

# WHY FERTILITY CHANGES

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KEY WORDS: demography, demographic transition theory, fertility transitions, family

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## *Abstract*

There is considerable controversy over the causes of the completed fertility transitions that occurred in most industrial countries from 1870 to 1930 and the "new" fertility transitions that are currently underway in the developing world. New data and empirical analyses of both historical and contemporary fertility declines have weakened the standard theory of the demographic transition, but none of the plethora of new theories of fertility change have emerged as hegemonic or as alternative guides to empirical research. The vast body of empirical evidence on the origins, speed, and correlates of fertility declines in different historical and geographical settings shows more diversity than a simple theory of fertility change would predict. The challenge for the field is to develop a common theoretical framework that will accommodate the diversity of historical paths from high to low fertility.

## INTRODUCTION

Over the course of the last century, changes in death and birth rates have transformed the character of life for virtually every society and family on the planet. Decreases in mortality have led in most parts of the world to reasonable expectations that parents will see virtually all of their children survive infancy. Childbearing has receded from the center stage of family life and from its primary role in the lives of adult women to become an option that can be scheduled and sequenced with vocational and lifestyle pursuits. Most parents can expect to live to see their grandchildren. Although these "new" demographic patterns are most common in advanced industrial societies, they are on the near-term horizon for most societies around the globe. If human progress is to be measured by longevity and reproductive control, the present century,

and the second half of it in particular, has no historical parallel for the advancement of the human condition.

Many people, social scientists included, assume that these demographic revolutions (including those still in process in the developing world) are products of the economic and technological changes of the modern era that have led to economic development, mass communications, effective programs of public health and curative medicine, and related social changes. This basic idea—that lowered mortality and lowered fertility, after some lag period, follow from socioeconomic development—is widely known as the theory of the demographic transition. Demographers, however, are not so sure. Broad empirical generalizations and theory construction were perhaps simpler tasks in an age with little empirical data. Over the past few decades, intensive research on demographic change in historical and contemporary societies has revealed complex patterns that do not fit neatly into earlier theoretical schema. The fact that fertility transitions in many developing countries are still “in process” adds more uncertainty to the search for explanations.

In recent years, the field of demography has spawned a variety of new ideas, conceptual and measurement frameworks, and theories of demographic change. The debates in the journals are hot with conflicting claims on every issue from questions of measurement and the relative importance of causal forces to the ideological bias of researchers and of the entire field (Thomas 1991, 1993, Cleland 1993). This essay is a critical review of some of the recent research and the theoretical debates on fertility transitions in different social, economic, and cultural contexts. Research on contemporary fertility trends and variations in low fertility settings (the United States and Europe) falls into a somewhat different literature and is not directly covered here.

The review begins with issues of measurement of fertility and fertility change. Next, I summarize the recent evidence on fertility levels and trends in historical and contemporary populations. The core of the essay consists of a comparison of classical and contemporary theories of fertility transitions and a discussion of unresolved issues in current research. Although I offer my own evaluation of the relative merits of different approaches in the field, I do not attempt to provide closure to current debates. In lieu of a conclusion, I suggest an alternative model for the field that implies a question very different from the one posed in the title of this essay.

## THE MEASUREMENT OF FERTILITY AND FERTILITY CHANGE

Questions of theory and interpretation are closely bound up with the measurement of the phenomena of interest. Any discussion of current research on fertility must be based on a clear understanding of some critical aspects of the conceptualization and measurement of fertility.

## *Fertility Rates and Population Growth Rates*

It is easy for the nonspecialist to become confused with the variety of demographic measures and rates. For example, population growth rates and fertility rates are often conflated in the media (and sometimes by scholars). At present, population growth rates in many developing countries remain high even though fertility rates have declined rapidly. This is because mortality has decreased further than fertility, and the age structure of the populations of many developing countries has a disproportionate number of persons in the childbearing ages (this is a byproduct of high fertility in prior years). The confusion between population growth rates and fertility rates often leads to frustration for those who just want a simple answer to the question of whether the "population problem" is getting worse or getting better. The question needs to be more precisely framed.

For the purposes of this essay, the reader need have only general understanding of one fertility measure and one related concept. The index of fertility is the "total fertility rate" (TFR), which is the average number of children born to women who survive to age 50 in a population. The additional concept is "replacement level fertility," which is a TFR of a little more than two births—the reproductive level needed to ensure the replacement of the mother and father in the next generation.

## *Period and Cohort Perspectives*

Fertility can be viewed as either a life-course phenomenon of women (and men) over their reproductive careers or as behavior within a specific interval (e.g. a single calendar year). This distinction—between cohort and period perspectives (and schemes of measurement)—is a central one for fertility analysis. Some measures of fertility can be constructed with either cohort and period data (e.g. total fertility rates, although children-ever-born is the more common term for a cohort measure), and care must be taken to be sure of the basis of measurement and the implications for interpretation.

The conventional demographic wisdom until fairly recently was that cohort measures of fertility were superior to period measures because they tap the life experiences of a real group that lives through a particular era of history together (Hajnal 1947, Ryder 1969, 1983). Ryder (1965) argued that social change (not just demographic change) occurs primarily via the behavioral patterns of new generations that are exposed to significant historical events at the formative stage of their socialization. Much fertility research, however, has tended to rely on period measures because of the nature of available data. Completed cohort fertility cannot be computed until the end of the childbearing span for each generation (until age 45 or 50). The formal interdependence of

period, cohort, and age has made it difficult, but not impossible, to estimate effects of each.

In spite of the general theoretical preference for cohort measures, recent empirical studies of fertility trends have found that period influences tend to be more powerful than cohort influences in explaining variations in fertility rates (Foster 1990, Ni Bhrolchain 1992, Raftery et al 1993). In models of cyclical patterns of fertility change in advanced societies, the distinction has been critical because hypotheses are typically formulated in terms of the interplay of cohort and period processes (Easterlin 1976b, 1978a, Butz & Ward 1979). Much less debate has occurred over the appropriate frame of reference for studies of fertility in developing countries, but the greater availability of data and new analytical methods will probably shift attention to this issue in the coming years.

### *The Focus on the Emergence of Fertility Control*

In much of the recent literature on historical and contemporary fertility transitions, the primary focus has been on the emergence of intentional control of fertility within marriage (in contrast to variations and change in absolute levels of fertility). The reasons for this emphasis are found in several influential studies and their links to a particular theoretical interpretation of fertility change. Because I regard this emphasis as unduly narrow, I want briefly to review the conceptual and methodological assumptions of these classic studies and their subsequent imprint on the development of fertility research. First, a digression on potential and actual fertility is necessary to set the stage for the discussion of the concepts of "natural fertility" and "controlled fertility."

One of the nonintuitive features of human reproduction is that high (seemingly uncontrolled) levels of fertility are actually well below what would be unrestrained fertility (Bongaarts 1975). High-fertility societies rarely exceed an average of eight or nine live births per woman, which is well below the biological maximum that could be achieved in the absence of social and cultural norms that regulate marriage patterns, frequency of intercourse, and length of breastfeeding in noncontracepting societies. The classic articles on "intermediate variables" by Davis & Blake (1956) and on "proximate variables" by Bongaarts (1978, Bongaarts & Potter 1983) provide conceptual and analytical frameworks for the incorporation of these sociobiological factors as intervening variables in the fertility determination process. These conceptual frameworks, however, do not explain the origins of the social and cultural influences that constrain fertility in high-fertility settings.

