CHAPTER 1

Introduction

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Throughout the developed world, economies are experiencing two important trends. First, spending by governments is evolving away from the general (e.g., national defense, roads, etc.) and toward the age-specific, particularly social insurance transfer programs targeted to the elderly. Second, the combination of low birth rates and increasing longevity is inducing a marked change in the population age structure, with rapid increases in the old-age dependency ratio. Together, these trends are predicted to lead to very sharp increases in the share of GDP absorbed by government spending sometime in the next few decades, although the timing and magnitude may be expected to differ across countries.

These projections pose several interesting challenges to traditional approaches to the evaluation of fiscal policy. First, they suggest that short-run measures of fiscal balance, most notably the government budget deficit, are grossly inadequate for characterizing the true state of fiscal policy. In particular, this year's U.S. budget does not reflect the very large imbalances implicit in unfunded social insurance commitments. The same is true in Europe, the recent success in meeting the Maastricht debt targets notwithstanding. This helps explain why, in spite of current budget indicators, the United States is confronting the prospect of social security privatization and changes in the Medicare system, and why some European countries are beginning to experience labor strife as they attempt to reduce the generosity of government programs.

Second, because many of the complex demographic factors driving changes in government spending are typically omitted from economic forecasting models, these models are likely to prove inaccurate in projecting what will happen to different spending programs. Third, the

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changing age structure, combined with the age distribution of fiscal
benefits, may upset stable political environments and lead to unexpected
changes in government spending patterns. Finally, with changes in fiscal
burdens being projected well into the future, the question of optimal
policy response requires a much longer perspective than is typical in
fiscal policy analysis.

Other powerful demographic changes are also affecting public expen-
ditures. Trends in marriage, divorce, and extramarital childbearing have
created rising proportions of single-earner households with children,
which are frequently in poverty. Need-based family support systems, such
as those in the United States, experience budgetary pressures from these
changes, although these pressures are dwarfed by those due to pop-
ulation aging. Immigrants and their families qualify disproportionately
for need-based programs because of their often lower incomes and high
fertility, while their concentration in the preretirement ages temporarily
eases the consequences of population aging, with the longer-term effects
open to question.

This book contains the proceedings of a conference held at the Uni-
versity of California, Berkeley, in October 1998, the objective of which
was to develop the points raised above (except for immigration, which
is not discussed in this volume). The authors and discussants who par-
ticipated in the project include many of the world's leading public finance
economists and economic demographers. The papers addressed theoret-
ical, methodological, and empirical aspects of these problems. The book
includes not only these writings, revised in light of issues raised at the
conference, but the comments of discussants as well,[1] which have gen-
erally been paired to offer a broad economic and demographic perspec-
tive on each paper. These comments constitute an important part of the
volume, for a breadth of perspective is unusually important for the topics
being covered here.

The eight chapters that follow are divided into three groups. The first
three focus on theory and methodology; the next two provide interna-
tional comparisons; and the last three cover effects on the three main
types of transfer programs in the United States, respectively, health care,
social security, and poverty. Although these three chapters focus on
U.S. institutions, their lessons are generalizable so that, like the other
chapters, they illuminate the situation facing industrialized economies
in general.

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[1] Two of the discussants, Paul Gertler and Kenneth Wachter, chose not to submit com-
ments for publication.

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Methodology

When projecting revenues and expenditures from age-related programs, such as social security, long-range forecasts are essential to understand the impact of demographic changes. The U.S. Social Security Administration, for example, forecasts over a 75-year horizon. However, standard government methods typically provide relatively little information about the uncertainty associated with forecasts or the sources of this uncertainty. Chapter 2, by Ronald Lee and Shripad Tuljapurkar, describes and illustrates the techniques that they and other economic demographers have recently developed to provide forecasts and confidence intervals for fiscal policy variables driven by demographic factors. The authors' results suggest not only that the potential range of outcomes is extremely wide, but also that the "intermediate" forecasts currently utilized in the United States may not provide a very representative picture.

