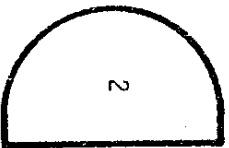


International Union for the Scientific Study of Population 04

INTERNATIONAL POPULATION CONFERENCE

11EGE 1973



A.J. COALE
The Demographic Transition Reconsidered

Union Internationale pour l'Etude Scientifique de la Population

CONGRES INTERNATIONAL DE LA POPULATION

THE DEMOGRAPHIC TRANSITION

A.J. COALE

Office of Population Research
Princeton, New Jersey

The subject of this plenary session of the IUSSP is familiar -- perhaps over-familiar -- to everyone present. In fact, every member of the International Union probably could give an impromptu lecture on the topic. However, because in the three or four decades since the idea of the demographic transition was fully formulated and designated by that name there has been an unprecedented flood of demographic research and profound changes in birth and death rates in most populations of the world, it may be of interest to reexamine the subject to see whether the basic ideas of the transition are as valid and germane in the contemporary world as they seemed to be when they first became popular.

THE DEMOGRAPHIC TRANSITION IN THE WORDS OF ITS ORIGINATORS

The easiest way to summarize the ideas of the demographic transition is to quote from one of its formulators (Notestein, 1953) :

"(Premodern birthrates in Europe) although ... lower than in Colonial America, or in the Orient today, ... were high by present standards. Indeed, they had to be high. We may take it for granted that all populations surviving to the modern period in the face of inevitably high mortality had both the physiological capacity and the social organization necessary to produce high birth rates.

"Peasant societies in Europe, and almost universally throughout the world, are organized in ways that bring strong pressures on their members to reproduce. The economic organization of relatively self-sufficient agrarian communities turns almost wholly about the family, and the perpetuation of the family is the main guarantee of support and elemental security. When death-rates are high the individual's life is relatively insecure and unimportant. The individual's status in life tends to be that to which he is born. There is, therefore, rather

little striving for advancement. Education is brief, and children begin their economic contributions early in life. In such societies, moreover, there is scant opportunity for women to achieve either economic support or personal prestige outside the roles of wife and mother, and women's economic functions are organized in ways that are compatible with continuous childbearing.

"These arrangements, which stood the test of experience throughout the centuries of high mortality, are strongly supported by popular beliefs, formalized in religious doctrine, and enforced by community sanctions. They are deeply woven into the social fabric and are slow to change. Mortality dropped rather promptly in response to external changes because mankind has always coveted health. The decline of fertility, however, awaited the gradual obsolescence of age-old social and economic institutions and the emergence of a new ideal in matters of family size.

"The new ideal of the small family arose typically in the urban industrial society. It is impossible to be precise about the various causal factors, but apparently many were important. Urban life stripped the family of many functions in production, consumption, recreation, and education. In factory employment the individual stood on his own accomplishments. The new mobility of young people and the anonymity of city life reduced the pressures toward traditional behaviour exerted by the family and community. In a period of rapidly developing technology new skills were needed, and new opportunities for individual advancement arose. Education and a rational point of view became increasingly important. As a consequence the cost of child-rearing grew and the possibilities for economic contributions by children declined. Falling death-rates at once increased the size of the family to be supported and lowered the inducements to have many births. Women, moreover, found new independence from household obligations and new economic roles less compatible with child-bearing.

"Under these multiple pressures old ideals and beliefs began to weaken, and the new ideal of a small number of children gained strength. A trend toward birth restriction started in the urban upper classes and gradually moved down the social scale and out to the countryside. For the most part this restriction of childbearing was accomplished by the use of folk methods of contraception that have been widely known for centuries throughout the world. However, they were not widely used until the incentive for birth restriction became strong. Later, presumably in response to the new demands, the modern and more efficient methods of contraception were developed and gained widespread acceptance. By the middle nineteenth-thirties birth-rates throughout the modern West had reached very low levels. The transition to an efficient recruitment of life on the basis of low birth-rates and low death-rates was virtually completed".

CERTAIN FEATURES OF FERTILITY TRENDS DURING THE DEMOGRAPHIC TRANSITION REEXAMINED

In reviewing the transition, I shall not attempt to consider all of the points that have been challenged by later writer or that are not fully consistent with evidence now available. In particular, the controversy about whether declining mortality was the principal basis of accelerated population growth in the late eighteenth and early nineteenth centuries, and about the causes of declining mortality will not be reviewed. Instead I shall consider the adequacy of the attempts of the demographic transition to describe and to some extent to explain trends of fertility during modernization.