In one of the most influential articles in modern demography, Henry (1961) presented the concept of "natural fertility" to characterize fertility in societies where married couples do not consciously try to limit the number of children they have. Variations in natural fertility can range by a factor of two or more

(e.g. from a TFR of 4 or 5 to more than 8). Henry defined "fertility control" (breaking with natural fertility) as parity-specific behavior to restrict fertility—"when the number (of births) reaches the maximum that the couple does not want to exceed" (1961:81). Transitions from natural fertility to controlled marital fertility are critical historical moments, according to Henry, that began the shift from the regulation of births by traditional social customs to the low levels of reproduction that are typical of modern societies.

Henry's definition of natural fertility as the lack of parity-specific control led to the development of a variety of ingenious indirect methods to measure intentions (conscious efforts to limit fertility) with only standard demographic data. These innovative methods include the inspection of the shape of age-specific fertility curves (Knodel 1977) and the famous "M & m" indicators developed by Coale & Trussell (1974, 1978) as deviations from an empirically observed set of natural fertility patterns. Gradually, these new methods, and the assumptions behind them, led to a focus on explaining the emergence of fertility control as the primary question in the field—and a lack of interest in explaining the wide variations in fertility among "natural fertility" populations.

This focus on the emergence of conscious fertility control is illustrated in the analysis and the conclusions of the Princeton European Fertility Project (Coale & Watkins 1986). Even when one could not show direct measures of "parity-specific control," patterns of sustained declines in marital fertility were interpreted as the product of conscious planning by couples to limit their fertility after reaching their desired family size. This interpretation may well be correct, but its attractiveness was enhanced by the fit with the "new" explanation of the European fertility transition from 1870 to 1930 as a product of the diffusion of ideas and knowledge of the means of fertility control.

There are several problems with the exclusive focus on the transition from natural to controlled fertility as the central empirical question in the field. Most basic is the simple measurement question of whether fertility control is accurately measured by indirect measures. Guinnane et al (1992) show that changes in aggregate fertility ( $I_g$ ) and "little m" may be poor indicators of the origins of fertility control (defined as stopping behavior). Moreover, fertility control could be based on "spacing" rather than "stopping" and thus present a definitional problem for the distinction between natural and controlled fertility (Knodel 1983). Indeed, there is considerable evidence that lengthening of birth intervals was an important component of historical fertility transitions (Bean et al 1990:207) and contemporary fertility declines (Caldwell et al 1992).

Another problem is that variations in natural fertility (that are not subject to conscious planning) are deemed to be theoretically unimportant. Although the rapid pace of decline in marital fertility that eventuates in very low fertility may require conscious use of birth control, the variety of social customs that regulate marriage behavior, divorce, widow remarriage, spousal separation,

length of breastfeeding, and coital frequency may well reflect the impact of economic and environmental influences on reproduction. In other words, consciousness may be an important intervening variable, but it is not an indispensable ingredient in the story of how fertility is socially regulated.

The other dilemma of the "natural fertility-to-controlled fertility" scenario is the need to show that pretransition societies did not know how to regulate marital fertility (Knodel & van de Walle 1979). If the means of fertility regulation were widely known to married couples in pretransition populations, it is difficult to maintain the assumption of natural fertility in all pretransition populations. The evidence is, however, mixed, and several well-chosen examples do not establish the pattern for all pretransition societies. Counter-examples of control of marital fertility in pretransition populations can also be cited (Wrigley 1966, Andorka 1982). Blake (1985) argues that there is more continuity than divergence in the practice of marital fertility control among pre- and post-transition societies.

Van de Walle (1992) has argued that pretransition societies do not have a clear concept of desired family size and that there is a lack of conscious thinking about family size. This may be true in many instances, but it does not mean that fertility behavior was not "regulated" in many pretransition societies. My conclusion is simply that the focus on the emergence of fertility control is both too narrow (much of significant fertility variation is ignored) and unnecessary—individuals and populations can reduce fertility without necessarily planning consciously a desired family size. The distinction between natural and controlled fertility may be an important element in the process of modern fertility transitions, but the current emphasis seems disproportionate to its value.

## HISTORICAL AND CONTEMPORARY TRENDS IN HUMAN FERTILITY

The assumption of constant high fertility in pretransition societies is widely held, but there is considerable evidence of systematic variation. One of the most significant findings of recent research is that fertility is higher in intensive agricultural societies than in forager (hunting and gathering) and horticultural (swidden agricultural) societies (Gillian et al 1993). The reasons for this difference (and the behavioral mechanisms) are unclear, but possible explanations could be related to higher mortality in agrarian societies, problems of caring for too many infants and small children in migratory populations, and earlier weaning of infants in settled agricultural populations. Anthony Reid (1988:158, 162, 1992:461) speculated that the spread of world religions (Islam and Christianity) in settled agricultural populations in Southeast Asia led to a rise in fertility relative to that of migratory populations with traditional animist

beliefs. He reasoned that traditional belief systems did not forbid premarital sexuality which coexisted with endemic gonorrhea resulting in high levels of sterility.

There were systematic oscillations in fertility in preindustrial Europe in response to changes in economic conditions, primarily through the mechanism of marriage (Wrigley 1969, Galloway 1988, Wilson & Woods 1991). The European (actually Western European) marriage pattern, which Coale (1973) labels the "Malthusian transition," emerged sometime during the Middle Ages. There were two components of the European marriage system, the high average age of people at marriage and the high proportion of people who never married. These patterns varied widely within and between populations, and they rose and fell in response to economic conditions (Goldstone 1986, Hajnal 1965). At times of economic crisis, the average age of marriage could rise to 30 (Wrigley 1966) and the proportion of a cohort never-marrying to above 20% (Goldstone 1986). One major consequence of the European marriage pattern was that pretransition fertility in Europe was at moderate levels relative to "high fertility" levels elsewhere.

Traditional levels of fertility in non-European societies were higher (approximately 6-8 births per woman compared to 4-5 births per woman in many pretransition European populations), but they were also socially regulated by "intermediate variables" other than age at marriage and the proportion ever-married, for instance, spousal separation, breastfeeding, sexual abstinence, nonmarriage after widowhood, and so forth. In an interesting illustration of the differing mechanisms of fertility regulation, Kumar (1971) showed that marital fertility was higher in nineteenth-century Sweden and Finland than in twentieth century India. It is unclear if fertility fluctuated in response to economic conditions (wages, harvests) in premodern non-European societies as it did (via marriage) in Europe.

The first "modern" fertility transitions began in early nineteenth century France and the United States (Coale & Treadway 1986:37, Tolnay & Guest 1984, Sanderson 1987, Haines 1989, Bean et al 1990, Gusmann & Fliess 1993). The rest of Europe followed suit, about a half-century later, in the last three decades of the nineteenth century. These trends, which consisted almost entirely of declines in marital fertility, were largely completed by the 1930s. The patterns are extensively documented in the many publications of the Princeton European Fertility Project (summarized by Coale & Watkins 1986). If the onset of a marital fertility transition is marked by a decline of 10% from the pre-transition plateau, the descent to about 50% of the pretransition level was largely completed in 30 years (Coale & Treadway 1986:40-41). In contrast to the fluctuations in fertility in earlier centuries, these modern fertility transitions were permanent reductions.

