PETER H. LINDERT

Fertility and Scarcity in America

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PETER H. LINDERT

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Preface

Teaching often breeds research, and the present book grew out of a series of lectures in economic history in which I attempted to survey the literature linking population growth and economic growth in the past. Those lectures were breezy and ambitious at first. They noted the likely mutual interaction between modern economic growth and the demographic transition, and veered off into a theme I felt deserved more attention: the seeming tendency of fertility and income inequality to feed each other.

Lecturing on these economic-demographic interactions soon showed me some of the glaring theoretical and empirical inadequacies of the existing literature. When drawing causal arrows from population growth to the economy, most authors casually assumed one or the other labor-supply effect. Some presumed that diminishing returns and substitution effects predominated, so that extra labor supply lowered capital per worker and output per capita. Others, especially when facing the postwar growth "miracles," felt that extra labor supply bid down wage rates and shifted income toward the accumulating classes enough to raise both capital per worker and output per capita. This threw the net effect of population growth on per capita income into doubt, and in doubt it remains. At the same time I came to feel that nobody had reflected carefully enough on just how child costs, whatever that meant, evolved with economic development and differed across income classes. In the background lay the nagging suspicion that these economic-demographic interactions should also be modelled in a way that had something to do with the price of land.

These dissatisfactions led to an overambitious research grant proposal on "Fertility, Land and Income Distribution." I proposed to develop a grand computer simulation model revealing the interactions among the variables advertised in the proposal of the title. The model would be about as large as the World I model of the Club of Rome group proved to be. It would be confronted with exhaustive empirical gleanings from the whole history of the United States and modern Britain and Japan. In passing I would set straight the whole confused literature on the welfare economics of having children. The proposal succeeded, apparently on sheer *chutzpah.*

The subsequent research process was one of reverting to a careful treatment of theoretical and empirical issues that the proposal had assumed were already resolved. I quickly dropped the grand simulation model, a step I have never regretted. Britain and Japan dropped by the wayside as it became clear that only the United States would easily yield the underlying empirical tests. The price of land became something to be documented and explained in its own right, and could not be pursued as a fertility determinant at any length. The work on land scarcity became a separate article in the 1974 *Journal of Economic History*, with only slight links to the rest of the research. Instead of neatly picking an influence of income inequality on aggregate fertility out of a well-established fertility literature, I found myself retreating to rethinking basic unresolved questions about how incomes and relative prices really affected fertility. At the same time, the empirical link from fertility to inequality of human capital and of income proved more fascinating at the microeconomic level than I had realized. The result was an unanticipated exploration into the interior of the household, to quantify how an extra child related to the allocation of time and goods and to subsequent child achievement.

It remains for future research to follow more leads given in my original research plan. The rethinking of the concept of relative child costs in Chapter 4 here is being extended, at last, to developing nations in a Universities-NBER paper on "Child Costs and Economic Development." The tests of the relative-income hypothesis in Chapter 5 should be extended to other countries. And the asserted link between population growth and income inequality is leading into a larger project on the macroeconomic determinants of inequality trends in several countries, to be conducted with Jeffrey G. Williamson. True to earlier form, this project has begun by answering a question I had earlier thought was answered by past literature: what really were the trends in income inequality in the U.S., Britain, and other countries?

The present book reflects generous inputs of funding and effort from others. Two agencies gambled on the proposal at the outset: The Population Council, with grant D72.64A and an earlier summer grant; and the Rockefeller Foundation, through Grant RF72017 in the Ford-Rockefeller program on Law and Population Policy. When more was needed, the Institute for Research on Poverty (backed by the Office of Economic Opportunity) and the Graduate School of the University of Wisconsin came to the rescue.

As the inquiry became more microeconomic and empirical, I was able to benefit from generous help in the acquisition and processing of survey and other data. Three scholars generously supplied computer-ready data banks. Professor Kathryn Walker of the College of Human Ecology at Cornell made available the uniquely detailed Cornell Time Use Survey data gathered in Syracuse in 1967–68, used in Chapters 4 and 6 and Appendix C. Professor Allen C. Kelley of Duke, along with his research assistant Glenn Worroch, delivered the computer tape of the 1889–90 industrial worker survey, used in Chapter 4 and Appendix B. Professor Albert I. Hermalin of Michigan supplied cards and codes for the New Jersey sample of siblings, used in Chapter 6. These data sets were processed according to my labor-intensive specifications by three expert programmers at Wisconsin: John T. Soper, Nancy Williamson, and Leo DeBever. I am deeply indebted to these people, as well as to my research assistants. Rebecca Maynard labored through the early rounds of child-cost calculations, which proved convincingly that no young couple would ever make such calculations before deciding whether or not to have a child. Patricia Lipton continued the same elaborate child-cost arithmetic, while also contributing immense labor to computer programming and the gathering of further historical data. Research help was also generously given by Moses S. Musoke, Robert Gitter, and J. Scott Winningham.

I wish also to acknowledge the helpful comments and criticisms given on earlier drafts by, among others, Duane E. Ball, James Cramer, Phillips Cutright, Richard A. Easterlin, Elizabeth Hoffman, Ronald D. Lee, Arleen Leibowitz, Warren Sanderson, Theodore W. Schultz, Julian Simon, Alan Sweezy, Boone A. Turchi, Jeffrey G. Williamson, and seminar participants at the Universities of Michigan, Pennsylvania, and Wisconsin.

Most books, I suspect, are written by families and not by individuals. This one benefited from the last-minute help in drafting figures given by my father-in-law, Frank D. White. It benefited, above all, from the support and preseverance of my wife Lin, to whom it is dedicated.

University of California, Davis
and
University of Wisconsin, Madison

Part I:

OVERVIEW

CHAPTER 1. The Issues

Since before Malthus, scholars have maintained a strong interest in both sides of the circle joining human fertility with the economy. The intuition persists that higher fertility, and population growth in general, must make natural resources more scarce and reduce material living standards, even though the data have not yet confirmed this pessimistic view. Scholars have also been recurrently fascinated by the possibility that economic forces may help us explain movements in fertility itself. This book takes up both kinds of issues. It seeks to redirect our concern over the economic consequences of higher fertility and population growth toward more emphasis on their tendency to heighten economic inequalities. It also seeks to improve upon our knowledge of how economic developments affect fertility.

There are reasons to be concerned about the economic implications of bringing extra babies into the world, but there is also reason to believe that the scholarship on this issue has not yet succeeded in resolving which reasons for caring are most compelling. Population growth has been suspected of (1) lowering aggregate income per capita, (2) making natural resources more scarce, (3) lowering environmental quality, and (4) making incomes more unequally distributed. The first of these concerns deserves less emphasis than it has received, while the last deserves more.

To be a proper object of social concern, extra births must have clear negative effects on the well-being of persons outside the individual family having the extra children. It must also be shown that these negative effects outweigh other positive effects that transcend the family. If the social costs of an extra child are borne only by his parents and older siblings, the extra birth is the family's business and not society's.

