PERSPECTIVE

Redistributing Work in Aging Europe

James W. Vaupel and Elke Loichinger

As Europe ages, the proportion of people who work will decline unless older individuals remain in the labor force. Such reform could be part of a more general redistribution of work. If a greater share of the population worked, then the average number of hours worked per week could be reduced. This could particularly help younger people and increase Europe's low birth rates. The challenges facing Germany, Europe's most populous country, are highlighted, but statistics are also given for five other European countries and, for comparison, the United States. Social science research is needed to provide policy-relevant knowledge about life-course options.

Europe, the oldest continent, is growing older. Low birth rates (*1*, *2*), rising life expectancy (*1*, *3–5*), and, to a lesser extent, migration flows (*1*) are reshaping the "pyramids" that describe population composition by age and sex (Fig. 1). The new demography poses challenges to current labor practices and policies and offers individuals opportunities for greater life-course choice. We summarize the social science research needed to help societies meet the challenges and to help individuals take advantage of the opportunities. We highlight Germany, Europe's most populous country, but also present data on five other members of the European Union and, for comparison, the United States.

Two Indicators of Demographic Change

Traditionally, the burden of old-age dependency has been summarized by the ratio of the number of people above 60 to the number of people between 20 and 60. We introduce two "Rostock indicators" that we believe are more informative for summarizing the magnitude of the economic and social challenges caused by population aging (Table 1). The first is based on a simple measure of labor force participation, namely the ratio of nonworkers to workers, with workers including everyone who works for remuneration for at least 1 hour per week (*6*). In 2005 in Germany, this dependency ratio was 1.27: There were five people who were not working for every four people who were (*7*). To determine the impact of demographic change, we can calculate the ratio keeping labor-force participation rates by age and sex at 2005 levels but using the population pyramid for 2025. This dependency ratio for Germany would then be 1.47, with nearly three nonworkers for every two workers. Other European countries show essentially the same picture, but in the United States it improves. The United States faces a less daunting demographic future because women (and men) in the United States are having about two children on average (compared with $1\frac{1}{3}$ to $1\frac{1}{2}$ in much of Europe) because of sizable immigration flows of young workers, and because life expectancy has been relatively low and increasing relatively slowly.

Our second indicator of demographic change is based on the number of hours worked per week per capita. Germans in 2005 worked an average of 16.3 hours per week (*7*). This value is so low because only 44% of Germans worked at all. Demographic change from 2005 to 2025 will result in an 8% decrease. In France, Italy, and the Netherlands, population aging will reduce the hours worked per week per capita by about 10%. To a rough first approximation, their economies will be smaller by 10% than they otherwise would have been. If productivity gains are large enough, Europeans may enjoy a somewhat higher standard of living 20 years from now even though they are working less. The distribution of work, however, will be even more unequal than it is today. People will be working less on average because more people will not be working at all.

Working at Older Ages

To keep dependency ratios and hours worked per week per capita at current levels, it is necessary for age-specific patterns of work to change. Consider Germany. The hours worked per week per capita in Germany in 2005 can be broken down by age (blue line in Fig. 2). If average effort is to be maintained at its current value of 16.3 hours per week, one option would be to increase work by people in their 50s and early 60s (red line in Fig. 2). Not everyone at