There were "baby booms" with a modest resurgence in fertility in some

Western societies during the 1950s (the United States, in particular), but these were temporary and did not represent a return to pretransition fertility levels. Over the last 20 years, fertility in most industrial countries has remained at the lowest levels ever recorded—well below the replacement level (Davis et al 1986). Japan, the most modern non-Western society, followed the European pattern fairly well. Japan's modern demographic transition began in the late nineteenth century but was interrupted by World War II and its immediate aftermath (Mosk 1979, Hanley 1979). The rapid decline to replacement-level fertility in Japan in the 1950s is a continuation of trends firmly established earlier in the century.

In the 1960s, fertility began to decline in some developing countries. Initially, these declines were limited to a small number of rapidly modernizing societies in East Asia, and it was unclear whether these trends would spread to the larger and poorer countries in the Third World. In the last decade modern fertility transitions have begun in most countries in East Asia, Southeast Asia, South Asia, and Latin America (McNicol 1992, Palloni 1990, Feeney et al 1989, Robey et al 1992, Freedman & Blanc 1992, Leete & Alam 1993, Hirschman & Guest 1990). There are still many areas with high fertility in South Asia and sub-Saharan Africa, but recent evidence shows that fertility is beginning to decline in many of these countries as well (Menken & Phillips 1990, Caldwell et al 1988, 1992, Robinson 1992, Brass & Jolly 1993, Rutenberg & Diamond 1993).

There has been some concern that the rate of fertility decline has slowed down in some developing countries in the last decade—stalling at a plateau of moderate fertility in the range of three or four births per woman (Bongaarts 1987, Horiuchi 1992). Freedman & Blanc conclude, however, that the slowdown is largely concentrated in East Asia where levels are reaching the replacement floor (1992:45). There is evidence of below-replacement fertility emerging in a number of developing countries including Taiwan, South Korea, Singapore, and Thailand (Rele & Alam 1993, Hirschman et al 1994).

At present, a crude threefold division of the world fertility regimes might be: (i) industrial societies, that have experienced long-term fertility declines beginning in the nineteenth or early twentieth century and that currently have fertility at or below the replacement level, (ii) developing societies, that have experienced significant fertility declines over the last 10 to 25 years and where current total fertility rates are between 2.5 and 4 births per woman, and (iii) less developed countries, that have yet to experience significant fertility reductions and where average childbearing levels exceed 5 births per woman. As soon as such a typology is presented, there are qualifications about the homogeneity of the categories and the placement of particular countries or regions in these categories. A number of developing countries have entered (or shortly will enter) the first category of below-replacement level fertility.



And more and more countries are moving from the third to the second category. Any cross-sectional portrait of a rapidly changing historical process is out of date as soon as it is published and is likely to be a poor image of the future.

## THEORIES AND MODELS OF FERTILITY CHANGE

Interpretations of modern fertility declines ranged widely in the late nineteenth and early twentieth centuries, mixing social explanations with speculations about the impact of industrial life on biological capacities to reproduce and on declining sexual motivations. Demographers, most notably Warren Thompson (1929), emphasized the social and economic forces of modern societies as the basic causes of lowered fertility. These ideas crystallized over the second quarter of the twentieth century and emerged in the 1940s as Demographic Transition Theory (DTT), largely under the pen of Frank Notestein, as a synthesis of ideas and empirical correlations based on the historical experiences of Western Europe and North America (Notestein 1945, 1953).

### *Demographic Transition Theory*

Notestein emphasized the changing institutional fabric of urban industrial society that led to the "emergence of a new ideal in matters of family size" (1953:16). Among the motivating factors of modern society were: "reduced ... pressures toward traditional behavior," "education and a rational point of view," "the cost of child-rearing grew and ... economic contributions by children declined," and that "women ... found new independence from household obligations and new economic roles less compatible with child-rearing" (Notestein 1953:16). The means for fertility control was contraceptive use by married couples—which had "been widely used for centuries throughout the world," but was "not widely used until the incentive for birth restriction became strong" in industrial society (Notestein 1953:16–17).

The corpus of transition theory was very broad. Within the same theoretical tent, Kingsley Davis could minimize the role of religious and cultural values as primary determinants of fertility while Ronald Freedman was pointing to the central role of norms for family size (Davis 1955, Freedman 1963). Critics of the 1980s and 1990s who charge demographic transition theory with being narrowly economic or with ignoring the role of ideas have missed the central point: that transition theory had room for every causal variable.

The two modern seminal contributions in the development of demographic transition theory (and the most widely cited) are Kingsley Davis's "Theory of Change and Response in Modern Demographic History" (Davis 1963) and Ansley Coale's 1973 essay on the demographic transition, which reflected many of the findings from the Princeton European Fertility Project (Coale 1973). It is hard to imagine two articles more different, yet the field has

accepted both as part of a common theoretical stream and not as contradictory theses.

Davis (1963) put the conscious use of contraception by married couples as only one of many possible responses in his "multiphasic theory" of demographic change. The most important independent variable is the level of household economic strain, which is a function of household size and potential economic resources. High levels of household economic strain were the motivating factor that caused individuals (and families) to postpone marriage, never marry, migrate, use abortion, practice infanticide, and restrict marital fertility by contraception. All of these were mechanisms to maintain (or improve) economic welfare. Davis argues that most societies will use all of these methods (in varying proportions) in response to the population pressure (manifest as economic strain) caused by mortality declines and the economic opportunities that accompany modernization. Absolute poverty does not provide a context for demographic responses, according to Davis; it is the possibility of betterment (or of holding onto recent improvements) during the modernization process that provides the central motivation.

Although Davis's article is widely cited in the demographic transition literature, the body of research that tests hypotheses from his theory is relatively modest (Friedlander 1969, 1983, Mosher 1980a, 1980b). One problem of testing Davis's theory is the identification and measurement of economic strain that is a function of potential household size and economic aspirations. If economic welfare rises faster than aspirations, there would not be any pressure for changes in demographic behaviors. Modernization may have direct impacts on the motivation for fertility (and other demographic behaviors) independently of changes in economic strain caused by declining mortality.

In contrast to Davis's broadening of the range of demographic responses, Coale (1973) focused on the reasons for declines in marital fertility alone. He identified three necessary conditions for the decline of marital fertility: (i) a setting that allowed for fertility planning to be part of the calculus of conscious choice, (ii) the availability of effective information about the means to control fertility, and (iii) clear economic advantages of fertility control. The third condition is the standard link to the traditional thesis of demographic transition theory (DTT) that socioeconomic factors change the incentives for childbearing. The first two conditions are ones that demographers had pretty much taken for granted—that societies adjusted demographic behavior when circumstances warranted and that some knowledge about fertility control was available in most historical societies.