This simple welfare rule of thumb is one that has not been well heeded by past attempts to show that extra births reduce income per capita. An extra child may lower income per capita without harming anyone. Income per family member is almost sure to be reduced by the arrival of an extra child. The child is an extra mouth to feed, an extra "capita" in the ratio of income per capita, and this almost invariably outweighs his net contribution to family income, even in less-developed settings in which a child gives more work value to his parents' household than he detracts from the earnings of other family members. The extra child might reduce national income per capita only to the extent that he reduces income per capita within his own family. A voluntary decision to have an extra child may thus have no more serious social implications than a voluntary decision to retire from the labor force and enjoy more leisure time. Both decisions lower aggregate income per capita, yet this effect on income per capita is a weak basis for urging that society discourage such private activities.

The concern over the effects of fertility on income per capita has been misdirected for other reasons as well. Superficial looks at international cross sections have failed to reveal the expected negative relationship between the rate of population growth and the rate of growth of national product per capita.[1] It could be argued that these glances at cross sections are not a fair test of the proposition that population growth drags down the rate of growth of income per capita. It seems more useful, however, to take these simple results as another clue that to establish the economic case for restricting fertility, one must look beyond income per capita.

The absence of a simple correlation between population growth and income-per-capita growth suggests that increases in population have not pressed so relentlessly against nonrenewable natural resources as intuition and David Ricardo have said. A little reflection confirms that population growth need not constrain economic growth by making natural resources more scarce. Population growth does not affect all sectors of the economy proportionally, nor do all sectors use natural resources in the same proportion. It might be the case that population growth causes a shift in resources away from the sectors that use natural resources most heavily. This possibility deserves to be explored, the more so since there has been no long-run historical trend toward higher relative prices for most natural resource products. Such a re-examination of the link between population and natural resource scarcity would require a book in itself, and is not attempted here.

The lack of a clear effect of population growth on income per capita also suggests other ways of redirecting the inquiry into the economic case for discouraging births. First, any further investigation of the effect on aggregate living standards ought to drop income per capita in favor of (full-time) income *per lifetime* as a welfare proxy. We care about the length of life as well as income per year. Attention should be given to the strong possibility that extra births may reduce life expectancy by spreading infectious diseases and by lowering living standards and disease resistance in poor families, thus burying those whose welfare losses are hidden from the measurement of national income per living person per year.

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[1] See Alfred Sauvy, "Les charges économiques et les avantages de la croissance de la population," *Population* 27 (January–February 1972), 9–26; J. C. Chesnais and Alfred Sauvy, "Progrès économique et accroissement de la population: une expérience commentée," *Population* 28 (July–October 1973), 843–857; Simon Kuznets, "Population and Economic Growth," *Proceedings of the American Philosophical Society* 3 (June 1967), 170–193; and Richard A. Easterlin, "Population," in Neil W. Chamberlain, ed., *Contemporary Economic Issues*, Homewood, Ill.: Richard D. Irwin, 1973, pp. 346–348.

More important than this adjustment of the old income-per-person yardstick is the pursuit of two sets of potential "externalities," or "spillover" effects, of extra fertility that are missed by any ordinary measure of income per person. One set consists of the environmental externalities imposed on others through pollution and congestion. The other consists of externalities transmitted through the effects of extra births upon the distribution of income. Extra children may on balance raise social tensions and cries of injustice by transferring income from less fertile to more fertile households, or from poor to rich. Persons who care about such redistributions of income may bear external costs from fertility increases, or receive external benefits from fertility reduction.

Both sets of externalities deserve further exploration. In recent years the concern over population externalities has focused almost exclusively on the environmental effects. Some of the environmental externalities from population growth appear to have received more than their share of emphasis. To be sure, the average extra child would tend to pollute and crowd the world a bit if nothing were done to check this influence. But there is no reason to work on restricting fertility while leaving other things equal. As other authors have pointed out, restricting human numbers is a grossly inefficient way of combating most kinds of pollution.[2] Direct disincentives to engage in the polluting activity itself are much more efficient. The importance of emphasizing the environmental externalities is also often limited by a failure of the locus of the problem to correspond to the locus of extra population growth. Pollution, for example, seems to impose much higher psychic costs on higher-income countries than on lower-income countries, which are not willing to give up much economic development at all to reduce pollution. The demand for clean air and clean water is highly income-sensitive. It seems, on the other hand, as though significant further reductions in the rate of population growth in higher-income countries are unlikely now that the rate has tapered off toward zero. There is reason to think that policy could make major reductions in the rate of population growth only in countries now characterized by rapid population growth, the very countries in which policy-makers place the lowest values on the quality of ambient environments.

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[2] E.g., Edmund S. Phelps, "Population Increase," *Canadian Journal of Economics* 1 (August 1968), 510–511; and Glen G. Cain, "Issues in the Economics of a Population Policy for the United States," *American Economic Review* 61 (May 1971), 410.

This is not to say that all of the environmental externalities from population growth have been overemphasized. There is prima facie evidence that population growth imposes congestion costs and changes global climate in ways that are hard to offset completely without attacking population growth itself. It may be, for example, that all sorts of basic human activity, such as breathing, burning fuel, and cultivating dry lands, have the effect of shifting the monsoons dangerously toward the equator, bringing sustained drought to the populous monsoon zone stretching from Sahelian Africa through Northern India to the Philippines.[3] Such possible congestion and climatic effects may prove very serious. Not enough is yet known about such effects. They fully deserve the attention they are receiving. They cannot be pursued here, however.

The possibility that higher fertility and population growth may make incomes more unequally distributed has received relatively little attention.[4] The possibility that rapid population growth may depress wage

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[3] See Reid A. Bryson, "World Food Prospects and Climatic Change," testimony before the joint meeting of the Senate Subcommittee on Foreign Agricultural Policy and Subcommittee on Agricultural Production, Marketing, and Stabilization of Prices, October 18, 1973, and the sources cited there.

[4] The most notable recent exceptions are J. E. Meade, "Population Explosion, the Standard of Living, and Social Conflict," *Economic Journal* 77 (June 1967), 233–255; Herman E. Daly, "A Marxian-Malthusian View of Population and Development," *Population Studies* 25 (March 1971), 25–37; T. Paul Schultz, "An Economic Perspective on Population Growth," in Roger Revelle, ed., *Rapid Population Growth*, Baltimore: The Johns Hopkins Press, 1971, p. 159; Neil W. Chamberlain, *Beyond Malthus: Population and Power*, New York, 1970, Chap. 7; Robert Repetto, "The Relationship of the Size Distribution of Income to Fertility and the Implications for Development Policy," Harvard University Center for Population Studies, Research Paper no. 3 (March 1974; revised, fall 1974); Hollis Chenery et al., *Redistribution with Growth*, London: Oxford University Press, 1974, Chaps. 1, 2, 11; and James Kocher, *Rural Development, Income Distribution, and Fertility Decline*, New York: Population Council, 1973.