In discussing fertility in the context of the transition, is convenient to use indexes that were designed for a research project in which the province-by-province decline of fertility in Europe is being studied, a project conducted by the staff of the Office of Population Research in Princeton in collaboration with several European colleagues. The indexes have been fully defined elsewhere and will merely be described in a few words here. (Coale, 1965) The indexes measure the overall fertility of women of childbearing age (I_f), the fertility of the current married women (I_g), and the non-married (I_h). Each of these indexes states the fertility of the specified group relative to what it would experience if it had the highest set of fertility rates by age on reliable record (that of married Hutterites). Thus an index of 1.0 means that the group in question (e.g., all women, or married women) has fertility equal to the highest on record; a value of 0.5 implies fertility on average half as high as the Hutterites, etc. The index of proportion married (I_m) is a fertility-weighted aggregate index of nuptiality among women of childbearing age; if all women from 15 to 50 are married, the index has a value of 1.0. The advantage of these indexes over direct calculations of general fertility, marital fertility, and the simple proportion married among women 15 to 50 is that the indexes incorporate an indirect standardization for age distribution within the childbearing span, and that the value of the fertility indexes has a direct intuitive meaning (i.e., fertility is stated relative to the maximum on record). There is a useful relation among the indexes :

$$I_f = I_m \cdot I_g + (1.0 - I_m) I_h$$

which reduces to $I_f \approx I_m \cdot I_g$ when the contribution of illegitimate fertility is negligible.

We shall now consider certain aspects of fertility trends that appear inconsistent with, or at least more complex than, the description of fertility changes provided in the demographic transition.

Large differences in the fertility of premodern societies

In the statement of the transition quoted earlier the characterization of fertility in traditional societies is not very specific, and certainly does not do justice to the large range in fertility among populations classed together as premodern. Total fertility was as low as 5.0 in early nineteenth century Sweden and mid-nineteenth century England, and as high as 8.4 in the Cocos-Keeling Islands, and well over 8.0 in a number of African populations, according to the best available estimates. The difference between the highest and lowest pre-transition fertility levels is a magnitude comparable to the change in fertility during the transition itself. Incidentally, in none of the fairly voluminous data now available from "traditional" populations is there an example of fertility that approaches the biological maximum, as implied in some statements of the transition. A total fertility of 8.4 implies an I_f of about 0.67. A population in which all women of childbearing age were married and in which marital fertility equaled that of the Hutterites would have an I_f of 1.0; the Hutterites themselves, with only about 70 percent of women of childbearing age married ($I_m = 0.7$), have an I_f of 0.70. An I_f of 1.0 is "biologically possible", but the highest values found are about 0.7.

Differences in proportions married in premodern societies

One source of large differences in fertility among populations that have not experienced the transition is differences in proportions married at the childbearing ages. Differences in marital status are especially conspicuous between the population of western Europe before the modern decline in fertility on the one hand, and populations of Asia and tropical Africa on the other (Hajnal, 1964). In western Europe in the nineteenth century the mean age at first marriage for women was usually above 23 years and sometimes as high as 28 or 29; the proportion remaining single at the upper end of the childbearing span was typically more than 10 percent and sometimes 25 or 30 percent or more. In the traditional societies of Asia and Africa the mean age at first marriage for women is usually less than 20 years; the proportion remaining single at age 35 or 40 is usually less than five percent, and often less than one percent. Eastern Europe, North America, Latin America, and the European populations of Oceania are intermediate in the prevalence of marriage.

Differences in the marital status of women in the potential fertile ages are succinctly expressed by the index of proportion married (I_m) described above. The highest value of I_m that has been computed for a national population is 0.91 for Korea in 1930; the lowest is 0.33 for Ireland in 1900. In northwestern Europe -- The United Kingdom, Scandinavia, The Low Countries, plus Germany, Switzerland, and Austria -- I_m prior to the modern decline in fertility was between 0.55 and 0.50, about half the level found in Korea.

There is reason to believe that this western European form of nuptiality had not existed continuously since the fall of Rome, but rather that late marriage and frequent permanent celibacy were developments occurring after the Middle Ages. It might be said that western Europe has experienced two demographic transitions. The first -- the extent, date, duration, and some might say even the existence of which are conjectural -- was a transition from early and universal marriage to the west European form of nuptiality; a reduction in proportion married from an I_m of 0.75 to 0.85 to an I_m of 0.40 to 0.50. If I_g remained constant during this transition, the fall in I_f was as much as 30 to 50 percent. This first transition might be considered the *Malthusian* transition, since Malthus, writing at a time of low I_m and at least moderately high I_g , and contending that the fertility of his day was too high for continued human progress, advocated still higher age at marriage (still lower I_m) as the solution. The second transition (the transition that is our subject here) could then be called the *Neomalthusian* transition, since it is based on a reduction of I_g by techniques advocated by Neomalthusians.

The Malthusian transition had demographic consequences -- on the rate of increase and the age composition of the population -- comparable to the later demographic transition that is the subject of this paper. But later marriage is a different kind of response from the voluntary reduction of marital fertility, and arises from a different set of social forces. Couples marry within a range of socially accepted ages, and postpone marriage within that range because of inability to satisfy the current norms (e.g., of dowry, property ownership, or income) for marriage. Few couples marry at 25 instead of 24 because of a calculation that they will have one birth less; whereas the practice of contraception or abortion is directly aimed at fewer births.