The three preconditions in Coale's framework fit well with Henry's (1961) thesis that natural fertility was practiced in pretransition societies. Because the last condition was already well known, most subsequent attention has been focused on the observation that natural-fertility societies lacked legitimating

cultural values for fertility control and information about the means to control fertility (although Coale acknowledges that folk methods of contraception were used in some pretransition populations; see Coale 1979:15). The widely cited evidence that many women in traditional societies cannot answer questions about desired family size (lacking numeracy about family size; see van de Walle 1992) illustrated the cultural roots of high fertility. Coale's formulation represented a shift away from the central theme of Demographic Transition Theory, that changes in socioeconomic institutions are the primary precursors to fertility decline. The initial challenge to DTT was, however, not theoretical but empirical. Without disconfirming evidence, Coale's categories would probably have found their place under the broad umbrella of DTT, where many variant ideas were often expressed with little internal conflict.

Beginning in the 1970s and throughout the 1980s, empirical studies of fertility of both historical and contemporary societies reported findings that were at odds with the expected associations of socioeconomic variables and fertility. The most famous was an article by Knodel & van de Walle (1979) that summarized the findings of the Princeton European Fertility Project with a discussion of the implications for future fertility transitions in less developed countries (the article was later published as chapter 10 in Coale & Watkins 1986). Knodel & van de Walle reported that fertility declines began about the same time in a number of European countries that were at quite different levels of socioeconomic development. They emphasized cultural setting and diffusion as the critical elements to explain the spread of fertility control in Europe. In subsequent summaries of the Princeton European Fertility Project (EFP), Watkins (1986, 1987) also concluded that the results disconfirmed the empirical predictions of standard demographic transition theory.

About the same time, results on fertility change from the contemporary less-developed countries were being published from the World Fertility Survey (WFS) program (Cleland & Hobcraft 1985, Cleland & Scott 1987). Cleland summarized the results of the comparative WFS analyses of marital fertility as representing a clear refutation of the "demand" (demographic transition style) theories (Cleland 1985, Cleland & Wilson 1987). Few of the expected associations between socioeconomic variables and fertility (with the exception of female education) predicted by DTT were consistently found in the comparative analyses of the WFS.

This double whammy (from the EFP and the WFS) created a crisis for demographic transition theory. It is now the conventional wisdom in many circles, inside the field of demography and beyond, that demographic transition theory is near death. In the overview theoretical chapter in a book of historical analyses of European fertility declines, Alter states that "In the last 20 years, the field's dominant consensus, the theory of the demographic transition, has been dramatically shattered" (1992: 13). Theories, however, rarely pass from

the scene unless there is a superior alternative that provides a clearer account of research in the field. The dilemma is that there is no consensus on an alternative theory to replace demographic transition theory. A theoretical vacuum is not tolerable for an empirical science with a continuous need for testable hypotheses. So the debates continue with a plethora of contending theoretical frameworks, none of which has gained wide adherence.

### *Caldwell's Theory of Intergenerational Wealth Flows*

In a series of influential articles and books, Jack Caldwell (1976, 1980, 1982, Caldwell et al 1988) criticized the economistic biases of traditional demographic transition theory and offered his revisionist theory of intergenerational wealth flows. In Caldwell's theory there are only two stable fertility regimes—traditional societies where fertility is as high as possible and modern societies where childbearing is low. In traditional societies, children provide a positive net flow of resources, services, and status-honor up the generational ladder to parents, especially to the patriarch. In stable high-fertility societies, there is always an incentive for additional children. In modern societies, there is a reversal of the wealth flow, and parents contribute time, money, services, and support downward to children with minimal expectations of any return. According to Caldwell, there are few economic incentives for fertility in modern child-centered societies.

The reasons for the destabilization of high-fertility regimes are not a simple matter in Caldwell's theoretical writings. In some places, he emphasizes the diffusion of Western cultural models of the nuclear child-centered family via international communications and the mass media. In other contexts, Caldwell has stressed the impact of "mass schooling" in a community, which tips the balance to lowered fertility. His theory has been interpreted as supporting aspects of both structural and cultural theories.

The principal obstacle for many scholars in the field has been the lack of a clear model for conducting empirical tests of hypotheses from Caldwell's theory. Caldwell's insistence that demography must shift its focus to more ethnographic investigations ("micro" approaches) has not clarified the task. Measuring intergenerational wealth flows (or perceptions of the flows) over historical time is a difficult challenge. The methodological problems include the measurement of the nonmonetary components of wealth flows, such as services, deference, emotional gratification and undefined obligations. Beyond Caldwell's own research, there are relatively few empirical studies of the intergenerational wealth flow hypothesis.

### *Economic Theories of Fertility*

There are two major economic approaches to the study of fertility change and many variants (Sanderson 1976). The first is the "new home economics,"

which is the application of microeconomic theory to family issues, including fertility (Becker 1960, 1988, Schultz 1981). The second is the synthesis of economic and sociological theories of fertility presented in the supply and demand framework of Richard Easterlin.

The first applications of microeconomic theory to fertility behavior were rather mechanistic illustrations of consumer choice theory with little acknowledgment of the significant differences between the acquisition of an automobile and a baby. These early applications of economic theory to fertility inspired Judith Blake's devastating critique (Blake 1968, also see Turchi 1975). Over the years, however, economists have become more sophisticated in their application of economic theory to household behavior, and they have also become more rigorous in the measurement of economic behavior in their empirical analyses. Ideas and hypotheses have also gradually drifted across disciplinary lines. Demographic research that includes the opportunity costs of women's time as well as the impact of the prices and incomes on demographic behavior is now much more common in the literature. There is some evidence in support of economic hypotheses (Hulaserani & Rournasset 1991), but the approach remains too narrow to be a significant theoretical challenge to demographic transition theory. As Robinson (1992:453) notes, "the proposition (microeconomic theory of fertility) has not been proven, only asserted often enough to gain a certain credibility and force through repetition."

In several essays and a major book, Richard Easterlin has made a serious effort to join economic theories with more traditional sociological research on fertility (Easterlin 1969, 1978b, 1983, Easterlin & Crimmins 1985). Two volumes of state-of-the-art essays on fertility in developing countries, sponsored by the National Academy of Sciences, were organized around Easterlin's framework of the three basic determinants of fertility: demand, supply, and the costs of fertility regulation (Bulatao & Lee 1983). Demand factors include the standard socioeconomic determinants of fertility from modernization (demographic transition) theory. Supply factors are environmental and cultural factors that constrain natural fertility. The costs of fertility regulation include the monetary, time, and psychic factors associated with the use of contraception. In a series of ingenious graphs, Easterlin shows how modernization can lead first to a rise and then to a fall in fertility as the forces of supply, demand, and regulation costs combine to shape fertility behavior (1983:566-574).

The inclusiveness of Easterlin's model has clarified some empirical anomalies in the study of fertility trends. Nevertheless, his model shares two limitations of prior work in the literature. First, the assumption of natural fertility means that the wide variations in pretransition marital fertility (and marital behavior) are outside the scope of the theory. Second, there is no effort to resolve the theoretical and empirical problems in the specification of what socioeconomic variables account for demand. In general, demand for fertility

does decline with modernization, but the question of the many weak associations between the standard predictor variables and fertility remains unresolved.