Chapter 3, by Alan Auerbach and Kevin Hassett, applies optimal control techniques to derive government decision rules for responding to long-run uncertainty about economic and demographic factors. There is a tendency in policy debates to view extreme uncertainty about the long run as a reason for inactivity, but one of the results set forth in this chapter suggests that this intuition is generally wrong. Indeed, risk aversion should encourage governments to act in a precautionary manner. The chapter goes on to consider the effects of restrictions on the ability of government continually to undertake "major" policy reforms. As numerical simulations confirm, such inflexibility provides a second reason for precautionary policy actions, although there is an asymmetry to the pattern of optimal responses to fiscal imbalances; policy should respond more forcefully when the elderly are overburdened, for it is easier to spread additional costs over many future generations.

The composition of government spending depends on the demographic makeup of the population. This is true not only because of the uses that different groups make of different government-provided goods and services, but also because demographic changes alter political outcomes. However, the impact of population structure on public spending depends on the structure of government itself. In a federal system, one dimension along which governments differ is the level of government, from national to state to local. While public spending at the federal level may be determined by centralized voting, those at the local level also depend strongly on the sorting of individuals among communities, in a process first elucidated by Tiebout (1956). In Chapter 4, Thomas

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MaCurdy and Thomas Nechyba develop a positive model of government behavior. Their model predicts not only how expenditures and revenues of local governments should vary with demographic composition and spillover effects among communities, but also how higher-level governments should intervene to counteract these interjurisdictional spillovers. Using data on California counties, they find evidence in support of their model.

International Comparisons

Countries differ in the nature and timing of their demographic changes and also in the structure and generosity of their social insurance programs. International comparisons can provide insight about how serious the problems of different countries are, and perhaps they can illuminate which elements of program design would likely be most successful in dealing with the coming fiscal pressures. Comparisons can also offer evidence of the political economy of government spending, by relating differences in spending levels and patterns to differences in population structure and government organization.

Chapters 5 and 6 consider the international differences in government spending and fiscal stability associated with aging populations. The first, by Jonathan Gruber and David Wise, summarizes a recent, large-scale research project on international comparisons of old-age pension systems, focusing on the generosity and incentives for labor supply and early retirement that such systems provide. Using the United States as a benchmark, the authors discuss how the programs of other countries differ in structure and how these structural differences contribute to widely varying, and in some instances extremely powerful, incentives to leave the labor force.

Chapter 6, by Bernd Raffelhüschen, provides a European perspective on aging and fiscal health, comparing a number of countries recently analyzed in a comparison project. Using the technique of generational accounting developed by Auerbach, Gokhale, and Kotlikoff (1991), the chapter presents estimates of the fiscal imbalances of each country and decomposes these imbalances, indicating how much is due to changes in population structure and how much to preexisting national debt. Raffelhüschen finds that most of the countries in his sample face substantial fiscal imbalances and that the major part of these imbalances is attributable to demographic trends, rather than past accumulations of national debt.

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Program Effects

The book's three remaining chapters all aim at providing estimates of
the impact of demographic change on the costs of fiscal programs. In
Chapter 7, David Cutler and Louise Sheiner evaluate the impact that
demographic change has on medical care spending, currently the fastest-
growing and most challenging component of the U.S. federal budget.
They start with the well-known fact that medical care spending rises with
age and ask what this implies about the level of medical care spending
as life expectancy increases. They quickly show why the simplest intu-
ition, that spending should rise because the older spend more, is inade-
quate, for it uses cross-sectional differences at a fixed point in time in
predicting changes over time, when other things are changing as well.
Ultimately, they argue, it is necessary to take into account the many
factors, such as health, technology, and the market structure of the health
care delivery system, that influence age-specific medical spending, rather
than simply focus on changes in the population's age structure, to get a
picture of what lies ahead.

As many have noted, the U.S. social security system has been an engine
for intergenerational and intragenerational transfers, helping older gen-
erations at the expense of younger ones and, in general, lower-income
individuals at the expense of higher-income ones. In Chapter 8, Steven
Caldwell, Alla Gantman, Jagadeesh Gokhale, Thomas Johnson, and
Laurence Kotlikoff consider these distributional issues, using a detailed
microsimulation model. Their simulations present comprehensive esti-
mates of the rates of return that social security provides, based not only
on age and income, but also on race and sex. They also illustrate how the
different assumptions underlying the Social Security Trustees' alterna-
tive projections translate into impacts on different groups.