Rostocker Zentrum for the Study of Demographic Change and Max Planck Institute for Demographic Research, Konrad-Zuse-Strasse 1, D-18057 Rostock, Germany, and Terry Sanford Institute of Public Policy, Duke University, Durham, NC 27708, USA. E-mail: jwv@demogr.mpg.de
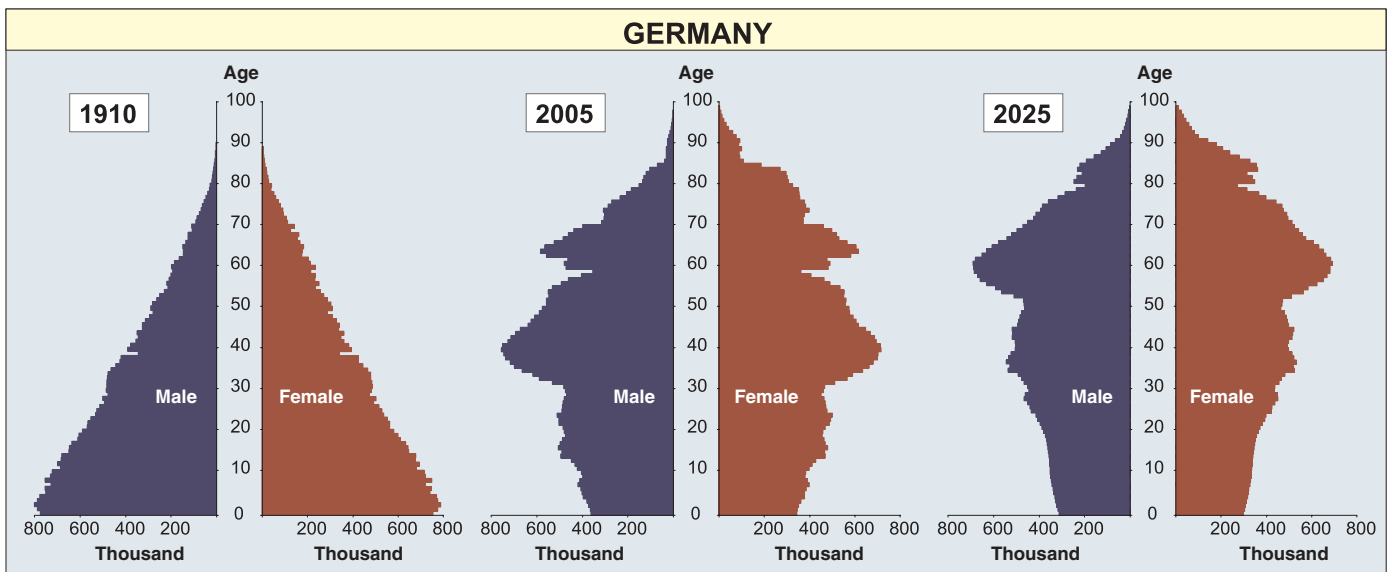
Fig. 1. Population pyramids for Germany in 1910, 2005, and 2025 (*7*). The data for 1910 do resemble a pyramid, with many children and few elderly people, but by 2005 there was a bulge of adults around age 40. This bulge will rise to age 60 in 2025.

these ages will be healthy enough to work, but a key finding of recent social science research is that as people live longer they tend to have a longer span of health (*8*). Social science research has also deepened our understanding of the relationship between health and retirement and between health and wealth (*9*). Furthermore, the incentives that drive employee and employer decisions about retirement age are now well understood (*10*, *11*). A knowledge base of demographic and economic theory and evidence exists to inform policymakers and the public about broad needs and options to increase employment at older ages (*12*, *13*).

As the proportion of voters who are older than 50 grows, it may become more difficult to increase the age of retirement. As costs of supporting the elderly rise, expenditures on everything else, including research, education, and child care, may be reduced. This dismal prospect has received much press, but there is little evidence to either support or refute it (*14*, *15*). In the United States and several European countries, intelligent discussion of policy alternatives has created, to varying degrees, a climate of public opinion that recognizes, reluctantly, the need for an increase in the typical age of retirement. In contrast, in France and Italy, public discourse about retirement age (and other economic reforms) is woefully deficient. Social scientists could play a constructive role by participating more actively in public discussions and by putting more emphasis on policy-relevant research.

Some of this research could focus on improving the productivity of older workers through better work environments and lifelong learning. Not everyone has the skills and interests to carry out particular tasks. What kinds of education and organizational arrangements are required to match the labor force with work needs? Many older workers may prefer part-time work. More studies are needed on how to organize 20- and 30-hour work weeks so that they are profitable for organizations and satisfying for individuals.