### *Ideational Theory*

Within the dominant branches of American demography, there has been persistent skepticism that values, attitudes, and other psychological orientations can explain fertility trends or variations between populations. It is, therefore, perhaps appropriate that the new interpretation of fertility linked to deep cultural variables, known as ideational theory, was developed primarily by European demographers, especially Ron Lesthaeghe (Lesthaeghe 1980, 1983, Lesthaeghe & Surkyn 1988). Much of the impetus for ideational theory has been the alleged failure of demand (socioeconomic) theories (Cleland 1985, Cleland & Wilson 1987). Culture spans a wide variety of phenomena, and there are quite varied meanings of the term in the demographic literature (Hammel 1990, Pollak & Watkins 1993). This gives rise to not one, but several theories of culture and fertility.

The strong cultural hypothesis is that groups differ in fertility behavior because of cultural values. Some populations may have higher levels of fertility than other groups with equivalent socioeconomic characteristics because their culture places a higher value on children or proscribes certain methods of fertility control. Lesthaeghe & Surkyn (1988) argue that historical variations in European fertility are closely related to national differences in religious beliefs, individualism, and secularism. Even if this argument is accepted, the question of the origins of cultural values remains unresolved (Preston 1986: 186–189). Davis (1963) dismissed all cultural theories because of the inherent circularity of the basic logic, that is, behavioral patterns are explained in terms of cultural preferences for that behavior. To avoid this fault, cultural variables need to be explained in terms of structural conditions or historical experiences.

Traditional values are typically rooted in rural environments and among recent migrants to urban areas. Cultural values, however, may persist long after the structural conditions in which they originated have eroded. Lesthaeghe & Surkyn (1988) argue that the rise in fertility after World War II (baby boom) may be explained by the orientations of generations that were reared in traditional prewar environments (the very low prewar fertility was a product of economic constraints). According to this argument, the change in values after World War II toward greater materialism and individualism led to the lowered fertility in the 1960s and 1970s.

A weaker version of the cultural interpretation posits that ideas about appropriate family size and methods of birth control can diffuse more quickly within culturally homogeneous populations (Retherford 1979, Retherford & Palmore 1983). The critical assumption is that the lag period between structural changes and demographic responses can be shortened or lengthened by in-

tragroup communication about fertility ideals, the legitimacy of fertility control, and techniques of birth control and abortion. Interpretations based on studies of the European demographic transition suggest that the cultural diffusion of ideas (and knowledge about the practice) of birth control can even precede the structural changes in society. The result is that patterns of fertility decline are more likely to mirror geographic maps of ethnic groups than of socioeconomic change (Watkins 1986, 1987).

The empirical base for ideational theory seems to rest more on a negative case for the alternative model—the rejection of socioeconomic explanations—than on positive evidence (Cleland & Wilson 1987). The claim that fertility declined at about the same time in a variety of socioeconomic settings does not mean that culture is the prime mover (Mason 1992). It is clear that diffusion is an important process in the explanation of fertility, but the links between culture and diffusion have yet to be clearly articulated and empirically tested.

## UNRESOLVED ISSUES IN RESEARCH ON FERTILITY

The absence of a hegemonic theory of fertility does not mean that there is not a great deal of knowledge and many empirical generalizations about the determinants of fertility in various settings. The existing base of knowledge, however, cannot be summed up in one or two global statements. In this section, I review some of the major issues that require further empirical understanding (and perhaps some new insights) before it will be possible to frame a unified theory of fertility transitions.

### *Marriage, Family Structure, and Fertility*

In most contexts, human fertility occurs in family units. In fact, the standard definition and functional explanation of familial institutions are invariably presented in terms of childbearing and childrearing. Although there are close connections between family structure and fertility, the relationship is not simple. Prior research has examined many strands of the relationship, including the timing and prevalence of marriage, the complexity of household structure, residence patterns after marriage, and inheritance patterns. There seem to be few universal relationships.

The idea is sometimes expressed that age at marriage does not necessarily have a strong influence on fertility because there is generally sufficient time to "make up" for any delay in childbearing following marital postponement. Although this is logically true for individuals, aggregate patterns almost invariably show that later marriage means lower overall fertility (Smith 1983). Indeed, the principal mechanisms of fertility regulation in premodern Europe were variations in marriage timing and the prevalence of marriage (Coale & Treadway 1986:47-48). The partial breakdown of the system of marital post-

ponement is thought to have contributed to a rise in fertility in the early stages of modernization (Tilly 1978, Goldstone 1986).

If marriage was the traditional mechanism of fertility control in Europe, and the modern European fertility transitions from 1870 to 1930 were largely confined to declines in marital fertility, then a reasonable hypothesis might be that changes in marriage patterns do not covary with changes in marital fertility. Indeed, this logic has been implicit in much of the historical demography literature. Therefore, Coale's (1992) recent paper which shows a close association of delayed marriage and the advent of fertility control within marriage (for both historical and contemporary populations) raises a number of significant questions. Coale reasons that cultural contexts that lead to later marriage are also favorable for female autonomy and control over reproduction. The finding is also consistent with Davis's (1963) multiphasic theory of demographic response.

In many developing countries, there have been trends toward delayed marriage (Smith 1980) and also declines in marital fertility. Although the largest component of Asian fertility declines has been declines in marital fertility (Retherford & Cho 1973, Hirschman & Guest 1990), changes in marriage patterns have also been significant in some cases. The negative impact of marriage timing on fertility is confounded, however, by the fact that marital postponement often leads to a shorter first birth interval (Hirschman 1985). This apparent anomaly has been explained by Rindfuss & Morgan (1983) as a result of a trend toward romantic marriages and increased coital frequency early in marriage. The evidence is largely indirect, but the strength of the logic and replication of the basic findings support Rindfuss & Morgan's interpretation (Fricke & Teachman 1993). Although the trend toward marital postponement may lead to shorter birth intervals in the short run, the long-run expectation is lowered marital fertility.

Another emerging pattern is a lowered prevalence of marriage in societies that formerly had universal marriage. Recent data show double-digit percentages of women in their early thirties who have not yet married in several Asian countries (Lim et al 1987, Xenos & Gultiano 1992, Guest & Tan 1993). This increase in the numbers of never-married will have significant implications for future levels of fertility and other social patterns.

The classic interpretation of the impact of family structure on fertility was presented almost 40 years ago by Kingsley Davis (1955). He noted the strong association of extended family households with higher fertility in less developed areas and argued that the extended family structure provided extensive supports for early marriage and childbearing. Marriage did not have to be postponed until an independent household could be set up. The costs of children and the burden of child care are subsidized by other members of the household, not borne exclusively by the parents. In extended family house-



holds, the young married couple, especially the bride, acquires recognition and status with the production of children. This thesis conforms to the traditional contrast of the nuclear family system in many industrial countries with the traditional pattern of young and universal marriage in other parts of the world (Hajnal 1965, Dixon 1971). But there may be more flexibility between family structure and fertility in modern industrializing societies.

