READING 20

AN ECONOMIC ANALYSIS OF FERTILITY

Gary S. Becker

Leibenstein's cost-benefit approach to fertility decisions (see reading 18) emphasizes the long run effects of a secular rise in income on family size decisions. Taking the less developed low-income countries as his starting point, he concludes that in the long run economical progress with its con-comittant rise in income levels ultimately depresses income levels.

Professor Gary Becker (born 1930) now at the University of Chicago focuses on the more developed affluent societies in which children do not contri-bute to the income of their parents.[20] Their economic benefits are zero but they do provide psychic income or satisfaction. Using a utility maxi-mization model subject to budget constraints he argues that rising dis-posable incomes result in higher fertility. Treating the demand for children analogously to the demand for consumer durables such as houses and cars he concludes that when the consumers' income increases his demand for children will increase as well. The empirical fact that in reality the more affluent families are often smaller than the low income ones is ac-cording to Becker due to unequal access to contraceptive information and devices. In a society where access to contraceptive knowledge and facili-ties would be completely equal, income and family size would be positvely correlated.

Becker also distinguishes between quantity elasticity and quality elasti-city. As incomes rise, people not only consume durable goods in greater quantity (inferior goods being the exception to the rule) but they also require higher-quality products which yield extra satisfaction. The same holds for children. With rising incomes the concern with child quality is intensified and parents spend increasing amounts on higher-quality rearing and education. Becker concludes that the quantity income elasti-city is positive but low while the quality elasticity is high. Hence as incomes increase people do to some extent respond by having larger fami-lies but the main part of the added income set aside for children is de-voted to higher-quality rearing and education.

In comment we may observe here that Becker only considers the short term effect of income changes. As long as tastes and preferences do not change rising disposable incomes will in fact tend to affect fertility positively. In the longer run, however, rising incomes tend to modify people's value systems and attitudes. Higher income levels are usually associated with socio-economic progress which presents new needs and opportunities such as increased access to education and information as well as greater social and spatial mobility. These phenomena affect people's fertility negative-ly via a change in their preferences and values.

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[20] Source: G. S. Becker, "An Economic Analysis of Fertility", Demographic and Economic Change in Developed Countries ed. National Bureau of Econ-omic Research (Princeton: Princeton University Press, 1960), pp.209-217.

The inability of demographers to predict western birth rates accurately in the postwar period has had a salutary influence on demographic re-search. Most predictions had been based either on simple extrapolations of past trends or on extrapolations that adjusted for changes in the age-sex-marital compostion of the population. Socio-economic considerations are entirely absent from the former and are primitive and largely implicit in the latter. As long as even crude extrapolations continued to give fairly reliable preductions, as they did during the previous half century, there was little ca'l'l for complicated analyses of the interrelation be-tween socio-economic variables and fertility. However, the sharp decline in birth rates during the thirties coupled with the sharp rise in rates during the postwar period swept away confidence in the view that future rates could be predicted from a secularly declining function of popu-lation compositions.

Malthus could with some justification assume that fertility was deter-mined primarily by two primitive variables, age at marriage and the frequency of coition during marriage. The development and spread of knowledge about contraceptives during the last century greatly widened the scope of family size decision-making, and contemporary researchers have been forced to pay greater attention to decision-making than either Malthus or the forecasters did. Psychologists have tried to place these decisions within a framework suggested by sociological theory, but most persons would admit that neither framework has been particularly succes-sful in organizing the information on fertility.

Two considerations encouraged me to analyze family size decisions within an economic framework. The first is that Malthus' famous discussion was built upon a strongly economic framework; mine can be viewed as a generalization and development of his. Second, although no single variable in the Indianapolis survey explained more than a small fraction of the variation in fertility, economic variables did better than others. Section I develops this framework and sets out some of its implications. Section II uses this framework to analyze the actual effects of income on fertility. Section III speculates about some further implications of the discussion in I and II.

I. THE ECONOMIC FRAMEWORK

General Considerations

In societies lacking knowledge of contraception, control over the number of births can be achieved either through abortion or abstinence, the latter taking the form of delayed marriage and reduced frequency of coition during marriage. Since each person maintains some control over these variables, there is room for decision-making even in such societies.