In Chapter 9, Robert Moffitt considers the impact of demographic
change on government spending on poverty programs. Looking first at
the past, he decomposes the growth in spending on AFDC, food stamps,
and Medicaid into changes attributable to demographic shifts and other
factors. He finds that demographic change, notably the increase in the
incidence of female-headed households, has exerted a considerable
impact on the growth of AFDC spending. He then considers the evidence
for the alternative direction of causality, that is, the extent to which
welfare benefits influence family structure. He argues that the rising rate
of female-headed households cannot be attributed primarily to changes
in welfare benefits. Finally, he considers the future, asking whether demo-
graphic influence on poverty-program spending is likely to be important

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in the coming decades. Using current demographic projections, he suggests that these changes are likely to be modest.

Conclusion

A common theme running through the chapters in this book is the importance of projecting fiscal trends by looking at disaggregated changes in population and how these changes interact with changes in fiscal programs themselves. Another evident theme is the difficulty of doing so, since it is a challenge to make reasonably accurate, detailed projections that extend far into the future. But one will also find advances in the methodology of making such projections and the analysis of how to use them. Thus, the book exposes a vast area for future research and offers some initial steps in the indicated directions.

References

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CHAPTER 2

Population Forecasting for Fiscal Planning: Issues and Innovations

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Introduction

Is population forecasting different from other kinds of forecasting, that it should warrant its own special methods and its own special discussion? In some important respects it is; in particular, long-term demographic forecasts many decades into the future may contain more useful information than is true for other forecasts, such as turning points. There are several reasons:

1. The initial age distribution of the population provides early information about future population size, age distribution, and growth rates. For example, since their birth, we have known exactly when the baby boom generations would swell the numbers of elderly.
2. The relative slowness, smoothness, and regularity of change in fertility and mortality facilitate long-term forecasts. Compared to real productivity growth or to real interest rates, for example, the vital rates are less volatile.
3. Fertility, mortality, and nuptiality have highly distinctive age patterns, which have persisted over the several centuries for which they have been observed. These regular and distinctive age

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patterns make the consequences of initial age distributional irreg-
ularities more predictable.

Demographers have developed methods and models for exploiting these
features of population evolution in their projections. This does not mean,
of course, that demographers have built a sterling record of success in
long-term forecasting. Their record, which we will review later, has been
a mixture of success and failure.

Demographic forecasts have many uses. A few users, such as the man-
ufacturers of infant formula, are interested in the numbers of births by
quarter in the coming year. Educational planners are interested in the
numbers of school-age children, typically in a local area, over a longer
horizon, perhaps five to twenty years. Some users, such as planners for
Social Security and Medicare, have a much longer horizon of seventy-
five years and are particularly interested in the age distributions of
workers and the elderly. Social Security planners also need information
on the distribution of the future population by marital status, since
benefit payments differ by marital status and by living arrangements.
Environmental analysts also have long horizons, but are typically less
interested in the details of age distributions. This chapter will focus on
long-run forecasts of national populations, and specifically will consider
forecasts over a seventy-five-year horizon, with detail on age distribu-
tion. Sometimes population projections are used for analytic purposes,
to consider the effects of different future scenarios, rather than as
predictions. Here, we will restrict our attention to predictions or fore-
casts. We believe that most, though not all, population projections fall
into this category, despite any disclaimers by their authors.

We will also focus primarily on what might be called core demo-
graphic forecasts of fertility, mortality, migration, population size, and
population age distribution. Many other demographic variables are of
interest, but discussing them would take us far afield and dilute our
effort. Thus we will not discuss forecasts of marriage, divorce, and the
corresponding statuses of the population, household living arrange-
ments, and kinship ties. We refer readers to Mason (1996), Goldstein
(1997), Wachter (1997), and the Office of the Actuary of the Social Secu-
rity Administration (henceforth OASSA) (1997) for work and literature
review on these topics. Nor will we consider projections of the health,
functional status, disability, or cause of death of members of the popu-
lation. For these we refer readers to Manton, Corder, and Stallard (1997),
Wilmoth (1996), and OASSA (1992). Forecasts of labor force participa-
tion, income, education, and related variables are even further outside
our scope.