It seems likely that even in eastern Europe that the marriage state had become less universal in the late nineteenth century than several centuries earlier, because I_m , generally above 0.60 and thus well above what was then characteristic of the northwestern part of Europe, was still short of the range 0.75 to 0.9

of many Asian and African populations.

The geographical pattern of nuptiality in Russia in 1897 is of particular interest. I_m was below 0.55 in the four provinces bordering on the Baltic, but as one moves across the map of Russia in any direction from the Baltic, one finds ever larger values of I_m , reaching a maximum in the opposite (southeast as opposed to northwest) corner of European Russia -- a maximum of about 0.80 in the province bordering the Caspian. A simple measure of "distance" from the Baltic -- the minimum number of provinces that must be traversed to reach the Baltic -- has a linear correlation of 0.92 with I_m . This tight-knit geographical pattern suggests that within the Russian Empire at the end of the nineteenth century the custom of late marriage was still spreading from its hypothetical point of introduction in the most Europeanized provinces (the Baltic) through neighboring areas to the most distant part, still essentially Asian in terms of age at marriage.

Differences in marital fertility in pre-transition populations

The variation in the prevalence of marriage is not the only source of differences in fertility among populations not yet subject to the prolonged decline of the transition. The index of marital fertility (I_g) in provinces of pre-transition Europe ranges from about 0.65 to nearly 1.0 (or as high as among the Hutterites). In India, even if an estimate of the birthrate well above that of the Registrar General is accepted, I_g during the 1950's was less than 0.60; in Taiwan in 1935, prior to any decline, I_g was 0.70. The highest marital fertility in pre-transition populations is at least 50 percent higher than the lowest.

The basis of these differences is far from fully understood, although they have been the subject of speculation and of research limited by the data at hand.

A useful distinction was introduced by Louis Henry : the distinction between *natural* fertility and controlled fertility (Henry, 1961). By his definition, natural fertility is what prevails in a population in which the couple's behavior is not modified according to the number of children ever born; *control* is indicated by special measures taken by couples with many children. Thus Henry considers as natural the low fertility that may exist in a society that observes a taboo against intercourse during lactation, provided the taboo is invoked after the first birth as well as after the ninth. In a study of examples of what seemed on the basis of available clues to be natural fertility, he found a substantial range in level; among the marital fertility schedules he tabulates as natural, the range of I_g (where the underlying

data are reliable) is from 0.64 to 1.0.

Some but not all premodern societies are characterized by natural fertility (in this sense). The presence or absence of control is difficult to establish since there is no direct way of ascertaining the extent of the practice of contraception and abortion in European populations more than a century ago. But control is indicated, crudely, by a steeply declining age-schedule of marital fertility, and more precisely by such clues as a substantially earlier age at the birth of the last child for women who married under age 25 than for those who married over 30. Low fertility caused by control has been detected in selected French villages before the end of the eighteenth century, among the dukes and peers of France and the bourgeoisie of Geneva as early as the seventeenth century, in a parish in Devonshire in the seventeenth century, and among Quakers in Colonial America by such evidence, and the age structure of marital fertility suggests the presence of control in several national populations prior to the sustained modern decline.

The variations in fertility in fully modernized societies

In the 1930's and 1940's when the demographic transition was becoming well known, fertility in the most highly modernized countries was -- or had recently been -- below replacement. That is to say that births were occurring at a rate insufficient to replace the parental generation. Fertility too low to maintain a constant population was viewed as the natural result of the transition. This view was supported, not merely by the fact that low fertility was so widespread in the 1930's, but also by an attempt to predict the implications of the universal extension of effective birth control. Thus Stix and Notestein wrote (Stix and Notestein, 1940) :

"No population, even under favorable mortality conditions, can maintain itself without an appreciable proportion of large families to counterbalance the unmarried, the married but sterile, and the couples who are unable to have more than one or two children. On the other hand, planned families of more than 5 children are rare. Estimates indicate that if populations are to be self-replacing of 4 or more children. It is doubtful if that proportion is approached in any group actually planning its families. Our own experience and that of western Europe point clearly to the fact that voluntary parent-hood will result in eventually declining numbers unless new factors enter the situation."

In fact, from the 1940's through the 1960's there was a "baby boom" of varying magnitude in precisely those areas (western Europe and America north of the Rio Grande) that exemplified the likelihood of decline. During this boom, fertility remained above the level required for replacement, at least until the 1970's. The anticipated period of decline in population turned into a period of unexpected rapid growth -- in western Europe post-war rates of increase were as high as during the transition itself.