Among the recent studies expressing concern over population growth that have rates is frequently mentioned and then dropped. This is curious in view of the fact that concern over the income distribution remains widespread. The degree of inequality in personal purchasing power is a public good, one that different people value differently. It is an aggregate outcome, possessing the two properties that define a public good: "nonexhaustion" (my enjoyment of the degree of equality of incomes does not keep you from enjoying or disliking it) and "nonexclusion" (once it is available, it is available for us all). If population growth tends to heighten inequalities, it has a subjective cost that can be very important even if not easily measured. If there is a strong link between extra fertility and inequality, then extra fertility has an external cost which society should consider shifting to young couples with measures discouraging larger families.[5]

If there seems to be a case for worrying about a fertility-inequality link in a high-income country, there is an even stronger case in the low-income countries, which tend to have higher income inequality,[6] higher fertility, and more rapid population growth. In many such countries a link between fertility and inequality would be a link between fertility and death. It may be that the high fertility of low-income countries causes millions of deaths each year—again, without noticeably reducing in-

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not even mentioned a link to inequality are: U.S. Commission on Population Growth and the American Future, *Population and the American Future*, New York, 1972, and the research report volumes of the same commission that deal with the economic effects of population growth; Ansley J. Coale and Edgar M. Hoover, *Population Growth and Economic Development in Low-Income Countries*, Princeton, 1958; Paul R. Erlich, *The Population Bomb*, New York, 1968; Gunnar Myrdal, *Asian Drama: An Inquiry into the Poverty of Nations*, New York, 1968; and Donella H. Meadows et al., *The Limits to Growth*, New York, 1972.

[5] Strictly speaking, a tendency of population growth to make income inequality greater than most members of society wish is not sufficient basis for policies to restrict births, since society could treat the problem of inequality directly by shifting transfers in such a way as to offset any tendencies to redistribute income away from the optimum. The process of enacting legislation to redistribute income through transfers, however, has its own social costs. Social tensions mount and large amounts of energy and funds are spent on lobbying for and against any overt redistribution. It seems likely that over the generations substantial income leveling could be achieved with antinatal policies of various types with little social cost of policy enactment.

[6] Felix Paukert, "Income Distribution at Different Levels of Development: A Survey of Evidence," *International Labour Review* 108 (August–September 1973), Table 6; and Hollis Chenery, Montek S. Ahluwalia et al., *Redistribution with Growth*, Table I.1 (1974), Table 6.

come per capita per year. The exploration of this issue in Chapters 6 and 7 below reflects and supports this very suspicion about the importance of fertility restriction in low-income countries. It just so happens that the issue is best pursued here by following the better-documented American experience, one which tells a pessimistic story about low-income countries in mirror image, by linking the decline in American population growth to the twentieth-century decline in American inequality.

There are many plausible theoretical reasons for suspecting that higher fertility will lead to greater inequality of income, and that reducing fertility will equalize incomes. Some of these are microeconomic in the sense that they are theories about how changes in fertility affect the distribution of individuals' economic endowments within a fixed set of wage rates and rates of return on property. Another relates to the supply of school support from governments and nonprofit agencies. Still others are theories about the macroeconomic effects of fertility on rates of pay. Let us review these arguments, expressing each as reasons why fertility *reduction* might *equalize* incomes.

There are, first, two relatively subtle microeconomic reasons for believing that fertility reduction would level incomes:

(1) A reduction in fertility lowers the dispersion of family sizes, since birth restriction typically reduces the number of children born into very large families by a greater percentage than it reduces the number of first-born and second-born children. Since larger family size seems like a factor that should retard the development of earning capacity in individual children, the reduction in family size differences ought to reduce later earnings inequality.

(2) Since about 1910, birth restriction in the U.S. has on balance reduced the share of children born into poor and less-educated families. The same should be true of birth restrictions from 1970 into the future, since surveys have found that in the 1960s unwanted births were still a greater share of total births among the poor. Birth restriction should thus tend to lower income inequality by cutting down on the share of children born into the extreme disadvantage of being unwanted members of large low-income families.

Both of these arguments hinge on the view that extra children strain family economic and emotional energies.

One might also suspect that reductions in fertility ease the strain on the public and philanthropic supply of resources for schools, uplifting and leveling the earning power of each generation of children:

(3) If the total amount of philanthropic and taxpayer support for schooling is characterized by inertia, then the strain on school systems should be directly related to the share of the population that is of school age. Reducing births may reduce the ratio of children to adults more than it reduces public (and philanthropic) school expenditures per adult, so that the smaller cohort of school-age children enjoys greater public educational outlays per child. To the extent that this public-support effect is more relevant below college than it is for public funding of higher education, the extra public expenditures per child should help the most disadvantaged children the most. This should reduce inequalities of schooling and income.

This presumption may not be shared by all. One could easily imagine that the effect of fertility decline is exactly the opposite. It is possible that fertility decline would actually *reduce* public support *per child* for lower-level schooling and for education in general, by reducing the share of voters directly concerned about school quality. Fertility reduction, in other words, might spark a taxpayer revolt, in which currently childless taxpayers demand so much relief that school inputs drop even faster than the number of children. This same argument about the relative voting power of parents would predict that a baby boom would subsequently raise school support per child. Probably more people share the "strain on public schools" belief [(3) above] than believe in this voting-power hypothesis. The matter of which argument makes more sense is an empirical question addressed briefly in Chapter 6 below [which finds evidence in favor of (3) and against the competing hypothesis].

There are also several macroeconomic reasons for believing in a long-run link between fertility and inequality. Since Malthus and earlier, many observers have believed that population growth depresses wage rates by supplying more workers. This belief seems to have been Malthus' main economic reason for being convinced that poor relief, which he felt would breed larger families, would create even more poverty.[7]

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[7] Thomas Robert Malthus, *An Essay on the Principle of Population . . .*, London, 1798, Chap. 5. There is certainly reason to question whether poor relief significantly raised the fertility of the poor even in Malthus' time. See James P. Huzel, "Malthus, the Poor Law, and Population in Early Nineteenth-Century England," *Economic History Review*, 2d ser. 22 (December 1969).

Similar concern about the link between fertility and wage rates has at times been voiced by friends of labor and of business. In early nineteenth-century England, Francis Place, a birth control propagandist born into the working class, distributed handbills "To the Married of Both Sexes of the Working People," urging them to restrict births for the sake of future wages:

> By limiting the number of children, the wages both of children and of grown up persons will rise; the hours of working will be no more than they ought to be; you will have some time for recreation, some means as well as some time for your own and your children's moral and religious instruction."[8]

On the other side of the wage bargain, it was apparently business concern over the future of labor costs that recently caused Japan's former Prime Minister Eisaku Sato and Japan's Population Problems Inquiry Council to urge a crowded Japan to *raise* its fertility.[9]

A little reflection suggests that this basic argument can be divided in two:

(4) A drop in fertility would mean fewer labor-force entrants a generation later. This in turn should accelerate the rise of all employee wage rates—skilled and unskilled—relative to profit rates and to rates of return on property. Since the ownership of property is almost always distributed less equally than is human earning power, a rise in employee wage rates relative to rates of return for property holders and profit recipients makes income more equally distributed.

(5) Among employees, the reduced dispersion, and higher average level, of skills caused by the microeconomic effects of birth reduction [see (1) and (2) above] should further reduce inequality of earnings by bidding down the premia earned by higher-paid employees. That is, fertility reduction should raise the wage rates of unskilled labor more than it raises skilled wage rates. The same result is reinforced by the fact that lower fertility leads to an older, better-paid, and more experienced labor force.

