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The economics of
individual and
population aging

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PREFACE

This study summarizes and assimilates research by international scholars in economics, demography, and the other social sciences in order to provide a conceptual framework for the economics of aging. The objective of this analysis is to identify and describe the principal economic issues associated with individual and population aging and to assess the existing knowledge respecting the economic and social problems emerging with aging. The integration of interdisciplinary research is of special importance in any examination of gerontological issues, and we have been sensitive to this mandate. However, our primary focus has been on economic complexities of individual life-cycle allocation decisions and the macroeconomic problems that arise from age-structure changes.

The review is international in scope, as we trace the development of concern for population aging in Europe, the United States, and other industrialized countries. Theoretical concepts and changing demographic conditions are illustrated with data from various countries. Cross-national econometric studies are reported along with time-series and cross-sectional research on individual countries. National differences in the response to aging, the institutions that provide income maintenance to the elderly, and the economic conditions of the elderly are noted. In some cases, a single country is examined in detail to indicate a particular aspect of the economics of aging. Most frequently, the United States is chosen because of the availability of data, the greater number of empirical studies employing U.S. data, the familiarity of the

authors with U.S. institutions, and the essential universality of aging phenomena.

Throughout the manuscript, we have attempted to assess the current state of the literature bearing on economic concepts relating to aging phenomena and to indicate fruitful avenues for further research. It is our hope that scholars interested in economics or gerontology can productively utilize this text to identify important problems, become acquainted with previous research on these questions, and generate ideas for future study.

Many colleagues at Duke University and North Carolina State University have contributed to the improvement of this manuscript. We owe a special debt of gratitude to Juanita Kreps, who has worked with us on related projects and whose thinking is reflected in many sections of the book. George Maddox and George Brosseau have been instrumental in formative stages of our research on the economics of aging and have been helpful in the integration of interdisciplinary findings into the volume. Some of the material included in the volume was previously published in a condensed version in the *Journal of Economic Literature*.

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Recognition of the economics of aging

The economics of population aging is essentially a new concern for economists as well as other social scientists. Individual aging, of course, has always been a concern of man, both as an observer and as an individual undergoing the process of aging. Belletristic and other literature relating to man is replete with references to aging concerning its incidence among individuals and within the family. Of this we find representative evidence, for example, in Simone de Beauvoir's *The Coming of Age*, in relevant articles in the July–September 1977 *Educational Gerontology*, and in many interpretations of individual aging and its treatment by poets, novelists, and philosophers.

Even so, important research on aging is of relatively recent vintage. Don C. Charles writes (pp. 237–8) that “research (other than medical) on old persons is almost exclusively a phenomenon of the post–World War II period, although some work began prior to that – as early as the 1920s. Philosophers did, of course, give some thought to what we today call man’s life cycle (e.g., see Cyril P. Svoboda’s account of “Senescence in Western Philosophy,” pp. 219–35). Svoboda reports, for example, that Aristotle, one of the classical world’s most careful observers, “posited that it is natural for the body to reach its prime around age 35 and to ‘advance’ until about age 50,” and then begin to decline (p. 223). The “soul,” he said, reached its perfection at age

50. Some authors mentioned the functional usefulness of older persons and their experience, but without always correlating this aspect closely with specific age. At the other extreme, we find descriptions such as that of mythological Tithonus or Jonathan Swift's "Struldbugs."

Indicative of the growing concern with aging and relating problems is the fact that in the first (1933–4) edition of *The Encyclopaedia of the Social Sciences* there was no article on "aging."¹ In what amounts to a second edition, *The International Encyclopedia of the Social Sciences* (1968), there was a 26-page article dealing with the psychological, social, and economic aspects of "aging."

Given the low life expectancy found prior to the seventeenth and eighteenth centuries, the fraction of a population over, say, 60, would be small. For example (see United Nations, 1968, pp. 148, 182; United Nations, 1973b), with life expectancy at birth between 30 and 40 years, the fraction of a stationary population aged 75 and over would be between 1 and 2 percent, whereas the fraction 60 and over would lie roughly between 7.5 and slightly over 11 percent. With the population growing, this fraction would be lower. In populations with low life expectancies, therefore, older persons would not be conspicuous as in a modern society in which, with numbers stationary and life expectancy at 70.2 years, 6 percent would be 75 or more years old, and nearly 21 percent would be 60 and over. Such changes are reflected in the historical development of the age structure in America, as only 2.6 percent were 65 and over in 1850, compared with 6.8 percent in 1940 and about 19 percent were the population to become stationary.