A major part of this unexpected increase in fertility was the result of the rather sudden termination of the long-standing west European combination of late marriage and high rates of permanent celibacy. Average age at first marriage fell by as much as two or three years, and the proportion remaining single to less than 10 percent in most populations. I_m rose from values around or below 0.50 to values of 0.60 to 0.70. In France and the Low Countries I_m began to increase (quite gradually) no later than the middle of the 19th century, and the increase continued, except for the temporary effects of the two World Wars, into the 1950's. In most of the other European populations (and in overseas areas populated by Europeans), the increase in I_m began in the 1930's (in spite of the Depression) or in the 1940's and was large and rapid.

Other factors contributing to the baby boom were a pronounced decrease in childlessness (below the previously estimated minimal incidence of involuntary sterility, in some populations) and in the proportion of couples who stop childbearing with one child. There was no general return to large families. It became clear that the nuptiality customs of Malthus' time, although remarkably stable for more than a century, were not permanent features of western society, and that preferences for very small families evident among couples controlling fertility in the first decades of the twentieth century were also temporary. In short, counter-examples promptly came to life to disprove the proposition that no population can maintain itself without an appreciable proportion of large families to counter-balance the unmarried, the sterile, etc. The unmarried, the sterile, and the one-child family virtually vanished during the post-World War II era.

The decline in mortality does not always precede the decline in fertility

Descriptions of the demographic transition attributed the rapid growth of European populations during the nineteenth and early twentieth centuries to a decline in mortality that preceded the decline in fertility, a lag explained by the lesser resistance to modernization of the forces sustaining high mortality

than those maintaining high fertility. A further reason that the decline in mortality naturally precedes the decline in fertility is that a fall in death rates, especially among children, is itself a basis for a reduction in fertility: with lower mortality, given goals of size of family are achieved with fewer children; more survivors from a given number of births constitute a greater burden of child care; and lower mortality can help nurture a greater concern for the individual child, a concern that in turn contributes to the control of fertility.

A closer look at the evidence reveals many instances in which the decline in fertility and mortality were more or less synchronous (without the postulated lag), and even a number of populations in which the decline in fertility came first. France is the most prominent example of roughly simultaneous declines: the moderate rate of population increase established in the late eighteenth century scarcely accelerated during the transition, because the decline in the death rate during the nineteenth century was very well matched by a decline of the birthrate that occurred at the same time.

The modern decline in mortality in Germany began at the same time as the decline in fertility. Knodel has shown that trends in infant mortality were essentially horizontal until after 1870, and then diminished in remarkable parallelism with the fall in marital fertility. The inference of a causal relation is almost irresistible; but when province-by-province records are examined, it is found that in about half the provinces the decline in fertility preceded the decline in infant mortality; so it is an open question which trend is the cause and which the effect, or whether indeed it is not an instance of common causes of both trends.

The decline in marital fertility during the transition: the result of new techniques of contraception or of newly developed attitudes and motives?

One of the most carefully reasoned and persuasive aspects of the demographic transition was its refutation of simple biological or technological explanations of the fall in the rate of childbearing. Biological explanations -- that urban life or modern diets had reduced human capacity to bear children -- were shown to be false by demonstrating that conception rates were as high, and birth intervals as short, in modern populations when not practicing contraception as in primitive populations. Technological explanations -- that the decline in marital fertility occurred because of the invention of effective contraceptives -- were countered by the historical evidence assembled by Norman Himes of the centuries' old existence of

knowledge of folk methods of contraception, combined with clinical evidence of the effectiveness of such methods, especially *coitus interruptus* (Himes, 1936). It was also pointed out that the decline in fertility began before the wholesale manufacture and distribution of early new contraceptive devices, such as condoms and diaphragms.

Recent analysis doubt on the overriding importance of changing attitudes, and the secondary importance of the new availability of effective contraceptive technology. Surveys in the United States show a surprisingly large fraction of pregnancies to be unintended and unwanted, even in the 1960's. In many high fertility populations (notably in urban Latin America) women are so highly motivated to avoid birth that they resort to primitive methods of self-induced abortion, or put themselves in the hands of non-medically trained abortionists, with resulting high rates of hospitalization, and many deaths. These facts suggest that strong motivation is not enough; the mastery of technique is also important; and it is natural to infer that improvement in contraceptive practice, even if only in the form of the development of more effective use of folk methods, is usually an important ingredient in sharp declines in marital fertility.

The most telling evidence suggesting that in the nineteenth century new techniques must have become available to persons who strongly preferred to avoid childbirth is the decline in the fertility of unmarried women that took place during the same era as the fall in marital fertility. In many European populations the proportionate decline in illegitimate fertility (I_h) from the mid-nineteenth century until about 1930 was about the same as in legitimate fertility (Shorter, Knodel, and van de Walle, 1972). It can scarcely be argued that single women (and their mates) developed a new attitude and sought to avoid illegitimate births that previously they had welcomed. A much more natural reading of the evidence is that newly adopted procedures (and newly developed skills in their use) that permitted married couples to realize their (possibly new) intentions to have fewer children also permitted cohabiting unmarried couples to avoid illegitimate births. *Coitus interruptus* might always have been known to some, but mistaken beliefs about the consequences of its practice, plus restriction of knowledge to a minority, may have inhibited its use.