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[8] Francis Place, "To the Married of Both Sexes of the Working People," handbill, London, 1823, reprinted in Norman E. Himes, *The Medical History of Contraception*, New York, 1963, pp. 216–217. Place (earlier) fathered fifteen children, five of whom died at birth.

[9] Philip M. Boffey, "Japan: A Crowded Nation Wants To Boost Its Birthrate," *Science* 167 (February 13, 1970), 960–962.

Some other, more subtle, macroeconomic arguments relate to the presumed effect of fertility change on the demand for final products. It seems likely that lower fertility, by creating fewer mouths to feed, would reduce the relative importance of food in household budgets. This suggests that a decline in fertility should tend to have three demand side effects on overall inequality:

(6) By shifting demand away from agricultural products, reductions in fertility may lower the relative price of these products. This would tend to reduce inequalities in real purchasing power to the extent that agricultural products are a greater share of the cost of living of poor families than of rich.

(7) The same demand shift would cause a shift of labor and capital out of agriculture, in proportions that would reduce the farm sector's share of total labor employment more noticeably than its share of total capital employment would be reduced. This shift of low-paid labor out of agriculture into what will tend to be higher-paid jobs elsewhere should reduce inequality somewhat, farm labor being among the lowest paid in most countries.

(8) On the other hand, the shift in demand away from agriculture is a shift toward sectors that use low-paid labor less intensively. This might weaken the relative pay position of unskilled laborers somewhat, causing a counter-tendency toward inequality.

These three demand effects of fertility decline are each presumably of less magnitude than the two basic macroeconomic effects [(4) and (5) above], which are supposed to operate through labor supply. The net demand effect is also not likely to be large, since the last demand effect pulls in the opposite direction from the first two.

Theory thus predicts a fertility-inequality link that should be of concern to a population that cares about income inequality. If the theory is correct, there is a case for restricting fertility on income-distribution grounds. The theory needs to be tested against the facts. Chapter 6 tests the microeconomic argument about family size and inequality in detail. Chapter 7 compares the presumption of theory to the overall behavior of the American economy. This later section of the book finds ample support for the belief that fertility is a major determinant of overall inequality.

If there is good reason to go on believing that fertility reduction could enhance aggregate well-being, there is reason to want a solid basis for predicting fertility and its response to changing conditions. Such a basis is currently lacking. The study of fertility has produced many puzzles to date, and the role of economic development in determining fertility has proven particularly uncertain and controversial. On many fronts, what seem at first like clear truths about the economics of fertility turn murky upon a closer look. Take, for example, the well-known fact that as a nation modernizes its fertility undergoes a sustained decline, one that more than offsets whatever rises in fertility there may be in the early stage of modernization. We can all list the obvious sources of that fertility decline: education, urbanization, access to contraception, and "consumption aspirations" all rise with modernization, while the level of infant mortality falls. We have not yet resolved the relative importance of these factors, nor have we agreed upon a theory of why they should have affected fertility as they did. More serious, however, is another unanswered question: Why should these aspects of modernization have caused a net *decline* in fertility? Modernization brings more income along with changed attitudes. Why could not the later, more modern generations enjoy higher education, urban living, better contraceptive information, lower infant mortality, and higher consumption levels with the *same* average number of children per family as their ancestors had? There is no obvious reason why modernization should shift tastes away from childbearing more strongly than it raises the resources with which families could support children. Yet fertility declined with modernization in country after country, both under capitalism and under communism.

The same gap in our understanding arises in connection with the prevalence of a negative cross-sectional relationship between fertility and "status" or modernization variables. Within a generational cohort as well as across the generations, fertility is lower for the more educated, the more urban, the rich, and so forth. Why do the upper-status groups have fewer children on the average, instead of meeting their higher consumption standards with their higher incomes, while having the same average family size?

The economic side of fertility behavior has become even more complex as authors have tangled with some recent time-series patterns. It has seemed to some authors as though fertility responded positively to income gains in the upswing of the business cycle. The same positive relationship to income suggested itself even more strongly when the economic boom during and after World War II produced the famous baby boom in North America and to a lesser extent in other high-income countries. These patterns underlined the puzzling nature of the relationship of economic growth and modernization to fertility. If over the long haul and in cross sections modernization cuts fertility, why should the rapid rise in education, urbanization, and incomes set in motion by World War II have raised fertility? Prodded by the complexity of the income-fertility relationship, economists re-examined their own models and pointed out that the relationship should indeed be complex. Increases in income, education, and related variables affected not only family resources but also the cost of children, with no clear net outcome. To date, however, the economic side of fertility remains unresolved, the more so since nobody has yet spelled out what is meant by the "cost of children." Cost of *what kind* of child—pampered or neglected, high-income or low-income, first-born or fifth-born, male or female? And cost relative to *what alternative* to having the child?

Chapters 3 through 5 of this book re-explore the economic determinants of fertility in an attempt to clear up some of these basic uncertainties. Chapter 3 presents a theoretical model of fertility behavior designed to clarify the murky concepts of "income," "relative child costs," and "tastes" that a theory of choice brings to bear on the issue of fertility. Chapter 3 also offers a theory of taste formation which seems capable of resolving many observed fertility patterns. Chapter 4 treats the concept of relative child cost in more detail, quantifying it and examining how it has changed in America since the nineteenth century. Chapter 5 builds on this foundation and tests the reasoning of Chapter 3 against the aggregate fertility patterns of America since the Civil War.

CHAPTER 2. The Argument in Brief

The interactions between fertility and the economy are complex enough that any useful reinterpretation of them requires careful statements of both theory and evidence. For this reason the chapters and appendixes that follow are somewhat detailed. It is therefore helpful to survey the entire set of arguments and findings at the outset.

I. *Modelling Economic Influences on Fertility*

Used with care, a model reinterpreting the economic part of fertility behavior is capable of resolving many of the puzzles relating to past fertility patterns. Chapter 3 develops a model of couples' short-run fertility regulation. Though the model emphasizes short-run birth probabilities, it is also useful for analyzing completed cohort fertility. The model reexamines the three classic parameters of a theory of household choice: income, prices, and tastes. The income parameter needs only a slight redefinition to be used in analyzing fertility: to be a parameter, income must refer to a couple's lifetime purchasing power for given numbers and ages of their children. More extensive work needs to be done on the price and taste parameters.

The concept of the price, or the relative cost, of having another child is familiar yet undefined. It is "well known" that children "cost more" in higher-status families or in more modern societies, yet it is hard to see a correspondence between what is meant by cost here and what theories of household choice usually mean by relative cost or relative price. Is the cost of an extra child the value of time and commodity inputs devoted to that child, or the value of the time and commodities the couple would devote to other activities if they did not have the child? The two magnitudes are not the same, since having the child affects the family's earning power and the amount of taxes it pays. Two other unanswered questions are even more bothersome: To what kind of child does the "cost" refer? And cost relative to what? To say that a child "costs" more in one setting than in another is to say that a *given set of child inputs*, a given way of raising a child, costs more in the first setting. The fact that higher-status families devote more commodities to a child does not mean that a given way of rearing a child costs them more, any more than their higher grocery bills mean that they pay higher prices for food. It may mean only that they choose a different *kind* of child. Further, child cost can be analogous to the relative prices used in theories of household choice only if it is indeed an index of relative cost rather than an absolute cost. The dollar magnitude of the cost of child inputs by itself mixes quality with unit price. Yet if we are to compare the cost of a given set of child inputs to the cost of some other bundle of commodities and time, what is this other bundle? How do we know what goes into the alternative to having another child?