Other things the same, couples desiring small families would marry
later and have more abortions than the average couple. Yet the room
for decision-making would be uncomfortably small, given the taboos
against abortion, the strong social forces determining the age of mar-
riage, and the relative inefficiency of reductions in the frequency of
coition. Chance would bulk large in determining the distribution of
births among families.

The growth of knowledge about contraception has greatly widened the
scope of decision-making, for it has separated the decision to control
births from the decision to engage in coition. Presumably, such a widen-
ing of the scope of decision-making has increased the importance of en-
vironmental factors, but which of the numerous environmental factors are
most important? To simplify the analysis of this problem I assume init-
ially that each family has perfect control over both the number and
spacing of its births.

For most parents, children are a source of psychic income or satisfaction,
and, in the economist's terminology, children would be considered a
consumption good. Children may sometimes provide money income and are
then a production good as well. Moreover, neither the outlays on child-
ren nor the income yielded by them are fixed but vary in amount with the
child's age, making children a durable consumption and production good.
It may seem strained, artificial, and perhaps even immoral to classify
children with cars, houses, and machinery. This classification does not
imply, however, that the satisfactions or costs associated with children
are morally the same as those associated with other durables. The sat-
isfaction provided by housing, a "necessity," is often distinguished
from that provided by cars, a "luxury," yet both are treated as consumer
durables in demand analysis. Abstracting from the kind of satisfaction
provided by children makes it possible to relate the "demand" for child-
ren to a well-developed body of economic theory. I will try to show that
the theory of the demand for consumer durables is a useful framework in
analyzing the demand for children.

Tastes

As consumer durables, children are assumed to provide "utility." The
utility from children is compared with that from other goods via a util-
ity function or a set of indifference curves. The shape of the indiffer-
ence curves is determined by the relative preference for children, or,
in other words, by "tastes." These tastes may, in turn, be determined
by a family's religion, race, age, and the like. This framework permits,
although it does not predict, fertility differences that are unrelated
to "economic" factors.

Quality of Children

A family must determine not only how many children it has but also the
amount spent of them--whether it should provide separate bedrooms, send
them to nursery school and private colleges, give them dance or music
lessons, and so forth. I will call more expensive children "higher
quality" children, just as Cadillacs are called higher quality cars than
Chevrolets. To avoid any misunderstanding, let me hasten to add that
"higher quality" does not mean morally better. If more is voluntarily
spent on one child than on another, it is because the parents obtain

additional utility from the additional expenditure and it is this ad-
ditional utility which we call higher "quality."

Income

An increase in income must increase the amount spent on the average
good, but not necessarily that spent on each good. The major exceptions
are goods that are inferior members of a broader class, as a Chevrolet
is considered an inferior car, margarine an inferior spread, and black
bread an inferior bread. Since children do not appear to be inferior
members of any broader class, it is likely that a rise in long-run in-
come would increase the amount spent on children.

For almost all other consumer durables, such as cars, houses, or refrig-
erators, families purchase more units as well as better quality units
at higher income levels, with the quantity income elasticity usually
being small compared to the quality elasticity. If expenditures on
children responded in a similar way, most of the increased expenditures
on children would consist of an increase in the quality of children.
Economic theory does not guarantee that the quantity of children would
increase at all, although a decrease in quantity would be an exception
to the usual case. Thus an increase in income should increase both the
quantity and quality of children, but the quantity elasticity should be
small compared to the quality elasticity.

Malthus, on the other hand, concluded that an increase in income would
lead to a relatively large increase in family size. His argument has
two major components. First, an increase in income would cause a de-
cline in child mortality, enabling more children to survive childhood.
If a decrease in births did not offset the decrease in child mortality,
the number of children in the average family would increase. His second
argument is less mechanical and takes greater account of motivation.
An increase in income increases fertility by inducing people to marry
earlier and abstain less while married.