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How Demographers Approach Forecasting

Demographers typically approach forecasting through disaggregation. Faced with apparently varying demographic rates, the demographer's instinct is to break the population down into skillfully chosen categories, each with its own corresponding rate. The hope is that by so doing, it will be found that these more disaggregated rates will be found to be constant or to vary in regular and predictable ways. If the population growth rate is varying, perhaps the variation results from constant age-specific birth and death rates applied to a distorted population age structure. If age-specific death rates are varying, perhaps the variation can be tamed by looking at these by cause of death. If age-specific birth rates are varying, perhaps these can be tamed by looking at birth rates by age, parity (number of children already born), and length of birth interval, all broken down by race/ethnic category, for example. To take an interesting specific example, the extremely low fertility in Western Europe might be due to continuing postponements of childbearing rather than a change in the more fundamental ultimate number of births per woman (Bongaarts and Feeney, 1998).[1] This change in timing might be revealed by a disaggregation of fertility by parity (number of prior births) and age. The currently low fertility would then reflect an atypical structure of parity by age in Europe. This strategy of proceeding by disaggregation can be illuminating. However, it is limited by its inability to cope with genuine change in the underlying rates. It is through such genuine change in underlying rates that the population compositions and structures became distorted in the first place, and such changes can be expected to continue in the future.

Certain kinds of disaggregation inevitably raise the projected totals relative to more aggregated projections. This happens because any subgroups of the population that have growth rates above the initial average will grow relative to the other subgroups, and so will receive a

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[1] If every woman in the population postponed any planned birth for a year during some calendar year, then in that year, the total fertility rate (TFR) would be zero (except for accidental births). From this we can see that if 10% of women postponed their births in a year, the TFR would drop by 10%. We might suspect, then, that if the cross-sectional mean age at childbearing rises 0.1 years in a year, the TFR might be artificially reduced by 10%. If each generation is actually planning on having two children, then such a change in timing could depress the TFR by 0.2 births, making fertility appear far lower than its true underlying trend. Timing changes of this sort can continue for many years, so that the distortions in observed fertility can be persistent. In France, the TFR has been below replacement level since the mid-1970s, although women have been having 2.1 children on average by the end of their reproductive years (Bongaarts, 1998).

greater weight in the average of future growth rates, leading to an increase in the projected average growth rates. The level of the population projections and fertility forecasts of the U.S. Bureau of the Census rose substantially when it began to disaggregate the forecasts by race/ethnic categories a few years ago (although there other causes as well). Disaggregation of mortality by cause of death has a similar effect, when death rates by cause are extrapolated at their historical exponential rates of change. The most slowly declining cause-specific death rate, or the most rapidly rising one, then comes to dominate the total death rate in the long run, so mortality is projected to decline more slowly than is the case without disaggregation (Wilmoth, 1995). Pointing out that this is a necessary consequence of certain kinds of disaggregation does not necessarily help us understand whether the higher or lower projection is more correct.

Demographic Approaches to Predicting Future Change in Fertility

Economic theories of fertility are highly developed, and various models have been estimated and tested. In our view, however, they do not yet provide a useful basis for forecasting fertility. In any event, in order to use any of them, we would first have to develop forecasts of men's and women's potential real wages and nonlabor income, of interest rates, and of some key prices, at a minimum.

Nonetheless, there are some basic theoretical (or commonsensical) ideas that do influence fertility forecasts. The first of these is the idea that fertility is a means to achieve some desired number of surviving children, at least after the demographic transition is under way. Therefore, declining mortality or reductions in the perceived level of mortality are expected to cause a corresponding reduction in fertility. Secondly, avoiding births is costly, either in terms of forgone sexual relations or in terms of the steps needed to avoid conception or to abort a conceptus. Consequently, some portion of actual births to the population is unwanted, in the sense that if avoiding births were costless and perfectly efficient, these births would not have occurred. (Correctly accounting for the effects of mistimed pregnancies is a complicated separate issue.) If technological progress brings us closer to costless and perfectly effective contraception, we would expect a decline in the flow of births and in the number of children ultimately born to the average woman. With these two simple and uncontroversial ideas, we have reason to expect a long-term downward trend in fertility, without applying more interesting but also more questionable behavioral theories of fertility. Of course, both