New Perspective on Population Growth

. . . A growing body of evidence indicates that the rising value of an individual's time affects decisions about family size. This economic approach to childbearing decisions yields a less pessimistic outlook for future population growth.

Tax Cuts and Economic Activity: The Role of "Financing"

. . . Although the initial effect of a tax cut is expansionary, the longer term impact on the economy depends on how the government responds to the resulting loss in revenue.

On our cover: *Washington Crossing the Delaware,* by Emanuel Gottlieb Leutze. The event which this famous painting depicts occured Christmas night, 1776, when Washington's troops ferried across the icy Delaware River in order to make a surprise attack the next day on the Hessians garrisoned in Trenton, New Jersey. This advance led to the American victory at Princeton on January 3, 1777, which caused the British to withdraw from western New Jersey. These winter victories secured a safe post of observation for the winter at Norristown, and restored the colonists' confidence in their ability to defeat the British armies.

Emanuel Gottlieb Leutze (1816-1868) was born in Gmund, Wurttemberg. He came to Philadelphia as a child and studied art there. Leutze painted *Washington Crossing the Delaware* in 1851. He was in Germany at the time, and used the Rhine as a model for the Delaware. (The Metropolitan Museum of Art, Gift of John Stewart Kennedy, 1897.)

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An Economic Approach to Family Size: A New Perspective on Population Growth

By Donald J. Mullineaux

People are becoming increasingly anxious at the prospect that we humans will someday procreate ourselves right back into our ancestral cave dwellings. This is hardly a new worry. Thomas Malthus, the most pessimistic of a breed Carlyle dubbed the "dismal scientists," averred almost 200 years ago that population growth would inevitably outstrip man's ability to feed and clothe himself. Misery and distress would come to characterize the human condition. Experience has belied the Malthusian prophecy as living standards have risen sharply in most areas of the world. Yet Parson Malthus's theory of population and calamity has shown remarkable resiliency. Like some rubber-legged heavyweights, Malthus has been down but never out. Indeed, in two recent and highly publicized studies[1], the Malthusian outlook has resurfaced, fortified by computer analyses of the world economy and psychosociopolitical theorizing.

Until recently, economists have had relatively little to say about Malthus's views concerning fertility and population *per se*. The Malthusian prophecy was considered faulty because it neglected the saving grace of technology, and nothing needed to be said about family size. Indeed, nothing could be said, since family size was determined mainly by noneconomic factors. Some economists have recently had a change of heart, however. They emphasize that both logic and evidence indicate that economic variables play a role in family decisions about childbearing. One economic approach—sometimes referred to as the "household model"—suggests that neglecting the impact of *prices* on family size can lead to poor forecasts of population growth. In addition, the household model clarifies the relation of education and family size. Finally, the outlook for population growth suggested by this

[1]See Donella H. Meadows et al., *The Limits to Growth* (New York: Universe Books, 1972) and Robert L. Heilbroner, *An Inquiry into the Human Prospect* (New York: W. W. Norton and Company, 1974).

approach allows a much more optimistic view of mankind's future than the bleak Malthusian scenario.

AN ECONOMIC VIEW OF FAMILY SIZE: THE DEMAND AND SUPPLY OF CHILDREN

In recent years, economists have begun to apply their logic and methods in a number of areas once considered beyond the pale of economics. Decisions concerning marriage, childbearing, migration, criminal behavior, church attendance, suicide, and even (with tongue in swollen cheek) teeth brushing have all been subjected to economic analysis. Sociologists and psychologists have, of course, long studied these kinds of phenomena. The explanations of economists are not intended to displace or denigrate their efforts, but rather to complement psychological or sociological theories and hence provide a fuller elucidation of human behavior.

Many people are offended by the suggestion that children can be treated like any other economic good. Parents in particular are likely to resist attempts to attach a "price" to their children. The reason is that society uses prices to measure value, and most mothers and fathers would not assign a monetary value to their children (although the neighbors' children are often considered "priceless" in quite a different sense than our own). Economists seek to apply their logic to childbearing, however, not to debase the human qualities of children or parents, but to gain insights into behavior which may be useful for problem solving. In other words, economists are trying to abstract from the extremely large number of factors affecting family size and isolate those elements they understand best. This is not to suggest that all behavior is motivated *solely* by economic factors. Economists make no claim to completeness when studying the demand for children (though this is no less the case for automobiles or theater tickets). The point is that where economic factors play *some* role and are ignored, explaining and predicting human behavior and its consequences (such as population growth) will be at best difficult and at worst fallacious.