My analysis has generalized that of Malthus by relating the quantity
of children to the quality of children and by permitting small (even
negative) quantity income elasticities as well as large ones. My con-
clusion that in modern society the quantity elasticity is probably
positive but small differs from his for the following reasons. First,
child mortality has fallen so low that the ordinary changes in income
have little effect on the number of survivors out of a given birth co-
hort. Moreover, it is doubtful that even a large decline in child
mortality would have much effect on family size, for parents are prim-
arily interested in survivors, not in births per se. Therefore, a de-
cline in child mortality would induce a corresponding decline in births.
Second, births can now be controlled without abstinence and this has
greatly reduced the psychic costs of birth control. "Human nature" no
longer guarantees that a growth in income appreciably above the subsis-
tence level results in a large inadvertent increase in fertility.

Cost

In principle the net cost of children can be easily computed. It equals
the present value of expected outlays plus the imputed value of the
parents' services, minus the present value of the expected money return

plus the imputed value of the child's services. If net costs were positive, children would be on balance a consumer durable and it would be necessary to assume that psychic income or utility was received from them. If net costs were negative, children would be a producer durable and pecuniary income would be received from them. Children of many qualities are usually available, and the quality selected by any family is determined by tastes, income, and price. For most families in recent years the net expenditure on children has been very large.

Real incomes per capita in the United States have increased more than threefold in the last 100 years, which must have increased the net expenditure on children. It is possible that in the mid-nineteenth century children were a net producer's good, providing rather than using income. However, the marginal cost of children must have been positive in families receiving marginal psychic income from children; otherwise, they would have had additional children. Even in 1850, the typical family in the United States was producing fewer children than was physically possible. Some more direct inferences can be drawn from the data on Negro slaves, an extreme example of a human producer's good. These data indicate a positive net expenditure on male slaves during their first eighteen years. Slave raising was profitable because the high price that an eighteen-yearold could bring more than offset the net cost during the first eighteen years. Presumably, in most families expenditures on white children during their first eighteen years were greater than those on slaves. Moreover, after eighteen, white children became free agents and could decide whether to keep their income or give it to their parents. The amount given to parents may have been larger than the costs before eighteen, but it is more likely that costs before eighteen dominated returns after eighteen. This conclusion does not imply that monetary returns from children were unimportant, and indeed, they are stressed at several points in this paper. It does imply, however, that a basic framework which treats children as a consumer's good is relevant not only for the present, but also for some time in the past.

A change in the cost of children is a change in the cost of children of given quality, perhaps due to a change in the price of food or education. It is well to dwell a little on this definition for it is widely misunderstood. One would not say that the price of cars has risen over time merely because more people now buy Cadillacs and other expensive cars. A change in price has to be estimated from indexes of the price of a given quality. Secular changes in real income and other variables have induced a secular increase in expenditures on children, often interpreted as a rise in the cost of children. The cost of children may well have risen (see pp. 227-28) but the increase in expenditure on children is no evidence of such rise since the quality of children has risen. Today children are better fed, housed, and clothed, and in increasing numbers are sent to nursery schools, camps, high schools, and colleges. For the same reason, the price of children to rich parents is the same as that to poor parents even though rich parents spend more on children. The rich simply choose higher quality children as well as higher qualities of other goods.

It is sometimes argued that social pressures "force" richer families to spend more on children, and that this increases the cost of children to the rich. This higher cost is supposed to explain why richer families have fewer children than others and why richer societies have fewer

children than poorer ones. However, since the cost of different goods is given in the market place, social pressures cannot change this, but can only change the basket of goods selected. That is, social pressures influence behavior by affecting the indifference curve structure, not by affecting costs. To put this differently, social pressures may affect the income elasticity of demand for children by rich (and poor) families, but not the price elasticity of demand. Therefore, the well known negative relationship between cost (or price) and quantity purchased cannot explain why richer families have had relatively few children. Moreover, nothing in economic analysis implies that social pressures would make the quantity income elasticity of demand for children negative. Thus my conclusion that the quantity income elasticity if relatively small but positive and the quality elasticity relatively large is entirely consistent with an analysis which emphasizes social pressures.