Regional differences in the decline of fertility

In the continuing research on the conditions that prevailed in each of the more than 700 provinces of Europe as marital fertility declined, it is becoming evident that there are differences in the experience of provinces in different countries or

regions, differences that cannot be explained by recorded socio-economic characteristics. If a very close empirical relationship is found in one European country between the date at which marital fertility began to decline and certain socio-economic characteristics (say the proportion of the labor force in agriculture and the level of infant mortality), the relationship cannot in general be used to estimate the date of decline in another country. The same socio-economic characteristics may be related to the date of decline in a second country (although such is generally not the case) but the parameters of the estimating equation are different.

The strong difference from region to region in the conditions under which fertility declines was first noticed in W. Leasure's research on his doctoral dissertation, a study of change in fertility in Spain (Leasure, 1962). At one stage in his work he drew a map in which a code indicated the level of marital fertility in 1910 in each of the 49 provinces of Spain. It was very evident that provinces with similar levels of marital fertility were adjacent, rather than spotted through the country. Adjacent provinces with similar levels of fertility were often quite dissimilar in the extent of literacy, the proportion of the labor force in agriculture and the like. Leasure took his map, without a label, but with its various shadings, to a professor of romance languages at Princeton who specialized in Spanish language, literature, and culture, to ask help in interpreting the clusters that appeared on the map. His immediate reaction was that Leasure had drawn a linguistic map of Spain. When Spain is divided into the standard regions that are used by Spanish statistical authorities, regions delineated in part because they once constituted different kingdoms, and differ in language and traditions, analysis of variance shows that over 90 percent of the total variance in marital fertility is between regions, and less than 10 percent within. Similar results have been found by Knodel in Germany.

A vivid example of what might be called regional clustering of fertility change is found in Belgium. In an exploratory phase of research on the decline of fertility in Belgium by commune, Ronald Lesthaeghe has found structurally similar multivariate relations between fertility on the one hand and a set of socio-economic variables on the other in the French-speaking and Flemish-speaking parts of the country. The two linear regressions are separate, and if the two parts of Belgium are thrown together as one set of observations, the relationships are generally weakened, regression coefficients reversed in sign, and the statistical picture becomes confused if not meaningless.

The generalization that remains

In spite of the foregoing objections, qualifications, and doubts concerning particular points in the demographic transition, there remains an overall generalization that can hardly be denied. In Paul Demeny's words, "In traditional societies fertility and mortality are high. In modern societies fertility and mortality are low. In between, there is demographic transition" (Demeny, 1968). It is not at all impossible to formulate definitions expressed in quantitative indexes to delineate *traditional societies*, *modern societies*, and high and low fertility and mortality, such that as of a given recent date (say 1960) all societies qualified as traditional according to the objective quantitative criteria do, in fact, have high fertility and mortality, and all societies qualifying as modern do, in fact, have low fertility and mortality. The societies "in between" overlap, at each end, with demographic characteristics of traditional and modern societies. The definitions might be along the following lines: (a) society was modern, in 1960, if at least 50 percent of the population lived in urban settlements of more than 20,000 persons, if more than 90 percent of the female population at ages 6 to 13 was enrolled in school, and fewer than 30 percent of the labor force was engaged in agriculture, fishing, and forestry. A society was traditional if less than 30 percent of its population lived in urban settlements of more than 20,000 persons, if fewer than 50 percent of females 6 to 13 were enrolled in school, and if more than 60 percent of the labor force was engaged in agriculture, fishing, or forestry. High fertility and mortality could be defined as a total fertility of over 5.0 and an expectation of life at birth for women of less than 60 years; low fertility and mortality defined as a total fertility of less than 4.0, and an expectation of life at birth for women of over 68 years. The set of modern countries with low fertility and mortality includes communist, socialist, and capitalist countries; Protestant, Catholic, atheist, and Shintoist countries; and countries of Asian as well as European culture. This exercise illustrates the power -- and the weakness -- of the concept of the transition as it stands today. Its power lies in the undeniable fact that with sufficient modernization fertility and mortality change in a predictable manner. As Livi-Bacci once remarked, families of eight children are not common in any population that lives primarily in urban apartment houses, and enjoys the use of telephones, television sets and automobiles; whereas in an earlier, largely agrarian, less technological by advanced point in the history of such a population, large families were not unusual.