A popular approach involves treating each household as a miniature firm.[2] A firm purchases materials, equipment, and manpower to produce some product. Similarly, a household purchases goods and services and combines them with its own available time ("manpower") to produce things which give satisfaction to household members. A household for instance employs materials such as bread, wine, steak, vegetables, and the like along with shopping and preparation time to "produce" a meal. Just as the amount a business manufactures depends on what it has to pay for raw materials and for labor, what a household "produces" depends on the prices of household goods and the value of family members' time. This "household model" also suggests that as the price of a husband's or wife's time increases relative to the prices of other goods, a household will switch to activities requiring less time (just as a firm substitutes machines for labor when wages rise relative to equipment rentals).

The "services" provided by children represent one form of satisfaction produced in many households. Children yield their parents productive services (such as mowing lawns, washing dishes, "doing chores," and the like) as well as nonproductive services. Economists term the latter "psychic income" and it includes the sum of the innumerable joys of watching and helping children grow. Since children yield these services over time, from an economic viewpoint they can be considered akin to "durable goods." Like durables in general, children are costly. Expenditures on food, clothing, health maintenance, education, recreation, and so on can

[2]Not all economists employ the same framework in studying family size. For an alternative approach to the one outlined in this article, see Harvey Leibenstein, "The Economic Theory of Fertility Decline," *Quarterly Journal of Economics* 89 (1975): 1–31.

run into many thousands of dollars. In addition, there will be "psychic costs" to child-raising since growing up produces parental heartaches as well as joys.[3]

If children can be thought of as resembling other durable goods in a broad sense, then economists can apply their reasoning to derive suggestions about how people are likely to behave in making decisions about family size. For instance, the demand for "satisfaction" from children should fall when the "price" of children rises. As children become more expensive relative to other means of satisfaction, parents should want to bear and raise fewer children. This presumes of course that the other factors affecting fertility—both economic and noneconomic—are unchanged. Applying economics to childbearing decisions also would suggest that households should desire more children as family income rises (that is, if children are what economists call "normal" goods). Here is one point where an economic application appears to hit a snag. For the evidence is quite clear that over time and in almost all the various cultures of the world the birth rate *falls* as income increases. In the same vein, wealthier families typically have fewer children than families with lower standards of living. Looking at the relation between family size and income *in isolation*, however, can be misleading. Economists must try to "control" for the effects of other factors which may impinge on childbearing decisions. Recent studies show, for example, that once we take account of the effects of changes in the "quality" and "price" of children, family size on average does increase with income. Thus, income changes cannot explain the long-run decline in birth rates in most developed economies. According to the "household model," declining family size is accounted for mainly by three factors: (1) increases in the average "quality" level of children; (2) the rising "price" of children; and (3) increases in the average education level of parents.

Quantity vs. Quality of Children. The household model approach to family size suggests that children can be viewed much like other durable goods which are desired for the "services" they provide. At first glance, it seems vulgar or offensive to contend that children are wanted for their "services." However, economists define "services" quite broadly. Indeed, *any* kind of "good feeling" that a parent would attribute to having a son or daughter would be considered a "service" from the economist's viewpoint. Friendly greetings on arriving home, long walks in the woods, and games of catch in the backyard are all part of the "service flow" from children.

In many cases, households would like to increase the services provided by durable goods. There are two ways to accomplish this. More units of the good in question can be acquired, or alternatively, a higher quality unit (more BTUs or horsepower) can be purchased. Economists have carried over the quantity-quality distinction to their discussion of the demand for children. In particular, they note that "services" from children can be increased either by adding to the size of the family or by boosting the "quality" of the children parents already have.

By injecting "quality" into their analysis of family size, economists do not mean to suggest that some children are "better" in some moral sense than others. Instead they are simply emphasizing that some parents spend more on raising a family of given size than others. Rather than add further to family size, parents may opt for summer camp and nursery schools for the children they already

[3]Parents presumably compare the benefits of an additional child with the costs involved (such a calculation is, of course, rough at best and perhaps not even consciously undertaken) and adjust their reproductive behavior to add to the size of the family whenever benefits exceed costs. Some may find thinking about behavior this way crass or offensive. It should be remembered, however, that the economic approach is not intended to be the sole explanation of all we do. In addition, whether or not the household model is useful can only be judged in terms of its ability to explain and predict human behavior.

have. Indeed, households cannot avoid choosing between quantity and quality expenditures in childraising since no family has unlimited resources.