Population aging— increase in the relative number of older persons (e.g., those over 60 or 64) — would not become pronounced until a population virtually ceased to grow and life expectancy at birth had moved to a sufficiently high level (e.g., over 40). Moreover, the problem of collectively providing adequate support for aged persons who had retired from the labor force would not, as a rule, become pronounced as long as the ratio of persons of productive age to those aged 60 and over was considered sufficiently high.

Sensitivity of an economy to the ratio of persons of productive age to those beyond productive age is conditioned by the nature of the family support system. This sensitivity is greater when a major source of the support of welfare recipients and retired persons is a collective or national social security system whose resources are supplied mainly or entirely by employed persons of working age instead of by members of the traditional family sometimes supplemented by occasional work on the part of retired persons (Hareven, pp. 19–21; Hareven and Vinovskis; also Achenbaum; Treas; cf. Parnes and King). When support is supplied collectively, the number of beneficiaries and the amount of support supplied are much greater (e.g., see Browning). In part because contributions are involuntary, they assume several forms, and their incidence is widely distributed among members of the labor force.

The economic significance of the age structure commanded little attention in the nineteenth century. In his comprehensive *The Population Debate*, E. P. Hutchinson refers only to Hans von Mangoldt's discussion of age structure in his *Volkswirtschaftslehre* (1868), in which J. E. Wappäus's age data for 14 countries are commented on. Mangoldt pointed out that a population's average productivity depended upon the ratio of persons of working age to the total population (pp. 37–40), a ratio that varied inversely with the relative number of young people. He contrasted the fraction of France's population aged 14–60, 64.3 percent, with Prussia's, 59 percent (p. 38). He noted also the economic advantage of reduced child mortality (pp. 38–9). In summarizing economic thinking prior to the twentieth century, Hutchinson concludes that "not much attention was given the ratio of workers to total population. For population was generally taken loosely as equivalent to labor supply" (p. 396).

The importance of the age structure as the fundamental governor of the ratio of beneficiaries to contributors was not stressed until the 1930s after the implications of subreplacement fertility for the future age structure were illustrated through population projections. As early as 1895, Edwin Cannan (pp. 108–24) forecast that the population of England and Wales would be virtually

stationary by the 1940s and at a stationary maximum by 1995, but he did not draw attention to the decline in the ratio of persons of working age to those of retirement age. With the reexamination of the population prospect in the late 1920s and 1930s, theretofore stressed mainly in France, and the growing likelihood that population growth might cease, the implications of this trend for the dependency problem, especially the security of the aged, began to command attention. Economic implications of changes in age structure were pointed out in 1930 by L. I. Dublin and A. J. Lotka in *The Money Value of a Man*.

The first careful study of the then U.S. population prospect was set in motion by President Herbert Hoover when in December 1929 he named a committee to survey social changes under way and to identify emerging problems confronting the American people. One of these inquiries, by W. S. Thompson and P. K. Whelpton, projected the future U.S. population on the basis of then prospective trends. In this report, issued in enlarged form in 1933, the authors emphasized the unfavorable impact of the relatively rapid increase in the population over 65 years of age upon the pension system, the degree of aged dependency, entrepreneurial creativity, and economic progress (pp. 165–71) – conditions associated with the supposed approach of a stationary population (see also Whelpton). In the 1930s Enid Charles prepared several projections of prospective changes in the size of the future British population and its age composition – projections indicating a decrease after the 1950s in the ratio of the population 15–59 years old to that 60 and over (E. Charles, pp. 84–93). After World War II the League of Nations sponsored a study of the population of Europe and the Soviet Union, 1940–70, by F. W. Notestein and his associates at the Office of Population Research, Princeton. They called attention (Notestein et al., Chapters 4–8) to implications of declining fertility and changing age structure for manpower and dependency problems in some European countries, implications of which Sir William Beveridge took some note in his famous report (pp. 397–400). After World War II inquiries into population prospects were undertaken in a number of coun-

tries. In its report issued in 1949 the British Royal Commission on Population drew attention to the social effect of population aging, the "burden of dependency," and so on (Chapters 9, 11, 13). In 1956 and 1973 the United Nations issued a study on the implications of the aging of populations.