The weakness of the concept is associated with the difficulty of defining a precise *threshold* (a checklist of essential charac-

teristics, or a combined score on some socio-economic scale) of modernization that will reliably identify a population in which fertility is ready to fall. Attempts have been made to modify the concept of a threshold to allow for cultural differences in different parts of the world by defining *regional thresholds*, and to allow for the evolution of the cultural environment of the world as a whole by defining a *moving threshold*. These experiments may prove successful; they represent one of the current strategies for modifying the early versions of the transition. In 1870, only France and the United States had reduced fertility very far, but the country farthest along with industrialization was England. Essentially universal primary education had been achieved in Germany and Scandinavia by 1870, but fertility there remained on a high plateau. We cannot define measure of *modernized and traditional*, and high and low fertility and mortality for 1870 that would work as well as our definitions for 1960.

PRECONDITIONS FOR SUSTAINED DECLINE IN MARITAL FERTILITY LISTED

The diversity of circumstances under which marital fertility has declined, and the consequent difficulties of formulating a well-defined threshold, may originate in the existence of more than one broad precondition for a decline. Three general prerequisites for a major fall in marital fertility can be listed:

- (1) Fertility must be within the calculus of conscious choice. Potential parents must consider it an acceptable mode of thought and form of behavior to balance advantages and disadvantages before deciding to have another child -- unlike, for example, most present day Hutterites or Amish, who would consider such calculations immoral, and consequently do not control marital fertility.
- (2) Reduced fertility must be advantageous. Perceived social and economic circumstances must make reduced fertility seem an advantage to individual couples.
- (3) Effective techniques of fertility reduction must be available. Procedures that will in fact prevent births must be known, and there must be sufficient communication between spouses and sufficient sustained will, in both, to employ them successfully.

Alternative explanations of the decline of fertility differ in the assumptions they make (implicitly or explicitly) about these prerequisites. Biological explanations ignore all three

as irrelevant. A purely technological explanation (not much more tenable than the biological) would emphasize the invention and subsequent diffusion of effective techniques, and implicitly treat the other preconditions as always present, or unimportant.

Explanations of the transition by economists (such as Gary Becker, Richard Easterlin, or Paul Schultz) accept a rational conscious choice as an axiom of human behavior and look for the source of the change in fertility in precondition ~~to~~ a changed balance of the advantages and disadvantages of high fertility. The availability of effective techniques can be included in the economists' approach as an element affecting the cost of achieving reduced fertility.

The authors of the transition said that modernization produces preconditions one and two, and that the third (effective technique) was always latent.

An approach towards the reconciliation of the universality of the major decline in marital fertility in highly modernized societies with the variety of circumstances under which the decline occurs can be made in the following manner. If any society is to achieve the very high productivity that can be attained through modern science, engineering, and industrial organization, it must acquire certain characteristics, for example, an agglomerated residential pattern (typically in cities), and a variety of customs and attitudes suited to industrial rather than agrarian life. Among the characteristics a society must acquire to achieve the conspicuous material gains from modernization are the three preconditions for a decline in marital fertility. For simplicity, we might say that in respect to the preconditions, highly modernized societies are essentially homogeneous.

On the other hand, it is not true that all the preconditions are absent in all premodern societies. Instead, these societies differ widely in the prevalence of the prerequisites, and in the degree of change that must occur before the preconditions are introduced -- just as premodern societies differ in readiness to seize the opportunities for material gain inherent in the possibility of modernizing. In some premodern societies all three prerequisites for a decline in fertility exist, and fertility is reduced before extensive modernization occurs. At the other extreme, all of the prerequisites are absent, and deeply entrenched customs oppose their introduction. In between are populations in which one or more, but not all, the preconditions are present. The Hutterites appear to be an example of a population in which prerequisites two and possibly three exist, but a powerful religious dogma is a barrier to prerequisite one; the unmarried couples of the mid-nineteenth century surely were subject to prerequisite two and probably one, but had higher than intended ferti-

lity because of inadequate mastery of an effective contraceptive technique.

If prerequisite one is present in one national population and virtually absent in another, the province-by-province inter-correlations between marital fertility and various socio-economic characteristics may be quite different in the two populations. Unmeasured traditions and habits of mind may be the basis for differential resistance to the establishment of precondition one, and may be one reason for the strong relation (discussed earlier) between region and fertility. Because of a different culture based on a different language and different history, Basques with a certain number of years of schooling and a given occupation are different from Catalonians with the same qualifications, Germans from Frenchmen and Southern Italians from Northern Italians.

The strong regional patterns found in the decline of fertility can be interpreted, alternatively, on the basis of the presumed mechanism by which a new attitude toward childbearing or a new degree of skill in the control of conception is established. A new attitude or skill does not appear simultaneously in all members of the population, but spreads from the pioneers who first adopt it to the rest. The mechanisms of the spread must be to a large extent imitation, combined with informal, person-to-person communication among close friends and relatives. National, linguistic, or other regional boundary lines may delimit the groups whose day-to-day behavior is ordinarily imitated, and with whom intimate communication occurs. The boundaries may serve as firebreaks that temporarily confine a spread of controlled fertility. Probably the decline of fertility has a strongly regional pattern for both of these reasons -- both because regions with different cultures are differentially resistant to the prerequisites of decline, and because a region defined by a common language and culture is a natural unit within which diffusion occurs more readily than it does across regional boundaries.