For most durable goods, expenditures on quality seem much more responsive to income gains than does spending on quantity.[4] Several economists have argued that this is likely to be the case for children as well. They note that high-income families typically have only slightly larger or even smaller numbers of children than low-income families, but they spend more on each child. There is some disagreement about why this might be the case. Some have argued that social pressures dictate that children's living standards are inexorably linked to those of their parents. Other economists have contended that producing "quality" children becomes "cheaper" as incomes rise. Whatever the underlying reason, it is clear that ignoring the quality-quantity distinction in relating income and size of family can lead to misleading conclusions since quality can "substitute" for quantity to some extent. Still another factor which must be taken into account, however, is the "price" of children relative to other goods and services.

The Cost of Raising or "Price" of Children. In these inflationary times, everyone recognizes that rearing a family has become an increasingly expensive proposition. But it is difficult to think of any activity that isn't costing more today than yesterday. In fact, childbearing will be discouraged not by inflation *per se*, but by increases in the "price" of children *relative* to the prices of other goods and services. There is good reason to believe that the relative price of children has been rising sharply over time, at least in the developed countries. The reason is that the "services" that children provide are produced in the home using a resource whose value (relative price) has risen considerably—namely, the parents' (especially the mother's) time.

The dollar cost of the goods and services used in child rearing is only part of the total cost of children. Economists also reckon the "opportunity cost" of the time spent with children as part of the "price" of children. These opportunity costs represent the value parents would attach to *alternative* uses of the time and energy they allot to their children. For instance, to devote her time to her children, a mother foregoes opportunities to earn income in the job market or enjoy leisure activities. Indeed, the "production" of child services requires an extraordinary amount of the parents' time, especially when children are young. In the jargon of economists, producing satisfaction from children is very "time-intensive." Hence, this time or opportunity cost forms an integral part of the "full price" of children.

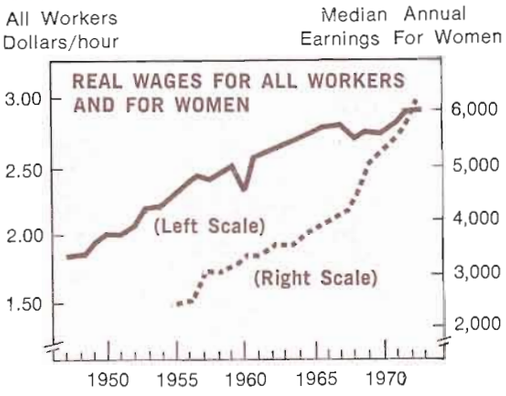
The value of the opportunities a mother foregoes to raise children can be considered the price of her time, and likewise for the father. For women who spend at least part of their time working in the labor market, their "real wage" (inflation-adjusted earnings) can be taken as a measure of the price of time. In the U. S. as well as in other developed economies, real wages have increased sharply over time (see Chart 1). Hence, the value of time has been increasing. A rising price of time translates into an increased price of children *relative to other goods and services* because children are *more time-intensive* than other kinds of durable goods. Economic logic dictates that as the relative price of children rises, people will shift to less time-intensive activities to economize on an increasingly scarce resource (time).

Some studies have considered the statistical relationship between family size and the

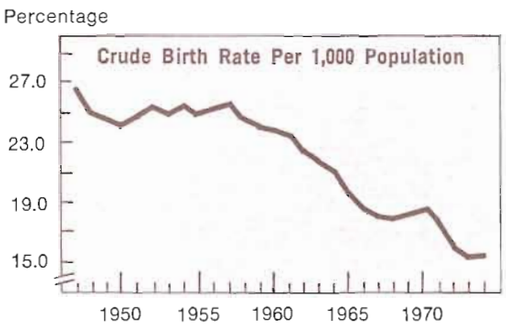
[4]For example, one well-known study estimates that if total income in the U. S. doubles, total spending on automobiles would rise 200 percent. However, spending on additional numbers of cars would rise by only 31 percent. The difference reflects increased expenditures on quality. See Gregory C. Chow, *The Demand for Automobiles in the United States* (Amsterdam, The Netherlands: North-Holland Publishing Company, 1957).

CHART 1

AS THE VALUE OF TIME HAS INCREASED SHARPLY IN THE POSTWAR PERIOD IN THE U. S. . . .