Our concern in the present review of literature relating to aging is with studies relating to the *age of population*, a process governed only in part by individual aging. In recent years numerous articles and books on medical, sociological, political, economic, and other aspects of aging have appeared. Illustrative of their variety are Dr. Nathan Shock's bibliographies of current publications in gerontology and geriatrics appearing regularly in the *Journal of Gerontology*, and collections based on them. Illustrative also are the items reported quarterly in *Population Index* and the emerging literature pertaining to dependency, pensions, and related problems affected by population age structures.

Treatment of population aging and its literature is complicated by the fact that population aging is a concomitant of the approach of a population to stationarity, and that some effects of each phenomenon are reenforced by those of the other (Spengler). In this report, however, attention is focused upon literature relating wholly or essentially to economic aspects of population aging.

Upon the discovery of a new area of inquiry in a social science, publications dealing with newly noted aspects of this area continue to increase, perhaps logarithmically, until the subject is exhausted or is found in need only of adjustment for new information. Such appears to have been the history of geriatric and gerontological literature in general as well as that of literature relating directly or indirectly to the nature and consequences of population aging. Studies, of course, may become more refined as data or theories are reexamined.² The voluminousness of the literature makes some review of it useful, in that scholars may thereby be freed of the need for completely canvassing what has been written and be able to isolate issues seemingly in need of further examination. In the reviews of the literature presented in the eight chapters following, such screening is attempted, together with some

indication of the findings. Although virtually all of the relevant literature is of post-1920s vintage, our attention has been directed mainly to that appearing since the 1950s. This examination is international in its scope, for the emergence of population aging is not limited to a few countries. The analysis notes the determinants of aging and the economic response to this process as presented in the international economic, demographic, and social science literature. Data from individual countries are used to illustrate theoretical and methodological issues and to assess empirical relationships. The following paragraphs indicate the content focus of each of the next eight chapters.

In Chapter 2 we indicate that population aging (i.e., increase in the relative number of persons over 60 and 65) is traceable mainly and essentially to decline in fertility or gross reproduction under modern conditions. The impact of prospective improvement in life expectancy at older ages appears to be quite limited, given current conditions, modes of living, and the state of medical and related sciences. Accordingly, labor force and related phenomena, especially those relating to income, are likely to continue to be dominated by the behavior of fertility. Indeed, however long the life span, its impact upon population aging can be offset by increases in fertility.

In Chapter 3 we review the literature bearing upon the way in which various changes in the age structure directly or indirectly affect the capacity of a population to support those of dependent age, especially older dependents. Also reviewed are references to age structure and retirement policies and how the latter need to be adjusted to the given age structure. Some attention is directed also to papers relating to optimum population growth from the standpoint of age structure as distinguished from pressure of numbers upon resources in the Ricardo-Mill tradition.

Chapter 4 is devoted to a review of works relating to the current and recent status of the elderly, mainly in the United States. These works do not relate significantly, however, to the pre-1930 evolution of family and aged support systems (e.g., see Treas, Rubinow, 1934a,b and his bibliographies). This chapter is intended

to illustrate the relative and absolute income position of the elderly in a developed country. The availability of recent data to the authors determined, in part, the choice of the United States for this example.

Two sets of changes affected these support systems and helped to give rise to interest in the development of pension systems in and after the mid-nineteenth century, initially in Europe and especially in Germany with its governmental provision against old age dependency in 1889. First, with the development of the industrial system and the breakdown in agriculture of patriarchal and similar systems which afforded the aged some support, there was less support for the aged outside the confines of the immediate or larger family. Moreover, prolongation of work life became more difficult with imposition of limits on the hiring of older workers and reduction of opportunities for their continuation with their current employers in less demanding employment – a practice that still prevailed in the United States around 1900 when 90 percent of the males aged 55–65 and about 68 percent of those over 65 were employed, often at jobs less onerous (e.g., “Sweeper”) than those they had formerly held (see Hareven, pp. 19–21).