THE DEMOGRAPHIC TRANSITION IN THE LESS DEVELOPED COUNTRIES

In the 1940's, looking at the prospects for population growth in the large portions of the world (most of Asia, Africa, Latin America, the Caribbean, and the large island population southeast of Asia) that had experienced little modernization, the authors of the transition forecast a period of very rapid expansion. Their interpretation of transitional experience where it had already occurred was that with modernization death rates had been more easily reduced than birthrates, that the decline of

mortality therefore occurred first, and that there was a period of rapid growth because of the gap between the time of the two declines. The implication of the demographic transition for the less developed part of the world at the end of the second World War was that modernization (needed to alleviate extreme poverty) would inevitably cause the same early decline in the death rate, while birthrates remained high, and consequently a period of rapid growth was in prospect. The most urgent need in the realm of population policy for the less developed countries was to shorten the gap between the fall in the death rate and the fall in the birthrate.

One cannot help but be impressed with the validity of this forecast and the accuracy of this insight into coming population problems. Attempts to make quantitative forecasts, however, fell far short of subsequent events: the difference between birthrates and death rates was much greater than foreseen. In population after population the decline in mortality was more rapid than it had ever been in the earlier experience of the pioneers in modernization. Scientific advances in medicine and inventions and innovations in sanitation and public health occurring in the laboratories and research centers of the modernized world proved (largely by design) readily transferable to less developed areas. The average duration of life has not infrequently risen for a decade or more one year with the passage of each calendar year, even when general social and economic progress has been moderate. The forecast of the transition was thus accurate in direction but inaccurate in detail, with respect to mortality. The error was in underestimating the pace of decline, and over-stating the connection with over-all modernization.

The forecast of the course of fertility was also qualitatively correct: the decline of fertility has lagged behind the decline of mortality. Indeed, a substantial decline in fertility has occurred in only a fraction of the areas that were pre-transitional at the end of World War II.

Looking backward at the history of the most highly modernized countries, the demographic transition correctly tells us that in all such countries fertility and mortality were much higher in the premodernized state; looking forward to the future of countries that in 1945 still had high fertility and mortality, it correctly predicted that mortality would decline before fertility, producing rapid growth. In neither instance does it specify, in terms that can be translated into quantitative measures, the circumstances under which the decline of fertility begins.

The success of the demographic transition, limited though it may be in interpreting the past and predicting the future, has made it an instrument in many debates about appropriate

measures to reduce fertility in low income countries with rapidly growing populations. It has been invoked in opposition to large investments in research on new contraceptive techniques, and especially in opposition to the establishment of large national programs to introduce birth control, programs supported by technical assistance from the more developed countries. The argument against such measures is that the demographic transition shows them to be ineffectual; it is modernization that brings about a reduction in fertility through a modification of attitudes and a change in the balance of advantages and disadvantages from large families. A family planning program operating many clinics and offering the latest in pills, in injections, and intra-uterine devices is useless without profound social and economic change.

Supporters of birth control programs also invoke the transition by proposing that such programs be planned as part of (not in place of) broad plans for social and economic development; by opposing policies of retarding the acceleration of population growth through the restriction of expenditures on public health, noting that mortality reduction is one of the factors causing a decline in fertility; and by supporting the development of new contraceptive technology on the grounds that if motivation is important, contraceptives should be developed that require less effort and less emotional cost.

Our re-examination of the demographic transition gives no clear indication whether or not birth control programs in countries at an early stage of modernization can be successful. We have noted that rural, poorly educated populations have in the past reduced fertility by voluntary control, even when mortality was higher than it is now in less developed countries. In fact, the weakness of the idea of the transition is that it tells us that a high degree of modernization is *sufficient* to cause a fall of fertility, but does not tell us what degree (if any) of modernization is *necessary* to produce a fall. Three broad conditions were proposed earlier as necessary: the acceptance of calculated choice as a valid element in marital fertility, the perception of advantages from reduced fertility, and knowledge and mastery of effective techniques of control. Apparently modernization ultimately establishes these conditions, but also, apparently, they can occur in little modernized communities. There is no convincing basis for asserting that a program of indoctrination in the advantages in health and welfare from reduced fertility would inevitably be a failure in a rural poorly educated population. Acceptance of contraception by national and community leaders would help make rational choice in fertility respectable.

European history suggests that educational efforts might be easier to design and implement effectively in some cultures than

in others. The regional, or cultural, factor is evident in the declines in fertility that have begun since World War II in various parts of the world, as well as in the earlier European experience. The tendency for a reduction in fertility to be identified with a particular culture is especially striking with respect to cultures of Chinese origin. The first reduction of fertility in East Asia was in Japan, and the other East Asian populations with reductions approaching (or exceeding) 50 percent are those of Korea, Taiwan, Hong Kong, West Malaysia, and Singapore, all with a large population of Chinese origin or with a culture that clearly derives from the Chinese. In West Malaysia and Singapore, the reduction in fertility has been limited to, or especially marked among, the Chinese. The universality of the decline among Chinese outside of the mainland of China makes accounts of a major reduction in the Republic of China more plausible.