Suppose there was an equal percentage decline in the price of all qualities of children, real income remaining constant. Although economic theory suggests that the "amount" of children consumed would increase, it does not say whether the amount would increase because of an increase in quantity, quality, or both--the last, however, being most likely. It also has little to say about the quantitative relationship between price and amount. There are no good substitutes for children, but there may be many poor ones.

Supply

By and large, children cannot be purchased on the open market but must be produced at home. Most families are no longer self-sufficient in any major commodity other than children. Because children are produced at home, each uncertainty in production is transferred into a corresponding uncertainty in consumption, even when there is no uncertainty for all families taken together. Although parents cannot accurately predict the sex, intelligence, and height of their children, the distribution of these qualities is relatively constant for the country as a whole. This uncertainty makes it necessary to distinguish between actual and expected utility. Thus suppose a group of parents received marginal utility equal to U_m from a male child and U_f from a female child. The expected utility from an additional child equals $EU = PU_m + (I - P)U_f \cong \frac{U_m + U_f}{2}$, where P, the probability of a male is approximately equal to $1/2$. They would have additional children whenever the expected utility per dollar of expected cost from an additional child were greater than that from expenditures elsewhere. The actual utility is either U_f or U_m, which differs from EU as long as $U_f \neq U_m$. In fact, if U_f (or U_m) were negative, some parents would receive negative utility.

A second important consequence of uniting consumption and production is that the number of children available to a family is determined not only by its income and prices but also by its ability to produce children. One family can desire three children and be unable to produce more than two, while another can desire three and be unable to produce fewer than five. The average number of live births produced by married women in societies with little knowledge of contraception is very high. For example, in nineteenth-century Ireland, women marrying at ages 20-24 averaged more than 8 live births. This suggests that the average family more frequently had excess rather than too few children.

Relatively effective contraceptive techniques have been available for at least the last 100 years, but knowledge of such techniques did not spread rapidly. Religious and other objections prevented the rapid spread of knowledge that is common to other technological innovations in advanced countries. Most families in the nineteenth century, even in advanced Western countries, did not have effective contraceptive information. This information spread slowly from upper socio-economic groups to lower ones.

Each family tries to come as close as possible to its desired number of children. If three children are desired and no more than two are available, two are produced; if three are desired and no fewer than five are available, five are produced. The marginal equilibrium conditions would not be satisfied for children but would be satisfied for other goods, so the theory of consumer's choice is not basically affected. Families with excess children consume less of other goods, especially of goods that are close substitutes for the quantity of children. Because quality seems like a relatively close substitute for quantity, families with excess children would spend less on each child than other families with equal income and tastes. Accordingly, an increase in contraceptive knowledge would raise the quality of children as well as reduce their quanity.

READING 21

In 1952 Sir Charles Darwin (born 1887), a well known British scientist and descendant of the great nineteenth century naturalist, published a work entitled The Next Million Years in which he argued that the prosperity a large part of the world then enjoyed could not be of lasting nature. We live, he said, in a "Golden Age" characterized like former periods of an identical nature by a food surplus due to technical advances. Periods of prosperity, however, tend to abolish the various checks on population and numbers grow up to the new population ceiling. Then the "Golden Age" is over and "Average History" recurs. Average history is characterized by heavy pressure of population on resources with many people unable to survive because of high mortality conditions.

The present address, delivered in Vevey, Switzerland, in 1960, summarized Darwin's views at that time. Darwin denies that economic development and increases in per capita income reduce fertility. This, it will be remembered, is the essence of the theory of the demographic transition. The fact that in most countries of the western worl the birth rate rose after World War II proved to him that economic progress stimulated fertility. In a sense Darwin returns to the views of the 18th century economist Cantillon and the classical economists such as Malthus who had argued that economic betterment (due to higher yields per acre, improved wages, etc.) tended to increase completed family size and thereby population. As a result, says Darwin, our relatively high living standards are not sustainable in the long run. Darwin also discusses some difficulties of population control.[21]

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[21] Source: E. Bignami, J.C. Corthesy (eds.), Humanity and Subsistence (Lausanne: Librairie Payot, 1961), pp. 88-95.