Second, although life expectancy at age 60 increased slowly – in Sweden from about 15 years in the 1880s to slightly over 16 years in 1910–20 – the number of survivors to age 60 gradually did increase. For example, in the United States where in 1900–2 only 46,452 of 100,000 newly born white males attained age 60, by 1974 the corresponding number of survivors had risen to 77,734. Accordingly, there were more aged in need of support.

Prolongation of later life thus reenforced the need for collective and governmental provision for support of the aged already made desirable by the earlier and gradual breakdown of existing family and aged support systems. Many believed it would be too difficult to build such a system solely on private initiative and individually oriented insurance and annuity systems. Today, in many European countries as well as in Canada and the United States, under social security and similar systems a worker upon retirement re-

ceives the equivalent of one-half or more of average earnings in manufacturing (Haanes-Olsen, pp. 3–14).

In Chapter 5 we review literature relating to relations between age and stage in the life cycle on the one hand, and individual economic activities and conditions, on the other. The division of life into stages is not new; it has entered into man's view of life and social policies over the centuries. Such division is of great importance in respect to socioeconomic policy and the ordering of life. Also of importance and stressed in modern life-cycle theory is the degree to which activities and planning in one stage of the life cycle affect those in later stages. Of corresponding importance is the degree to which planning of man's life in life-cycle terms actually influences his activities, together with the degree to which socioeconomic policies increase or reduce individual planning in life-cycle terms (e.g., the degree to which a social security system tends to discourage individual capital formation). Of individual and collective significance, therefore, is extension in the prospective length of the later stages in man's life cycle (Arrow).

In Chapter 6 we review literature relating to labor-force participation on the part of older persons, as well as changes in the incentives and disincentives that affect labor-force participation on the part of older as compared to younger persons. Data relating to labor-force participation as reported in Table 6.1 indicate that participation among males 55–64 remained about as high in 1948 as around 1900 and that participation among those over 64 was only about 40 percent lower than it was around 1900. Since 1948, however, participation has continued to decline among males both 55–64 and over 64; it has increased among females 55–64. A number of statistical studies of labor-force participation along with age of retirement reveal the relative importance of incentives and disincentives to retirement. These are further clarified by the literature reviewed in Chapter 7 – literature bearing upon personal and market determinants of retirement such as health, persistence of unemployment, and decline in occupations accommodating older workers (e.g., agriculture). Financial and individual determinants are also examined.

Chapter 8 is devoted to the growth and impact of the social security system throughout the world. The analysis concentrates on the individual effects. The development of private pension systems and their effects are also examined. Finally, a macroeconomic review of the aging problem is undertaken in Chapter 8. The potential impacts of population aging on consumption, investment, and savings are assessed. In addition, evidence pertaining to the productivity and mobility of an older work force is examined.

Population aging: sources

Population aging is represented by an increase in the relative number of older persons (e.g., those over 60 or 65 years of age) in a population; it is reflected also in the associated increase in the median age of the population. Population aging thus is a counterpart to population “youthening” and the associated decline in the median age of the population (United Nations, 1951, 1956, 1973; U.S. Bureau of the Census, May 1975). Population aging tends to emerge in a mature low fertility population, whereas “youthening” may characterize a high-fertility population experiencing declining mortality among the young (Spengler, 1968).

Inasmuch as awareness of the demographic sources of population aging is conditioned by the sensitivity of available demographic measures, we shall point first to the development of these measures. Later we shall review population changes that led to the emergence of population aging and conditions associated with it. Socioeconomic characteristics of older populations (U.S. Bureau of the Census, Nov. 1975), and implications of population aging are examined in later chapters.

Indicators of population aging

Although the age composition of a population may be affected by changes in mortality, fertility, and net external migration, careful measures of the extent of these effects were slow to