In re-examining the decline of fertility in western Europe, we noted that there must have been two transitional periods: A Malthusian transition in which later marriage and fairly common spinsterhood replaced early and universal marriage, and Neomalthusian transition in which marital fertility fell. One transition is the fall in I_m , the other a fall in I_g . I will conclude by suggesting that there is a tendency for both transitions to occur during the modernization of a traditional society if it is initially characterized both by high marital fertility and by very early and universal marriage (mean age of marriage below 20 and one or two percent remaining single). Each transition then makes an important contribution to the overall decline in fertility.

We have concluded that in no highly modernized society are married couples subject to "natural fertility"; we may also conclude that in no highly modernized society is the mean age at marriage likely to be below 20 years, or the proportion remaining single less than three percent. Apparently universal and very early marriage occur only when marriages are arranged by the parents of the bride and groom and such powerful roles of the family are among the traditional forms of behavior that do not survive intensive modernization. Countries that have undergone extensive social and economic change have had large reductions in I_m because of the virtual disappearance of extremely early marriage. In Korea, I_m was 0.91 in 1935, and had fallen to 0.70 in 1966. The provinces in Russia with values of I_m above 0.75 in 1897 had all experienced large reductions by 1926 and further decreases by 1959.

In the Far Eastern populations in which fertility has fallen sharply, there has been an increase in the age at marriage as well as a decline in marital fertility. In Japan from 1920 to 1950 and in Singapore from 1957 to 1966 (with reductions in I_f

of about 25 percent and 35 percent respectively), the reduction in I_m was about as great as the reduction in I_g . The reduction of I_m has also been important in Hong Kong and Taiwan; and large increases in age at marriage are repeatedly and persistently reported by observers of the Republic of China.

If less developed countries with high birthrates also have very high values of I_m , examples indicate that later marriage can occur, and that it has a large fertility-reducing effect. It is a subtle but relatively neglected instrument of public policy in the countries in question.

RESUME

L'appellation "transition démographique" est souvent donnée à des généralités concernant les variations dans la fécondité et la mortalité qui se produisent lorsqu'une société traditionnelle est transformée en société hautement industrialisée. On examine ici les variations dans la fécondité à la lumière de l'évolution de la démographie depuis la formulation de cette idée de transition. On note que l'étendue des variations de fécondité dans les sociétés pré-transitionnelles est aussi grande que les variations typiques de fécondité pendant la transition, et que dans les sociétés totalement modernisées on trouve une fécondité plus élevée et plus variée que celle envisagée par les théoriciens de la transition démographique. La mortalité n'a pas toujours baissé avec la fécondité; et on trouve souvent des variations de fécondité qui se ressemblent dans des régions délimitées par une culture ou une langue, malgré le fait que dans ces régions il existe des différences sociales et économiques. Néanmoins l'argument paraît valide selon lequel les sociétés modernisées ont toujours des taux de fécondité et de mortalité plus bas que ceux d'une période pré-moderne. On propose trois conditions préalables nécessaires à une baisse de fécondité de mariage, essayant ainsi de réconcilier les différences détaillées dans les conditions de populations individuelles au moment du commencement du déclin.

* * *

REFERENCES

- Cole, Ansley J. 1965. Factors associated with the development of low fertility : an historic summary. *United Nations World Population Conference*, 1965. Vol. 2, pp. 205-209.
- Demeny, Paul. 1968. Early fertility decline in Austria-Hungary : A lesson in demographic transition. *Daedalus* 97:502-522.
- Hajnal, John. 1964. European marriage studies in perspective. In Glass, D.V. and Eversley, D.F.C. (eds.). *Population in history*. London : Arnold.
- Henry, Louis. 1961. Some data on natural fertility. *Eugenics Quarterly*. Vol. 8, No. 2.
- Himes, Norman E. 1936. *Medical History of Contraception*. Baltimore, Williams and Wilkins.
- Leasure, James William. 1962. Factors involved in the decline of fertility in Spain : 1900-1950. Doctoral dissertation at Princeton University.
- Notestein, Frank W. 1953. Economic Problems of Population Change. In *Proceedings of the Eighth International Conference of Agricultural Economists*. London : Oxford University Press.
- Shorter, Edward; Knodel, John; and van de Walle, Etienne. 1971. Decline of Non-Marital Fertility in Europe, 1880-1940. *Population Studies*. Vol. 25.
- Stix, Regine K., and Notestein, Frank W. 1940. *Controlled Fertility : An Evaluation of Clinic Service*. Baltimore : Williams and Wilkins.

* * *