Redistribution of Work

If part-time work becomes common for workers above 50 or 60, then more opportunities for part-time work may open up for younger people. As shown by the yellow line in Fig. 2, if people in their 60s and early 70s worked considerably more than today, then work effort could be evenly distributed at a level of about 25 hours per week across ages 20 through 64. This level of effort could be achieved if a few percent were unemployed, a few percent worked 40 hours per week, and the rest worked either 20 or 30 hours per week. The ratio of nonworkers to workers would be cut to a fraction of its current value.

The 20th century was a century of redistribution of income. The 21st century may be

Table 1. Rostock indicators of demographic structure and change. *R* is the ratio of nonworkers to workers, with workers including everyone who works for remuneration for at least 1 hour per week (*6*). *H* is the number of hours worked per week per capita. The values for 2025 and the relative changes from 2005 to 2025 assume change in the population pyramid but no change in labor-force participation or effort by age and sex. For data sources, see (*7*).

Country	*R*, nonworkers per worker			*H*, hours worked per week per capita		
	2005	2025	Change	2005	2025	Change
Germany	1.27	1.47	16%	16.28	14.95	−8%
Denmark	0.97	1.12	15%	17.46	16.11	−8%
France	1.43	1.69	18%	15.09	13.63	−10%
Italy	1.59	1.86	17%	15.19	13.48	−11%
Netherlands	1.01	1.20	19%	15.31	13.88	−9%
UK	1.09	1.19	9%	17.32	16.34	−6%
USA	1.09	0.99	−9%	18.71	18.29	−2%

a century of redistribution of work. Such redistribution would spread work more evenly across people and over the ages of life. Individuals could combine work, education, leisure, and child-rearing in varying amounts at different ages. This vision is starting to receive some attention from social scientists (*16–21*). Achieving it would require radical increases in opportunities to work 20 or 30 hours per week. The Netherlands, Denmark, and Norway may be harbingers of economies with many part-time jobs. Much more research, however, is needed on basic issues concerning the efficiency of such redistribution of work and whether individuals would prefer it.

Future generations may think we (Europeans and Americans) were irrational about the way we spend the time of our lives. We concentrate work in those ages of life when we can have children and when children need the time and energy of their parents. Then, when we are in our late 50s or early 60s, we retire, enjoying decades of leisure, largely paid for by levies on younger adults who are also taking care of children. We concentrate the leisure of our lives in the years when we can no longer have children and when any children we did have no longer need the care they once required.

A redistribution of work might make it easier for younger people to have the number of children they would like to have. The causes of low fertility in Europe, however, are complex and only partially understood (*2*, *22*). Funding for research on policy options has been meager.

How could parents support themselves and their children if they worked only 20 or 30 hours per week? If the need for transfer payments from workers to nonworkers were reduced, taxes and other levies could likewise be reduced. Furthermore, a greater fraction of women, at both
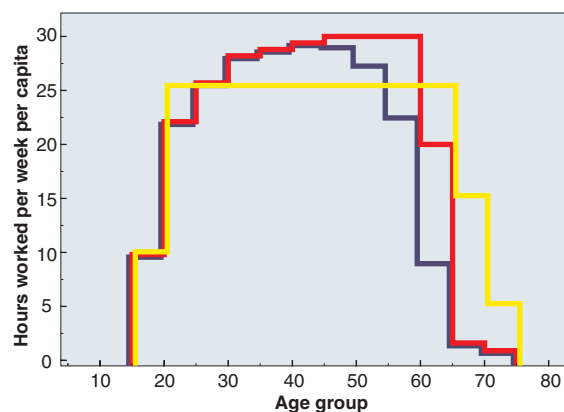

Fig. 2. Average hours worked per week by age in Germany (*6*, *7*). The blue line graphs the pattern in 2005 that produced the overall level of 16.3 hours of work per week per capita. The red line shows the increase in work effort by older Germans required to maintain this overall level of effort in 2025. The yellow line illustrates one way to redistribute work more equally while maintaining the overall effort: People between 20 and 65 would work 25.1 hours per week on average.

younger and older ages, would be in the work force. In principle, it should be possible to redistribute work while maintaining standards of living (*16*). The specifics of how to do this, however, have to be worked out.