Ronald Freedman and his colleagues have been monitoring changes in the structure of Chinese families and fertility in Taiwan for several decades (for the latest report, see Weinstein et al 1990). Initially it was assumed that there would be a close relationship between extended family living arrangements and fertility—both declining with modernization. The Taiwanese fertility transition is now complete with a below-replacement fertility rate, but co-residence of married couples with husband's parents remains an important aspect of family structure in Taiwan. About one half of adults live in extended family units, and most couples live with the husband's parents for at least some time after marriage. There has been some decrease in joint family living arrangements in Taiwan, but the continuity is most impressive.

The persistence of traditional Chinese family living arrangements in Taiwan, however, has not meant that fertility has remained high. It may be that traditional family structures in traditional societies result in high fertility, but traditional family forms can accommodate new content, including lowered fertility, in modernizing societies. Axinn (1992) reports that exposure to extrafamilial activities by husbands and wives leads to increased contraceptive use in Nepalese society. Family structures in developing countries are changing rapidly, as they are in industrial countries, and future patterns are unlikely to fit into neat categories of traditional and modern structures (Thorton & Fricke 1987). Enormous methodological problems confront research on the dynamic relationships between family structure and reproductive behavior (Burch 1983). Further progress may require longitudinal studies that track family interactions and exchanges across generations that are knit more by economic and social obligations than by common residence.

### *Modernization and Fertility*

The concept of modernization has undergone even more trials than the theory of the demographic transition. Even if synonyms (socioeconomic change, development) can be substituted as temporary remedies, the conceptual crisis remains—we do not have a precise account of the social, economic, and cultural forces that are necessary or sufficient conditions to transform low income, rural agrarian societies into high income, urban industrial ones. As with demographic theory, the search for a grand theory of modernization has often given way to a search for empirical patterns that may vary with specific institutional and historical circumstances.

Given that it is difficult to specify the components of modernization, it is not too surprising that the theory of modernization and fertility change (demographic transition theory) has encountered problems. Nevertheless, conclusions that socioeconomic forces are unimportant because fertility may be weakly correlated with "modernization" variables are premature (Cleland & Wilson 1987). The basic flaw in demographic transition theory, in my opinion, is the assumption that there is a single monolithic pattern of modernization that could be indexed by any socioeconomic variable. This assumption made it possible to use weak associations (and occasional negative evidence) as the basis for claims that all efforts to develop a theory of modernization and fertility are futile. The real theoretical challenge is to specify more clearly what aspects of modernization are linked to fertility change.

The weakness of some conventional research within the DTT tradition can be illustrated by considering the expected negative relationship between fertility and general modernization factors such as income or industrialization. It is true that both higher incomes and greater industrial employment are central elements of the broad complex of modernization forces that have transformed the world over the last century. This does not mean that higher income or industrial employment, by themselves, will motivate families to have fewer children. In fact, the reverse is equally plausible. The most direct consequences of an increase in income are higher levels of consumption. If children are highly valued in a society, economic theory would predict a higher demand for children. Economic theory is, however, indeterminate as to the effect on fertility because quality (higher-cost children with greater levels of investment and consumption) and quantity are substitutes. Higher levels of income may also loosen constraints to higher fertility, for example, less absence of the husband in search of employment, lower labor force activity by the wife, less breastfeeding. In a similar fashion, industrial employment may lead to younger age at marriage (and higher fertility) as traditional constraints on family formation are eased (Goldstone 1986, Haines 1979).

There are frequent findings of a rise in fertility before the transition to low fertility begins (Dyson & Murphy 1985). Easterlin explains this pattern as a product of a rise in "supply" factors (less breastfeeding, reduced sterility, early marriage, etc) in societies where demand for fertility exceeds actual fertility levels (1983:574). What is missing in Easterlin's explanation is a specification of what aspects of modernization lead to an increase in supply and what factors will lead to a decrease in demand in fertility. Davis (1963) argued that it was necessary to link the broader macrolevel forces with the microlevel motivations for lowered family size (with declines in fertility being one of several mechanisms to this end). In Davis's theory, the critical macrolevel factor was declining mortality, which led to household economic strain in the context of rising aspirations and new economic opportunities. The logic of Davis's argu-

ment is compelling—the expectation is not that any and all modernization variables will correlate highly with fertility decline, only those aspects of modernization that create direct incentives for smaller families.

Freedman (1979) hinted at a new approach in his classic assessment of the state of theory and research on fertility. After reviewing recent research that showed the weak empirical evidence for traditional demographic transition theory, Freedman noted that there were a variety of sufficient conditions, exemplified by different countries (or regions within countries), that could lead to modern fertility transitions. Certain variables, or combinations of variables (effective family planning programs, higher status of women, higher levels of social welfare, extreme population pressure, a strong state, etc), could lead to lowered levels of fertility even in the absence of other variables considered essential prerequisites for fertility transitions. Unfortunately, subsequent theoretical writings have not attempted to extend Freedman's analysis beyond the discussion of historical examples to the specification of hypotheses that relate critical factors (modernization variables) to fertility declines in various settings.

Perhaps the most effective strategy for the specification of a broader theory of modernization and fertility theory might be to identify the microlevel family motivations for fewer children and then to work outward to the relevant structural forces. The core idea of demographic transition theory is that the costs and benefits of children, both short-term and long-term, shape motivations for childbearing (Caldwell 1983). All other causal factors may be derived from this basic premise. Most obvious are the standard links to infant and child mortality (assuming that there is a threshold of family size where benefits decrease and/or costs rise), changes in the family economy (less dependence on child labor), and rising levels of education (increasing the cost of childrearing). The cost of children is not limited to direct monetary expenditures but is also evident in the time commitments necessary for childrearing. If there is a high opportunity cost of the mother's time or an absence of other family childcare providers or both, the cost of childrearing is much higher. Extensions of this basic logic can be applied to other socioeconomic variables, but a credible hypothesis must specify the causal links in terms of the incentives for childbearing. Care must be taken to consider the broader social and institutional context that may confound expected bivariate relationships. There may also be important thresholds or floor effects; for example, one or two children might be desired even if the costs of children are very high.

These issues can be illustrated with recent literature on the slow-down or stall in the fertility transition of the Malay population in Malaysia. Rapid modernization in Malaysia has brought very low fertility to the Chinese and Indian populations there (almost to the replacement level), whereas Malay fertility, after experiencing a modest decline during the 1970s, has remained at a plateau of over four births per woman during the 1980s. Lee & Tan

(1993) interpret these differentials as evidence that demographic transition theory is inadequate and that cultural variables, most notably Islamic fundamentalism, are necessary to explain why Malay fertility has not been reduced. It is difficult to evaluate post hoc explanations, but the lack of similar response among Malay populations in Singapore and Indonesia creates doubts that a simple cultural explanation is sufficient (Jones 1990). Government policies of Malay preference (affirmative action programs provide more education and employment opportunities for Malays than for Malaysian Chinese and Malaysian Indians) also seem to be correlated with diverging ethnic fertility differentials in Malaysia, although it is difficult to specify the precise mechanisms (Govindasamy & DaVanzo 1992). It is not possible to evaluate these conflicting claims empirically, but rival "demographic transition" hypotheses are also consistent with the reported trends. Malaysian Malay parents have been sheltered from the rising costs of childbearing by government subsidies for education (including college) and by a greater availability of low-cost childcare (Hirschman 1986). Although these ideas have not been empirically proven, they illustrate the potential importance of some socioeconomic variables (and not others) as determinants of fertility levels and change.