These problems of defining and measuring relative child cost are briefly introduced in Chapter 3 and treated at length in Chapter 4. They are not insoluble. The average inputs of both time and commodities that go into a child can be roughly measured for a given income class and birth order. Chapter 4 and Appendixes A through E tote up the absolute dollar costs of first-born and third-born children in certain "low-income" and "high-income" urban families in 1960. The estimates come from regressions on (a) the commodity consumption patterns in the 1960–61 Survey of Consumer Expenditures and (b) the patterns of family time use in the Cornell time use survey of 1,296 families in Syracuse in 1967–68. It is even possible to estimate what commodities and time would go into the extra life activities a family would enjoy without the extra child. Once one has already estimated what inputs seemed to go into the child, the trick is to use cross-sectional regressions to determine how the child affects total family time and commodity expenditures. By subtracting the amount of time that the child seems to make other family members spend at home from the estimated total time spent on the child, one gets a rough idea of what time inputs would have gone into other activities without the child. Similarly, one can add the inputs of a commodity such as food consumed by the child to the net change in family food consumption caused by the child to arrive at an estimate of the total extra food other family members would have consumed without the child. The estimation procedure is of course rough, but it is put to use in a way that leans only on its firmer numbers, the estimates of the net effects of an extra child on total family outlays. The procedure yields two bundles of time and commodity inputs, those going into the child and those going into the activities with which the child competes. By following the ratio of the prices of these two bundles across time and classes, one gains insights into how relative child costs have been changing.

In the process of quantifying relative child costs, Chapter 4 documents a number of patterns in the economic role of children since the late nineteenth century. Some of these roles have been changing, while others have remained the same.

The effect of an extra child on family time use and paid work has been changing in a way relevant to fertility behavior. In the late nineteenth century both urban and farm children, especially those who were not first-borns, gave the family a greater value of work time, both at home and for pay outside the home, than their rearing took from the paid work of parents and older brothers and sisters. This was especially true on farms, where children contributed heavily to housework and farm work, while having little effect on the ability of others to do their work. As incomes and education rose, children performed less and less work while living in their parents' household. With rising skill requirements, the economy found less use for relatively unskilled child labor. Parents also demanded more and more schooling for their children, a demand reflected in laws compelling schooling and limiting child labor. Meanwhile wives came to work more for pay outside the home. Since work outside the home conflicts more seriously with childrearing than work at home or around the farm, the impact of an extra child on the mother's paid work has grown considerably between the first decade of this century and the Korean War. By World War II, an extra urban child had clearly become "time-intensive" in the sense that he raised the total amount of time that other family members spent at home, by supplying less value of help with chores and paid work than he took away from others' paid work. Now that urban children have become time-intensive, increases in wage rates raise the relative cost of urban children. That is, increases in wage rates now raise the cost of a given set of urban child inputs by a greater percentage than they raise the cost of the apparent alternatives to a child. Before World War I, by contrast, wage rate increases may have lowered the relative cost of urban children, who then supplied more work than they cost other family members. As for farm children, their transition to time-intensive status was still incomplete by the mid-1960s. There is no great difference between the value of time an extra farm child contributes and the time he takes from the paid work of others.

The net impact of an extra child on family consumption patterns has changed little, despite obvious changes in what families buy for children or for other things. As incomes have risen, both the inputs into an extra child and the inputs into other things have conformed to the classic shift away from staples and toward luxuries. Families have shifted from cheaper to more expensive foods, and away from all foods to such income-elastic demands as recreation, education, and consumer durables. Yet a host of cross-sectional household surveys from the late-nineteenth and twentieth centuries reveal no change in the *net* percentage impacts of an extra child. An extra child, like a drop in family income, causes a shift in family expenditures back toward staples and away from luxuries. Children have apparently always been "food-intensive" in the sense that they raise the share of food in family budgets. The estimates suggest that this effect is a strong one. This means that fertility effects the relative demand for agricultural products, a point to which we return below. It also means that whatever raises the price of food products relative to the prices of luxury commodities raises the relative cost of children.

Taxes, like wage rates and food prices, are capable of shifting the relative cost of children. There is one episode in which changes in taxation have noticeably affected relative child costs. The prosperity and inflation of World War II brought over half of the families in the United States into the ranks of income-tax payers for the first time. Before 1941 the share of the population covered by returns paying income tax had never reached 10 percent. During and after the war a majority of families were subject not only to income taxes but also to the annual exemption per dependent. The calculations reported in Appendix F and Chapter 4 reveal that the onset of the exemption per dependent actually lowered relative child costs quite significantly between 1940 and 1945. In no other period have changes in taxes had any apparent effect on child costs.

The measurement of relative child costs is one contribution offered by the present study for the analysis of the economics of fertility. How important the index of relative child costs is in determining fertility behavior is an empirical question on which some initial light is shed in Chapter 5. Its relevance cannot be dismissed on the prejudice that a measurement so complicated and unfamiliar could not affect the behavior of young couples. As is argued in Chapter 4, it is not implausible to believe that couples could respond to the child cost implications of wage rates, tax rates, food prices, and the like, even though they are almost never aware of these implications. Young couples and those whose actions and opinions affect them are at least dimly aware of what they can afford. This simple fact means that whatever affects the actual relative cost of an extra child has a good chance of affecting the perceived cost as well. To repeat, the relevance of the relative cost measure is an empirical question.

The other restructuring of the basis theory of household choice for fertility analysis consists of a simple and incomplete yet powerful theory of taste formation. To understand fertility patterns it seems important to attribute a strong influence to the history of inputs per person in the families in which each generation of young couples was raised. It is hypothesized (in Chapter 3, Section V) that young couples retain a tendency to pattern their choices of life activities after the experiences of their original families, even in mid–twentieth century, when life styles seemed to contrast sharply across the generations. In deciding how to divide their time, energy, and funds among life activities, couples cannot reason out solutions from abstract principles and current stimuli alone. Typically, and often unconsciously, they economize on information costs by reverting to familiar paths. In patterning their lives in ways tied to (but not identical to) family history, they retain, I shall argue, a stronger sense of life styles per family member, and inputs of time and commodities per family member, than of how large a family should be. What they retain, furthermore, is a pattern of preferences, the roots of which extend further back than their personal memory. The advice and examples to which young couples respond are conditioned by their parents' views and their parents' choices of residence and social contacts. In this way, young couples' impressions about what they and their children should have or do or expect are based in part on a generation or more of family experience.

The impressions that young couples retain from past experiences are not impressions measured in dollars and cents or in hours spent. The impressions are rather a vast array of qualitative "needs" and rules of thumb for running a happy family. These impressions nonetheless carry real resource costs in time and money, so much so that it is hypothesized that they behave as if a major influence on their current family plans is the constant-dollar value of prior inputs per family member in their parents' households. The higher this value of prior inputs per person, other things equal, the more the young couple will feel pressure to limit family size to allow themselves the adult enjoyments and each child the inputs they feel necessary.