Population aging is not going to stop in 2025. Long lives are the probable destiny of most people alive today in developed countries (*1*, *3–5*). Extended life spans make life-course flexibility more desirable for individuals and societies (*19*, *20*). Social scientists can develop knowledge about how to move from the stultifying regime in Germany, France, and most of the European Union to societies in which individuals have greater choice about how to spend the time of their lives. To have influence, social scientists will have to augment their fascination with new kinds of data collection and more sophisticated methods of statistical analysis with a deeper concern about making their research more directly relevant to policy issues. To supplement recent decades of micro analysis of individual

behavior, researchers need to perform more macro analysis at the population level and more analysis of micro-macro interactions. As discussed by Butz and Torrey in this issue (*23*), such a reorientation could help social scientists contribute more effectively to understanding of demographic challenges and opportunities and a range of other important social issues.

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PERSPECTIVE

The Influence of a Sense of Time on Human Development

Laura L. Carstensen

The subjective sense of future time plays an essential role in human motivation. Gradually, time left becomes a better predictor than chronological age for a range of cognitive, emotional, and motivational variables. Socioemotional selectivity theory maintains that constraints on time horizons shift motivational priorities in such a way that the regulation of emotional states becomes more important than other types of goals. This motivational shift occurs with age but also appears in other contexts (for example, geographical relocations, illnesses, and war) that limit subjective future time.

Most scientists would agree that the explicit study of time falls in the purview of physics, yet interest in various aspects of time spans the natural and social sciences. Time is an integral part of virtually all psychological phenomena. From the sequencing of rewards involved in operant and classical conditioning to the flow of oxygen in the measurement of brain activation, time is built into most behavioral and psychological processes. Psychological science, however, has focused relatively little on the implications of our ability not only to monitor time but also to appreciate that time eventually runs out. I maintain that the subjective sense of remaining time has profound effects on basic human processes, including motivation, cognition, and emotion.

Although change over time is the basic foundation of developmental psychology, theoretical models of human development focus almost exclusively on the passage of time since birth. In child development, this marker has served scientists well. A substantial literature shows that chronological age is an excellent (albeit imperfect) predictor of cognitive abilities (*1*, *2*), language (*3*), and sensorimotor coordination (*4*). At increasingly older ages, however, chronological age is a poorer predictor. Instead, increased heterogeneity or differentiation within samples is considered to be a cardinal feature of life-span development (*5*). Presumably, this is due primarily to differences in experiences and opportunities that individuals encounter over time. Chronic stress, level of education, close relationships, and social status all place individuals on very different developmental trajectories that affect not only day-to-day functioning but also health and longevity (*6*). Late in life, chronological age continues to provide a rough marker of accumulated life experience, but it loses the precision it holds in youth.

A second index of time becomes salient as people grow older, namely the subjective sense of remaining time until death. Although correlated with chronological age, this subjective sense of time gradually becomes more important than time since birth. Because goal-directed behavior relies inherently on perceived future time, the perception of time is inextricably linked to goal selection and goal pursuit. Socioemotional selectivity theory (SST), a life-span theory of motivation, is grounded fundamentally in the human ability to monitor time, to adjust time horizons with increasing age, and to appreciate that time ultimately runs out (*7*). SST maintains that time horizons play a key role in motivation. Goals, preferences, and even cognitive processes, such as attention and memory, change systematically as time horizons shrink. Because chronological age is correlated with time left in life, systematic associations between age and time horizons appear, but findings from experimental studies show that when time perspective is manipulated or controlled statistically, many age differences disappear. In short, across many dimensions, older and younger people behave remarkably similarly when time horizons are equated.

Events like the attacks on September 11th and the severe acute respiratory syndrome

Stanford University, Stanford, CA 94305–2130, USA. E-mail: llc@psych.stanford.edu