### *Culture, Diffusion, and Fertility*

A superficial look at the recent literature on fertility may give the impression of a battleground between structural and cultural interpretations. This is, however, a mock battle played out by a few cases of extravagant claims and counter-claims for the benefit of graduate students who are seeking simple conceptual schema to organize the literature (see Mason 1992 for a critique of some of the rhetorical sleight-of-hand in Cleland & Wilson 1987). Not only is the evidence mixed, but most researchers acknowledge the interdependent role of social structural conditions that motivate behavior and the spread of ideas and information that reinforce behavioral change (Carlsson 1966, Friedlander et al 1991, Gillis et al 1992, Woods 1987). Most structural hypotheses are perfectly compatible with conscious decision-making as a potential intervening process. Theories of normative influences on behavior rarely deny that deep cultural values or innovative ideologies are rooted in historical experiences or material interests. Uncertainties arising from cultural lags, weak correlations, and the general lack of comprehensive data have led to differing emphases stressing certain variables as more important, but the number of demographers who subscribe to completely monolithic explanations is very small.

Indeed, there is often agreement on which variables are most important, but differing interpretations of what the variable means. One of the most consistent findings in the literature is a negative relationship between women's education and fertility, both at the individual and the aggregate level (Cochrane 1979,

1983, Cleland & Rodriguez 1988). There are exceptions, but the relationship is one of the most robust in the empirical literature. Although the general interpretation is that education is a socioeconomic variable that raises the cost of children (directly and indirectly because of the value of the mother's time), Cleland & Rodriguez (1988) argue that the influence of education is primarily ideological because most of the impact of female education is not mediated by employment. The same argument could be developed for other significant determinants of fertility without any clear resolution. Differences of interpretation are not entirely empty rhetoric, but convincing arguments should go beyond simply claiming a variable for one camp rather than another.

Two recent studies illustrate the complexity of social context and the role of sociocultural processes on human fertility. In one of the most important studies from the European Fertility Project, Lesthaeghe & Wilson (1986) found that "secularization" was an important predictor of the pace of fertility decline in a number of European countries. In an imaginative analysis, Lesthaeghe & Wilson showed that both socioeconomic structure (the mode of production, indexed by labor force composition) and secularization (vote for socialist or nonreligious parties) were important forces that led to more rapid declines in marital fertility. The authors reasoned that the political and cultural forces that led to a decline in support for traditional religious parties were part of a larger shift in the moral code that also legitimated nontraditional reproductive behavior (fertility control).

The argument that secularization led to both nontraditional political behavior and nontraditional fertility behavior is convincing. The question remains, however: what social conditions fostered the development of secularization? Secularization is not simply a product of shifts in economic structure because labor force variables (mode of production) were included as predictors in the models. It seems probable that the actions of political activists (local or outside), strikes or other consciousness-changing events, the distribution of newspapers or pamphlets, rising levels of education, and other social and political activities were responsible for the differential growth of secularism in some areas. Are these structural or cultural factors? Changes in the organizational structure and political experiences of a community are intimately bound up with changes in consciousness of the population. The task is to clarify how these factors intersected in different historical contexts to change fertility behavior (and other outcomes), not simply to claim that it is an "either-or" contest between culture and economic forces.

Another relevant study is the recent research by Goodkind (1991, 1993) on the concentration of births in auspicious years of the Chinese zodiacal calendar in a number of East Asian populations. Goodkind shows that the "traditional" custom of having a baby born in the year of the dragon did not appear in Taiwan before 1976. The explanation that the control of the timing of births

is not possible in natural fertility populations is disputed by Goodkind, who shows that the concentration of births in the dragon year of 1976 was accomplished largely by intermediate variables other than contraception (marriage timing, abortion, and coital behavior). If it was always possible to fine-tune the timing of births so that there was a concentration in auspicious years, why did this tradition begin only in the 1970s? It seems that the celebration of cultural practices is closely intertwined with modernity and not simply a product of historical continuity. In a survey of the role of cultural factors on Chinese fertility, Greenhalgh (1988) argues that cultural factors cannot be given a transhistorical role but must be interpreted within particular historical and institutional contexts.

The diffusion of patterns of low fertility is often given as a major reason for the importance of cultural factors. Clearly, information and beliefs spread more easily within communities that share common cultural and linguistic characteristics. But rapid changes in behavior over wide geographic areas do not necessarily mean that a common cultural system is an essential prerequisite for the diffusion of information or for changes in reproduction. In an excellent historical study of a rural Sicilian town, Schneider & Schneider (1992) show that several decades separated the fertility declines of different classes in the community. The fertility decline of the gentry began around the turn of the century, the artisan class developed a pattern of lowered fertility in the 1920s and 1930s, and the peasantry followed suit in the 1950s and 1960s. Changes in fertility seemed to be more closely associated with changes in social and economic incentives than the diffusion of values and information in this community. In other contexts, all social classes may face common incentives, and the pace of change may be determined solely by diffusion of information and the cost of fertility regulation. However, diffusion processes have proven much more difficult to model and test than to observe (Rosero-Bixby & Casterline 1993).

The classic idea of the diffusion hypothesis is that it requires much more motivation to be an earlier innovator than to be a later one. Pioneers have to bear the full costs of acquiring new information, independent decision-making, breaking with tradition, risking social disapproval, and assuming risks of uncertainty of future outcomes. After a significant proportion of a population has already engaged in innovative behavior (e.g. fertility control), the costs for those that follow are much less. This means that the level of motivation required for behavioral change by followers is also much less. Given this logic, the association of socioeconomic factors (the motivating conditions) and fertility behavior may loom much larger in the initial spread of a fertility transition than in the latter stages (Hirschman and Guest 1990).

The incorporation of diffusion processes into studies of fertility decline is as important as it is difficult (Casterline et al 1987, Montgomery & Casterline

1993). The development of time series data of detailed geographical areas and innovative statistical approaches may be essential prerequisites for such work.

### *Family Planning Programs and Fertility Declines*

Twenty-five years ago, there was great uncertainty whether family planning programs in developing countries would have any impact on fertility declines (Dav's 1967). Over the last 20 years, a series of cross-national studies have estimated the impact of socioeconomic development and family planning effort on fertility levels, fertility change, and contraceptive use (Freedman & Berelson 1976, Mauldin & Berelson 1978, Lapham & Mauldin 1984, Mauldin & Ross 1991). In spite of some thoughtful skeptics (Hernandez 1981, 1984), the general finding is that both socioeconomic conditions and family planning programs have significant independent effects on fertility decline, and there is a synergistic effect (lowering fertility) of rapid development and an effective family planning program. A well-designed longitudinal study of treatment (with a family planning program) and nontreatment areas in Bangladesh has found strong evidence that effective family planning programs lower fertility (Phillips et al 1988). A comparable study of Egypt, however, found mixed results of the effects of family planning on fertility attitudes and behavior (Stycos et al 1988).