II. *Reinterpreting Fertility Patterns*

This hypothesis about prior inputs, along with the information about patterns of relative child cost, allows one to link up parts of the puzzle of modern fertility patterns.

A. THE CROSS-SECTIONAL PATTERN

One pattern that can now be made less puzzling is the generality of the negative fertility-status relationship in cross sections. The prior inputs hypothesis contains what seems to be the best single explanation (though not the only one) of why such a negative relationship should prevail in modern times. Part of this explanation is an argument about diminishing human returns. There seem to be diminishing cross-sectional economic returns to inputs into human enjoyment and development. That is, persons who have received twice as great a value of time and commodity inputs as another group of persons will *not* have incomes twice as high on the average. This seems to follow from the fact that extra time and commodity inputs into the personal development of a child must be combined with a "fixed" input: the child's own physical makeup and life expectancy. Beyond some point extra inputs into a child begin to raise his economic potential by smaller and smaller percentages, because both his life expectancy and his ability to absorb extra skills are limited. In cross sections life expectancy, and the adult period over which one receives earnings from any extra training, is not enough greater for higher-status individuals than for lower-status individuals to offset this tendency for the rate of return to drop with extra training. The diminishing-returns tendency is likely to be characteristic of modern societies, in which the input advantage of high-status individuals consists more of extra human earning power than of extra nonhuman property income. This tendency implies smaller family size for higher-status couples. Having experienced prior inputs per person that are higher by a greater percentage than their current family income advantage, they feel pressure to have smaller families to guarantee the life styles they want.

The prevalence of a negative fertility-status relationship is further explained by another link between prior inputs, income, and tastes. There is a social selectivity mechanism that sorts families somewhat on the basis of their individual tastes regarding mobility and family size. Tastes are partly random, and some people will have stronger preferences for high inputs per person and smaller family size than others raised similarly. Part of their higher inputs per person will tend to be higher investments in their own careers (especially that of the wife), raising their relative status while they have fewer children. Thus there would always be some vague tendency for families choosing to have fewer children to rise in status over others with similar upbringing, even if there were not diminishing private economic returns to investments in humans.

These effects operating through differences in personal inputs and incomes seem more basic to the prevalence of the negative fertility-status profile than some other arguments that one might think of more readily. The argument that higher-status couples have fewer children in modern societies because they have better access to the means of birth prevention seems to account for little. Their better access, and their better contraceptive efficiency, seem to be not independent explanations but rather symptoms of their greater motivation to restrict births. Feeling the pressures just described, they invest more in finding out about, and in practicing, birth control. The relative cost argument also seems to play less role in explaining cross-sectional fertility differences than does the above argument about prior inputs. The negative fertility-status relationship shows up in many contexts in which it is doubtful whether the relative cost of a particular set of child inputs is higher for higher-status couples. In nineteenth-century urban America, for example, the relative cost of any "kind" of child probably did not differ across classes. As already noted, urban children were not time-intensive then, so that the higher wage rates of higher-status husbands and wives did not raise the relative cost of a given way of raising a child. While the relative cost argument would seem to account for some of the class fertility differential in the postwar period, and for part of the rural-urban differential, it cannot do so in many cases in which higher-status couples had a much lower average fertility than lower-status couples.

B. THE MODERNIZATION PATTERN

The fact that aggregate fertility declines as a nation modernizes also is more easily explained with the help of the arguments presented here than without them. For the modernization trend, however, more emphasis should be placed on the movement of relative child costs than on the dynamics of prior inputs and current income. With modernization, the luxury goods with which extra children compete become cheaper relative to food. This is true even though historical price series fail to confirm that food rises much in relative price. The historical price series measure prices at fixed locations and for fixed states of consumer information. Modernization, however, brings people from remote areas to urban centers, and urban information to remote areas. For the urbanizing families the absolute price of food rises. For all families the true price of luxury goods and services, adjusted for improvements in access to information about such commodities, drops relative to food prices. Since the arrival of an extra child brings pressure to consume more goods and fewer luxuries, modernization shifts commodity price ratios in a direction discouraging family expansion somewhat.

Modernization may also raise the relative price of a child through its effect on wage rates. In the earlier phases of modernization, as represented by the nineteenth and earlier centuries in America, the net wage effect on relative child costs is uncertain. On the one hand, the rise in child wage rates reported by historical series would have made children seem less burdensome, since they supplied a greater value of labor at any given wage rates than they took away from others' earnings. Other wage developments are also relevant, however. It is likely that modernization brought a drop in the ratio of children's wage rates to those facing adults, especially highly schooled adults. This development is what one would expect from the observed rise in average schooling and skills, and also from the shift from frontier agriculture to settled agriculture to nonagriculture. The relative value of a child's labor time was probably highest in agriculture, and especially in the relatively unimproved land on the frontier. With modernization this ratio dropped. Dropping even faster would have been the ratio of a child's wage to the present value of the extra wages he could expect by staying in school. By raising the value of child labor more slowly than the values of adult male and female labor, modernization would have tended to keep up the relative cost of a child.

In the later stages of modernization, represented in the United States by the period since World War I, the relative cost of a child would definitely tend to be bid up by wage developments. It is in this period that child labor most clearly lost earning power relative to adult labor. At the same time, the tendency of wives to be pulled into the labor force and of children to be taken out raised the time-intensity of childrearing and made further rises in wage rates raise child costs even more.

It is possible that the same diminishing-returns explanation proposed for the cross-sectional fertility pattern has some bearing on the tendency of modernization to cut fertility over time. It probably is less relevant here, however. There is no evidence that rates of economic return to human investments secularly decline with modernization. Human life expectancy has improved so dramatically in modern times that extra training in an advanced setting may raise later personal income by as great a percentage as it did at the start of modernization. For this reason there has apparently been less downward pressure on the ratio of current family income to prior inputs per person, and less pressure to limit family size on *these* grounds, over time than in the cross section.

C. POSTWAR FERTILITY WAVES

The same framework helps to account for the postwar U.S. baby boom and bust, as shown in Chapter 5. The pronounced swings in recent

American fertility seem largely, but not entirely, explained by the equally pronounced swings in the ratio of current income per adult to prior inputs per person. On this issue the findings of the tests of Chapter 5 correspond closely to the earlier findings of Richard Easterlin. To make this point Chapter 5 takes current income as a reflection of young couples' income prospects, and a mixture of current income and income per person twenty years back as a proxy for the prior inputs that are a taste parameter. Young couples in the era from World War II to the early 1960s experienced a better improvement in income prospects over past inputs per person than did any other generation of young adults. Impressions of what it took to raise children properly were still colored by the deprivation of the Great Depression, yet unemployment was low and current income high. In this setting, young couples received few signals that extra children made it harder to make ends meet. In the late 1960s and early 1970s, by contrast, young couples found their incomes lower in relation to the inputs into them than had the previous generation. This difficulty was made more acute by the earlier baby boom itself, which flooded job markets with new career entrants after the late 1960s. In this setting, the prevailing opinion shifted to the view that children damage a woman's career, restrict couples' recreational mobility, crowd the earth, and deplete nonrenewable natural resources.