THE BIRTH RATE HAS DROPPED SIGNIFICANTLY.



Source: Statistical Abstract of the U. S. & U. S. Department of Commerce, Current Population Reports P-60 Series.

price of parents' time.[5] The relationship between the father's wage and family size is unclear, but several studies have found that a higher value of the mother's time is associated with a lower number of children in the family. These studies typically use a woman's wage or number of years of education as a measure of the value of time. Years of schooling are of course only a "proxy" measure for the value of time. Some researchers employ this measure because wage-rate information is not available for a large proportion of women—mainly those who spend *all* of their time working in the home. The value of the housewife's time must exceed her potential wage in the labor market or she would devote at least some of her time to working outside the home. Studies have shown that the value of the housewife's time will depend on a number of factors,[6] but that education is especially important. Education increases productivity in *work at home* by improving the ability to acquire, evaluate, and use information concerning matters such as consumer products and health maintenance. Since education also has a positive effect on earnings outside the home, it clearly affects the demand for children via its influence on the value of time. But education's impact on family size is not limited to the demand side. It also influences the supply of children by affecting a couple's ability to control the size of their families.

Education and the Supply of Children. Children are unique when viewed in an economic light since they are generally "supplied" by the same individuals who "demand" their "services"—namely, their parents. Having a child is not a perfectly predictable event,

[5]Several studies in the "household model" approach to fertility can be found in T. W. Schultz, ed., *New Economic Approaches to Fertility*, published in the *Journal of Political Economy* 81 (1973): S1–S299.

[6]See Reuben Gronau, "The Effect of Children on the Housewife's Value of Time," in T. W. Schultz, ed., *Economic Approaches to Fertility*, pp. S168–S199.

however, so that parents cannot expect to be completely successful in matching their "supplies" and "demands" for satisfaction from children. But couples are not completely at the mercy of chance in supplying children. They can exercise some control over the likelihood of having a child.

Trying to increase or reduce the chances of having a child is typically a costly activity. Many couples spend both time and money on family planning. Other kinds of costs may also be involved, such as any expectation of impaired physical health or any conflict with religious beliefs. Couples are willing to bear some of these costs to reduce the chances of having an unplanned child.

Some couples may be more efficient at family planning than others, however. In particular, better-educated couples may be able to reduce the chances of having an unplanned child more efficiently than the less-educated. Researchers have developed evidence which supports this claim. Some have argued that this finding simply reflects the fact that better-educated couples want fewer children (the demand side) and hence have a greater incentive to plan family size more effectively. At least one study has taken the desired number of children into account as a factor in determining family size, and it still remains true that better-educated couples are more effective at family planning.[7]

Within the context of the "household model" approach to family size, then, education clearly plays a leading role in contributing toward an explanation of birth rates. Since it affects both the demand and supply of children, it exerts a clear influence on the "price" of children which has been increasing over time. The notion that the "price" of children is important for predicting family size and population growth is a key one. It differs sharply from past thinking which assigned a role only to income when considering the impact of economic variables on population growth. Once prices are taken into consideration, the outlook for the "human condition" stands at considerable variance with the well-known Malthusian view.

[7]See Robert T. Michael, "Education and the Derived Demand for Children," in T. W. Schultz, ed., *Economic Approaches to Fertility*, pp. S128–S164.

THE LONG-RUN IMPLICATIONS OF THE "HOUSEHOLD MODEL" OF FAMILY SIZE: DOOMSDAY OR PROSPERITY?

Almost all "theories" of population behavior suggest that at some point growth in the number of people on our planet will come to a halt. Many thinkers are at odds, however, about the likely condition of the world once birth rates achieve rough congruence with death rates to produce what demographers call a "population equilibrium." Malthus's own conclusion was straightforward and depressing. Calamity and misery will characterize the human condition in population equilibrium. Recently, the Malthusian outlook appears to be making more and more converts (see Box 1).

The economic approach to fertility outlined in the "household model" yields a different and more optimistic answer about mankind's future. It suggests that population equilibrium is compatible with high living standards and a prosperous human condition. Prosperity prevails over calamity mainly because the "household model" visualizes a different set of factors underlying a decline in birth rates than the Malthusian approach. Malthus and his followers see increases in the relative prices of the *services of natural resources* as the key factor accounting for a leveling off of population growth. Land or energy prices become so high that families can no longer afford to feed or house additional children. According to the "household model" approach, however, an increase in the relative price of *human time* is the driving force which eventually brings worldwide birth rates in line with death rates. Procreation is limited in this scenario by the high price (opportunity cost) of children themselves.