In spite of the general consensus on the value of family planning programs, there is still much debate in the field over the relative efficacy of investments in family planning programs (compared to investments in development) and over what aspects of programs make a difference. The main analytical problem is that family planning programs are not random events but are disproportionately located in countries where social and economic conditions are already favorable for fertility declines. Skeptics claim that historical fertility declines in many Western countries occurred without organized family planning programs and that the distribution of contraceptives through the private market might well provide most of the services that public family programs currently do. These questions are still debated and probably cannot be resolved with the standard methods of program evaluation.

One of the important unresolved questions has been the identification of the components of family planning programs and the relative impact of different program activities on contraceptive adoption and fertility decline. The primary source of data about the attributes of national family planning programs has been ratings of program effectiveness collected in questionnaires from knowledgeable experts (program administrators, funding agency officials, and others familiar with family planning programs in various countries) (Mauldin & Ross 1991). In most studies, the responses from these questionnaires have been summarized into one global dimension of "program effort," although there is

clearly a set of underlying dimensions that characterize the major features of family planning programs (Entwisle 1989).

Perhaps the most important finding for policy makers is that the availability of family planning services, measured by the proximity to clinics, does have measurable effect on contraceptive use (Entwisle et al 1986, Tsui & Ochoa 1992). Research on the identification of the impact of specific aspects of family planning programs on fertility behavior and the relative cost-effectiveness of different strategies does not seem to have yielded clear answers (Phillips & Ross 1992).

## OTHER MODELS AND OTHER QUESTIONS

The title of this paper presumes that there is an answer to the question of why fertility changes. If the empirical research reviewed in this essay is an accurate picture of the state of knowledge on the topic, there are many possible answers to this question, usually phrased in terms of particular historical conditions. The model of social causation, implied by the question, does not accord well with such varied responses. The standard social science model is that society works pretty much like a regression equation: the task is to find the right set of predictors, solve the equation, and discover what factors are most important in predicting social outcomes. This framework does lead to empirical generalizations, but there seem to be endless qualifications about the measurement of variables, the meaning and interpretation of variables, the substitutability of one variable for another, and complex interactions with historical settings. If science is to discover parsimonious principles that explain complex patterns, we do not seem to be making progress.

Perhaps we need to reconsider the question about fertility change in light of other models of population and society. The classical model of demography is the Malthusian equilibrium, where there are fluctuations of growth and decline around the balance of population size and economic resources. Every student of demography quickly learns all the shortcomings of Malthus's principle of population—Malthus did not anticipate technological change nor the ability of modern societies to control marital fertility. What is rarely stressed is that the equilibrium model did fit rather well with the dynamics of pre-industrial societies (Wrigley 1969, Grigg 1980, Galloway 1988).

The logic of a homeostatic model is a system maintained by countervailing pressures. In the Malthusian system, constant pressure for population growth is fueled by the passion between the sexes, but this is countered by the negative feedback loop of limited food supplies on population size. This negative feedback loop (density dependence) effect leads to the positive check of increased mortality. Preventive checks (via constraints on marriage) that



slowed population growth were the other mechanism to maintain equilibrium in the Malthusian model.

Ronald Lee (1987) has suggested that Malthusian homeostatic principles, along with Boserupian forces that created positive feedbacks, were central to shaping cycles of population growth and decline until about 100 years ago when rapid technological progress broke the negative feedback loop. There may be, however, other equilibrating forces that have an impact on population growth in the modern era, especially in countries with rapidly growing populations. I am not suggesting that there is an instinct for families to have two surviving children, only that rapid population growth certainly creates systemic pressures (negative feedbacks) for lowered fertility. A homeostatic model, incorporating Kingsley Davis's notion of household strain as a central motivating factor, might well provide an alternative framework for studying fertility dynamics as part of an interdependent system that creates opportunities and costs for family welfare.

An equilibrium or homeostatic framework might be usefully applied to some of the anomalous patterns considered in the prior review of the literature (Lee 1987). The first case is the wide variations of fertility in "natural fertility" populations. Recall that fertility responded in a systematic way to variations in economic conditions in premodern Europe via changes in marriage patterns (Wrigley 1966, Goldstone 1986). There are also systematic differences between forager and agricultural populations (Gillian et al 1993) and between agricultural populations at different levels of density (Easterlin 1971, 1976a, Firebaugh 1982). The wide variations in intermediate variables in many traditional (pre-fertility transition) populations (sexual abstinence, breastfeeding duration, rules on widow remarriage, patterns of male migration, divorce, etc) seem to be simply cultural curiosities unless we assume that these practices were social adaptations to regulate population size and growth, just as rules on marriage in premodern England were responses to economic cycles. Much of contemporary demographic wisdom considers these variations beyond the relevance of theories of fertility decline, which are limited to the origins of conscious control of marital fertility. Conscious patterns of fertility control are an important part of the process, but the theoretical framework of fertility transitions should be built on a broader base.

If the homeostatic principle is to maintain demographic equilibrium in order to avoid community and household strain, then changes in fertility are only one of several mechanisms that can respond to the rapid increases in population growth (as a result of reductions in mortality) that began in the eighteenth and nineteenth centuries in many European countries and around the globe in the twentieth century. The first response was probably migration: to agricultural frontiers, to cities, and to settler societies in the New World and Oceania. The two extreme cases in European demographic history—why did the fertility

decline begin so early in France and so late in England?—may be explicable in terms of differential opportunities for outward migration from rural areas. But migration was only a temporary palliative; the explosive population growth that resulted from declining mortality rates led to fertility reductions that eventually (within a century) resulted in a near demographic equilibrium in industrial countries. If current patterns continue, the same outcome is likely in the contemporary developing countries in the next 50 years or so.

The wide variations in correlates of the speed of fertility reduction seem anomalous only if the “true theory” is fixed on a small number of master determinants of lowered fertility in all settings. If, on the other hand, the homeostatic principle is the central idea, the reduction of population growth by fertility decline could occur differentially across a wide variety of situations—depending on the value and costs of children, the costs of fertility regulation, access to information, and many other conditions. While it is important to map the variations in timing of fertility transitions (including the initiation and the pace of change) and the immediate correlates of differential timing, the central point is that all of these revolutionary demographic changes spanned the globe in about a century.

I am not entirely convinced that the alternative model of demographic homeostasis will lead to directions of day-to-day research fundamentally different from theories of fertility decline. But it casts the central question rather differently. Rather than asking why fertility declines and expecting a simple answer, the alternative may be to ask, how are demographic equilibria reestablished after mortality declines? This question will require a much greater tolerance of complexity as there are certain to be many paths to this end. There may also be greater variations in demographic regimes at the conclusion of fertility transitions, but that is a story for another day.

#### ACKNOWLEDGMENTS

This essay was written while the author was a Fellow at the Center for Advanced Study in the Behavioral Sciences. I am grateful for financial support provided by the National Science Foundation (SES-9022192) and the National Institutes of Child Health and Human Development (HD21267). I am grateful to JooEan Tan for bibliographical assistance in the preparation of this essay and to Barbara Entwisle, Kathleen Much, Samuel Preston, and Ronald Rindfuss for their critical comments and suggestions on an earlier draft of the essay.

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