The relationship of current income to prior inputs per person thus seems central to an understanding of recent fertility swings. It does not completely account for them by itself, however. Other economic and noneconomic developments have also been relevant. The movement of relative child costs, while not conforming perfectly to the swings in fertility, appears to have played a part. As mentioned, the relative cost of an extra child suddenly dropped during World War II as most couples entered the income tax system and began to claim child exemptions for the first time. Thereafter, relative child costs drifted upward with the secular rise in real wage rates, here representing the real cost of a mother's time. It was thus the case that a drop in relative child cost preceded the early postwar jump in fertility and a slight upward drift accompanied the decline in fertility since the 1960s. In the 1950s, on the other hand, relative costs rose while fertility also rose. The movement of relative child costs, then, plays a role, but apparently not so central a role as the dynamics of current income and prior inputs per person.

These economic factors do not completely explain the postwar baby boom and bust. Their influence has *not* sufficed to explain all of what was special about the later baby boom of the 1950s and early 1960s, or about the decline in fertility thereafter. Regressions reported in Chapter 5 found fertility still significantly higher in the late 1950s, and significantly lower in the late 1960s, than the arguments above would predict. Other forces appear to have been at work as well. In the case of the 1960s fertility decline, at least, it is easy to conjecture what else was happening. The contraceptive revolution ushered in by the pill, the IUD, and the shift in lay Catholic attitudes around the time of Vatican II seem to have been significant independent influences and not just endogenous responses to economic motivations to cut births. Though the tests in Chapter 5 did not permit giving the economic variables every conceivable chance to explain things, it does appear that they account for only a large part of, and not all of, recent fertility movements.

One other recent pattern is not explained by the model introduced above until it is given an additional working part. The baby boom saw a greater rise in fertility among more-educated couples than among less-educated. This is not directly explained by the arguments about prior inputs or relative child costs. The 1940s saw the incomes of the poor and less-educated rise faster than those of the more-educated, basically because the elimination of unemployment had more effect on poor incomes than on high incomes. By itself, this would lead to the prediction that fertility should have jumped faster among the poor, whose current incomes were much higher in relation to prior inputs. Yet the class differentials in fertility dropped in those periods.

This tendency of the baby boom to be more pronounced among those with more schooling (and status) seems best explained by noting that those couples with more schooling and higher prior inputs per person are likely to be more firmly in control of their birth probabilities precisely because they have previously had more reason to restrict births, and have invested more energy in finding out about birth control options. They are thus more sensitive in their birth responses to changing conditions. When economic prospects improved across the 1940s, more-educated couples could respond by raising births faster and more effectively despite a lower percentage improvement in incomes by shifting away from relatively effective means of birth control. This extra argument is consistent with the empirical results reported in Chapter 5. However, other special explanations of the class pattern in the baby boom could also fit the same results, and the issue is unresolved. With qualifications like this one, though, the arguments introduced above seem capable of improving considerably on our understanding of fertility behavior.

III. *The Effect of Fertility on Income Inequality*

A list of theoretical reasons for thinking that higher fertility should heighten economic inequalities was given in Chapter 1. Higher fertility might raise inequality at the "microeconomic" level by making family sizes and family inputs per child more unequal. A further microeconomic effect is imparted by any tendency of higher fertility to be concentrated in lower-income families. If the class fertility differentials widen, the disadvantage of being born into a larger family will become more correlated with the disadvantage of being born to poor parents. Conversely, if fertility reduction were greater among lower-income groups, as seems likely of future birth reductions, then declining fertility would be accompanied by declining inequality in children's economic endowments. Another argument linking fertility with inequality was the belief that higher fertility might put a strain on precollege public school budgets, thus causing a widening of inequalities in schooling. The remaining supposed links between fertility and inequality were macroeconomic: higher fertility should raise the quantity, and lower average quality, of man-hours of labor supplied, thereby bidding down unskilled wage rates relative to skilled rates, and bidding down all wage rates relative to rates of profit and of return on property.

Do these theories fit the facts? The bulk of Chapter 7 is devoted to showing that movements of income and wealth inequality in America are strikingly consistent with the overall hypothesis that fertility and any other source of population growth is a major determinant of the degree of aggregate inequality. Such a show of aggregate evidence does not tell us which of the supposed links actually transmits the effects of fertility to the distribution of income. Is it the microeconomic argument that fertility affects the inequality of family-formed human capital? Is it the strain on the supply of public schools? Is it the macroeconomic tendency of extra supply to bid down unskilled wage rates while enhancing the returns to property and entrepreneurship? *All* of these influences appear to be important. I shall summarize below first the evidence of Chapter 6 in favor of the microeconomic family-input effect and the strain-on-public-schools effect. The remaining point to review is the basic finding of Chapter 7 that aggregate movements in inequality conform so well to the apparent movements in inequality that it would be hard to explain them without accepting the importance of all of the fertility-inequality links mentioned above.

A. SIBLING POSITION AND SIBLING INEQUALITY

The view that higher family size raises the inequality and lowers the average level of schooling and other personal economic endowments has been advanced before. Most authors have been sympathetic to the view that being born into a larger family is a net economic disadvantage, whatever its effects on emotional happiness. A related literature has addressed the similar argument that being a middle sibling, like being one of many siblings, is a disadvantage for socioeconomic achievement. Several authors have claimed such an effect, which some have extended to asserting a disadvantage for last-borns as well. The argument has thus built up that any aspect of sibling position that strains parental energies and budgets, as larger family size and middle-born birth order would seem to do, is an economic disadvantage.

All of the evidence previously presented in support of this argument has been vulnerable to the charge that the importance of family size and birth order has been overstated by the omission of other variables correlated with both the numbers and the later achievements of children. It may be that unmeasured attributes of the parents of the children surveyed in past studies have fostered higher achievements in the children of those parents who also chose smaller family sizes than for other parents with the same age, schooling, race, and so forth. This omitted-variable criticism needs to be addressed if we are to believe firmly in the disadvantage of being from a larger family.

Chapter 6 retests the arguments linking sibling position with later schooling and career attainments, using as direct a test as one could ask. Use is made of a sample of over a thousand siblings, most of whom were over forty when a male sibling in each family was interviewed in New Jersey in 1963. This sample, previously analyzed by Professor Albert I. Hermalin, contains data on the age, schooling, and latest occupation not only of the interview respondents but also of their siblings living and dead. It is thus possible to test arguments about the effects of sibling position by examining differences in achievements of siblings within families as well as between families. In this way the argument that the effects of sibling position have been overestimated by omitting unmeasured parental differences can be essentially met.

The tests in Chapter 6 find that the importance of family size and birth order have not been overestimated, and may have been underestimated, by past research. Having more brothers and sisters, especially younger ones, is a significant net drag on schooling and career attainments. Being a middle-born is a disadvantage relative to being a first-born, according to intrafamily tests as well as interfamily tests. Being a last-born may be a slight disadvantage relative to being a first-born. The last-born's disadvantage, which other studies have found significant for I.Q., is not significant for schooling attainment and also probably not significant for early career attainment.