BOX 1

POPULATION AND CALAMITY: THE MALTHUSIAN VIEW

Social and natural scientists as well as mathematicians have long been intrigued by the implications of continuously growing numbers of people competing for living space on a finite planet. Thomas Malthus (in essays published in 1798 and 1830) contended that population growth sails along without bound as long as wages remain above the level required for subsistence. While the sum total of people grows and grows, the quantity of land is essentially fixed. Hence, increasing demands for food require that farmers turn to less and less fertile land. These inferior fields yield less and less output per acre (an example of the "law of diminishing returns"). As population doubles and redoubles, the earth is in effect halved until it shrinks so much that food production falls below the level necessary to sustain life. According to Malthus, population growth is eventually held in check by starvation and malnutrition, and hence misery and want characterize the human condition.

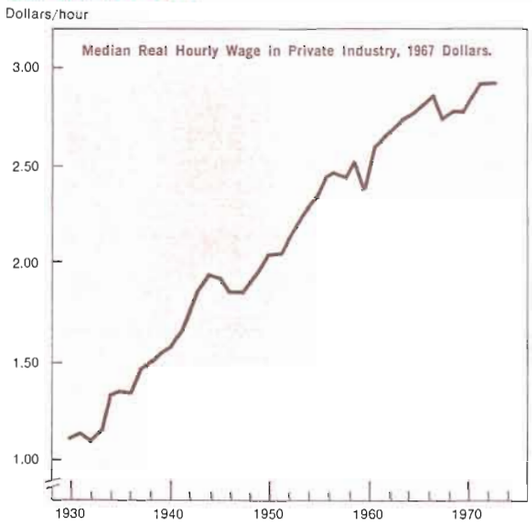
Except for incidents isolated in time and space, the Malthusian prediction of calamity has gone unfulfilled. Indeed, during the last 200 years living standards have *risen* sharply rather than fallen. Technological improvement in agricultural production is generally recognized as the providential savior which continuously redeems mankind from a Malthusian hell. Recently, however, debate has resurfaced concerning the outlook for future growth and prosperity, *despite projected advancements in technological wizardry*. In particular, a group of scientists and mathematicians has constructed a computerized "model" of the world economy. They employ a system of mathematical equations to predict future economic activity and population growth. Their conclusion is that continued economic growth is impossible. The earth's natural resources will soon be exhausted, they contend, and increased industrial activity will shortly strangle us in pollution. Furthermore, increasing population will eventually outrun the world's capacity to produce food, and famine will result. Because of the nature of the suggested interaction between depleted resources, pollution, industrial production and population growth, technological innovation cannot prevent or even long forestall the advent of doomsday. These researchers conclude that setting explicit limits on growth in capital (factories, trucks, machines, and the like) and population represents the only means of preventing the eventual realization of the Malthusian forecast.

The conclusions of any mathematical model, however, are only as strong as its weakest equation. One area where the analysis of the neo-Malthusians (as well as Malthus himself) can be challenged concerns the relationship between population growth and economic variables. Malthusians suggest that income is the only relevant economic variable for explaining and predicting fertility and population growth. They fail to consider the impact of *prices*—in particular the "price" of children—on parents reproductive behavior. The household model approach to fertility—which emphasizes the role of the "price" of children (and its relation to the price of time)—yields a different and more optimistic picture of the future.

Since no amount of technological virtuosity can squeeze more than 24 hours out of a day, time can be considered the ultimate economic resource constraint. Indeed, the *present scarcity* of time relative to other resources is reflected in long-run changes in relative prices. In the U. S., for example, wages adjusted for inflation—a rough measure of the price of time—have moved sharply upwards since the Great Depression (see Chart 2). In fact, total real compensation per hour at work in manufacturing increased between 1929 and 1970 more than *four times* as much as did the rent paid for the services of farmland in the U.S. As time becomes increasingly more expensive, economic logic dictates that households and firms will substitute material goods for human time and en-

CHART 2

THE VALUE OF TIME SHOWS A SHARP UPWARD TREND OVER THE LONG RUN IN THE U. S.



Source: *Statistical Abstract of the United States.*

gage in less time-intensive activities. If these trends continue on a worldwide basis (see Box 2 on the less-developed economies), the high price of time may become the basic constraint which determines the upper limit of economic growth and population increases.[8] The basic logic is simple. Time is fixed in supply and is becoming more and more expensive. Yet consumption takes time. Hence, eventually it is no longer "worth it" to add to the production stream because no time is available to consume the benefits. But the high price of time guarantees—indeed is synonymous with—continued prosperity once growth in production and population ends.

SUMMING UP

The "household model" represents an economic approach to family size, an issue economists in the past have considered outside their analytical domain. While it does not pretend that economics has all the answers, it does suggest that students of population growth may err in their explanations and predictions if they neglect the impact of relative price changes on family behavior. In particular, changes in the value of time are likely to exert an influence on birth rates over time and across families. This economic view also clarifies the nature of the several channels through which changes in the average level of education affect the rate of procreation. Finally, the economic approach foresees a future for mankind which stands at considerable variance with the well-known Malthusian prophecy of gloom and doom. Although some remain skeptical about the "household model" approach, the evidence accumulated thus far seems sufficiently favorable for policymakers to take account of the issues raised in an economic approach

[8]For some discussion about the reasons for the increasing value of time, see T. W. Schultz, "The Increasing Economic Value of Human Time," *American Journal of Agricultural Economics* 54 (1972): 843–50.

BOX 2

Can Economists Apply Their Fertility Approach to the Less-Developed Countries?

The optimistic outlook for the household model for mankind's future presumes that the relative price of time will continue to rise and that this approach is a useful analytical tool for predicting future population behavior. Some researchers have questioned the validity of this economic approach, particularly as it applies to the less-developed countries (LDCs). In these economies, human time is cheap and women have relatively few opportunities to earn income outside the home. In addition, life expectancy is lower, infant mortality higher, and the availability of family planning techniques (including information about them) is less widespread and hence more costly than in developed economies. The nature of the benefits of children may also differ in LDCs. In particular, more parents may invest in children with a view toward having their offspring support them in old age. This *pension motive* for having children undoubtedly bulks larger in childbearing decisions in less-developed economies where governments have yet to devise public retirement programs (such as Social Security in the U.S.) and where capital markets are not well suited to private pension savings.

None of these differences in the overall economic environment rules out the application of the "household model" to family size decisions in less-developed economies *in principle*. Rather, they require that the mode of analysis be revised to make it more relevant to economies with different characteristics than those of developed economies.* This, of course, does not *guarantee* that this overall approach will successfully explain and predict family size in LDCs. That is for empirical testing to decide, and such tests are just beginning to be undertaken.

At the same time, there is little evidence that the Malthusian approach is best fitted for the study of family size in LDCs. Per capita income is in general not falling in these countries. In addition, there are appreciable gains in living standards which are reflected in improved health conditions and longer life expectancy. Moreover, birth rates are falling in a number of LDCs.

None of this is to suggest that LDCs or even some developed economies do not have a population "problem." In fact, an economic approach to family size clarifies the nature of an overpopulation problem and suggests what may be required by way of a solution. The problem, simply stated, is "too many people" relative to some "desired" population from the point of view of society (as perceived by some agent of society—the government or a planning agency). Such a problem could stem from parents ending up with more children than they want or it may reflect that couples demand more children than is socially desirable. In reality, both factors no doubt play a role. This means, however, that policies designed to reduce the cost of family planning (by devising inexpensive and morally acceptable family planning methods, for example) cannot guarantee a solution to an overpopulation problem. Modern family planning methods only make it easier to control family size. They do not reduce the desired size of the family. To accomplish this, the government must either alter the incentives for childbearing (by changing the "price" or rate of return on children) or directly curtail the freedom of some or all families to choose the number of children they desire. Pills and propaganda are not enough to curb overpopulation, as the economic approach to family size makes clear.

*For an analysis in this vein, see Philip A. Neher, "Peasants, Procreation, and Pensions," *American Economic Review* 61 (1971): 380–89.

when designing population programs. In particular, assessments of the impact of various policies on the "price" of children would seem desirable. Finally, the optimistic conclusions of the "household model" about mankind's destiny should not be taken as a signal for complacency in the face of some obvious population problems in many parts of the world. Economists study only a part of the large puzzle known as human nature. Hence, the contributions of the other social sciences must also be taken into consideration in designing policies. The "household model" approach indeed tells us that doomsday is not the inevitable natural legacy of mankind. But from this we should not conjecture that the only other feasible outcome is prosperity and bliss.

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