Chapter 6 also investigates the issue of *why* family size and birth order should affect schooling and careers. Considerable support is found for the view that sibling position matters because it affects inputs of time and commodities into each child. This point can be made by constructing indices of predicted time inputs and commodity inputs into a child in each sibling position and comparing these with the observed relationships between sibling position and achievement. Chapter 6 constructs such indices for time inputs, based on the Cornell time use survey of 1967–68, and discusses the apparent parallelism between the distributions of time inputs and of commodity inputs across sibling positions.

Sibling position does seem to make quite a difference in the hours of parents' and others' time a child receives. The larger the family size, the fewer hours of attention, and presumably the lower the "quality" of attention, each child receives. The same regression-based estimates that yield this finding (in Appendix C) also show that a middle-born receives much less attention than either a first-born or a last-born. Last-borns receive about as much care time as first-borns, the important difference being that first-borns have a monopoly on parent-child interactions in their infancy, while the last-borns receive extra attention primarily in their later childhood. The last-borns also seem to receive better commodity, or financial, support than the others, especially when in their teens. It is perhaps because of these input patterns that last-borns tend to stay in school about as long as first-borns, despite having significantly lower I.Q. scores.

Sibling position not only matters to child care time—it is about the only thing that matters. Detailed regression estimates in Appendix C show that the parents' education and occupation do not significantly affect child care time inputs when the ages and numbers of children are properly held constant. That is, more-educated couples do not spend significantly more time in child care than less-educated couples having children of the same ages and number. It is only by having fewer children on the average that higher-status couples devote more time to each child. In this respect patterns of time inputs differ from patterns of commodity inputs or of likely parental "productivity" in producing achievement in children. Parents with more income and education definitely provide more commodities, and may well provide more achievement-producing attention per hour, but they do not provide significantly more hours of attention to their children except by having fewer of them on the average.

Family size and birth order also outweigh mothers' labor force participation as a determinant of the time inputs received by a child. Calculations in Appendix C suggest that children of working mothers receive more total care time, though less of mothers' care time, than do children of mothers not working for pay outside the home, even when family composition is held constant. That is, for a given number and ages of children, a mother's working for pay reduces her own hours of contact with her children less than it raises the amount of extra time that others, including her husband, devote to caring for her children. It may be, of course, that child development is less enriched by an hour of extra care by others than it would be by an hour of her attention. But the ratio of the unit effects of her care time to that of others would have to be high to offset the fact that some of her time is being replaced by *more* of others' time when she takes a job. And when it is remembered that working mothers have fewer children on the average, it becomes clear that being a child of a working mother matters much less to the time inputs one receives as a child than does the number of one's siblings.

B. FERTILITY AND THE SUPPLY OF PUBLIC SCHOOLING

Like the microeconomic argument that larger families feed inequality through their effects on family inputs, the argument that larger families tend to strain public schools also receives some support from the data. The evidence in this case is aggregate.

Since the early nineteenth century, educational expenditures have taken a steadily higher and higher share of Gross National Product. One can gain considerable insight into the effects of fertility on the support for schooling by following when the rise of educational expenditures seemed most impressive. One must take care, however, to measure the right variables. At issue are the determinants of (a) total educational expenditures per child of school age and (b) public expenditures on primary and secondary schooling per child of school age. The first is relevant as a measure of direct inputs into raising the average earning power of labor force entrants. The higher it is, the less unequal will be the wage rates for different "skill" levels, because a more-educated labor force will tend to compete more sharply for the higher-skilled (that is, more highly paid) positions. The second measure has a separate importance because it is related not only to the average level, but also to the dispersion, of schooling. Should public primary and secondary expenditures become less generous per child relative to total expenditures, schooling is likely to become more unequal.

To sort out the effects of cohort fertility on educational support, one must at least separate out the effects of incomes per adult. The demand for schooling is strongly income-elastic, and only when the effects of income have been sorted out can one begin to discern the effects of fertility. Chapter 6 compares the growth of educational expenditures per child to the growth of adult incomes, and finds a surprising twist in the long-run time trend between educational support and income. From 1840 to 1950, the long-run income-elasticity of educational expenditures remained fairly steady and high. From 1950 to 1968, however, this elasticity was distinctly lower. The trend in expenditures per child since 1968 has thus far been steeper, and resembles the pre-1950 relationship to income growth. The 1950–68 drop in the response of educational expenditures per child to growth in income was especially pronounced for public primary and secondary expenditures.

Why should the income elasticity of school spending per child have dropped off for the period 1950–68? The timing of this drop is somewhat surprising, since the decade 1958–68 brought a post-Sputnik educational boom, a "teacher shortage" that is dearly missed by academic job-hunters in the 1970s. The best explanation for the sag in support per child by a newly prospering postwar generation of adults is that educational expenditures have too much inertia to keep a baby boom from dragging down school resources per child of school age. The period 1950–68 is the period in which the baby-boom cohort of 1944–62 entered the public school system. It is precisely the one period in which the share of the population that was of school age (five to nineteen) was rising rather than declining. This coincidence, plus similar evidence from a recent cross-sectional study, suggests that extra fertility does indeed strain the support for schooling per child, especially the taxpayer support for primary and secondary schooling per child. This is the opposite of what one might have thought from the fact that parents' share of voting power, backed by the cry for more schooling to catch up with the Russians after Sputnik, hit its peak in the decade 1958–68 and then gave way to a publicized "taxpayer revolt" against higher school budgets. Despite such waves, inertia in total spending seems to have been sufficient to make support per child drop when the baby boom passed through the school system.

C. FERTILITY AND THE OVERALL TREND IN INEQUALITY

To test the macroeconomic part of the argument linking fertility and inequality, or to appraise the entire set of arguments, one must repair to aggregate data. What the aggregate data for the United States suggest is that the movements in inequality fit the present arguments extremely well, though other hypotheses could also fit the same aggregate data. Chapter 7 brings out this conformity of trends in inequality to trends in labor force quantity and quality, and argues that it is difficult to build an explanation for the movements in inequality without assigning a significant role to the labor supply variables that fertility effects.

The degree of income and wealth inequality in America, measured in any of several conventional ways, has not remained constant. In recent years our evidence of both current and past movements in the overall income and wealth distributions has grown greatly. Economic inequality now appears to have risen persistently from the early colonial period to World War I, followed by a well-known leveling of income and wealth between 1916 and sometime around the Korean War, and by stability in the overall distribution since the Korean War. The most recent movements are the best documented. Postwar series on income inequality before taxes show either stability or a slight rise toward inequality, depending on the measure chosen and on whether and how one adjusts for age, family size, fringe pay, and other considerations. None of the series indicates a very dramatic change. By contrast, all available series show a dramatic leveling of incomes between World War I and the Korean War. This drop in inequality is unmistakable from 1929 to Korea. There is some vague indication that incomes were more equally distributed in 1929 than in 1913 or 1916, though the difference between these peaks of inequality was not great. For the period before World War I, we have some data on wealth inequality but essentially nothing on incomes. The inequality of wealth-holding appears to have risen persistently from the late seventeenth century to World War I.

Explaining these movements in inequality is easier when we note their correspondence with trends in pay ratios, that is, in ratios of the rates of pay for highly paid to those of lower-paid groups. Changes in inequality can be decomposed into changes in these pay ratios, changes in the shares of the population represented by each group rate of pay, and changes in the inequality of income within each group. There is no law