Saving and Demographics: Some International Comparisons

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The United States saved only a small share of its aggregate income during the 1980s—a much lower share than most other large, industrial countries saved. As shares of GNP, both household and government saving were smaller in the U.S. The differences in personal saving owe much to demographic factors—especially to differences in the age composition of countries' populations. The differences in government saving around the world reflect budget balances: surpluses in high-saving countries and deficits in low-saving countries.

Differences in saving are important because saving is the source of funds required to finance investment in plant and equipment, structures, and housing. Persistently higher saving shares in both West Germany and Japan, for example, financed greater net investment relative to GNP than in the U.S. Over time, investment has increased the stock of productive capital and contributed to growing labor productivity and a rising standard of living in all three countries. But West Germany and Japan experienced a more rapid increase in labor productivity over

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the past 40 years because they saved a larger share of their aggregate incomes.[1]

Some analysts argue that the share of personal income saved in the United States will rise strongly during the next 20 years, as more and more of the baby-boom generation enters middle age.[2] These analysts anticipate that saving rates in the U.S. will rise to levels more like those in Germany and Japan. Indeed, recent economic research does suggest that projected demographic changes are likely to narrow the gap in saving rates between the U.S. and Germany or Japan, but this result derives as much from falling saving rates abroad as from a rising saving rate in the U.S.

TABLE 1
Saving and Investment as a Share of GNP
(Average for 1980s, in percent)

	U.S.	West Germany	Japan
Net National Saving	3.0	10.2	18.1
Household	3.8	7.8	11.0
Business	1.7	1.0	2.8
Government	-2.5	1.3	4.3
Net Fixed Investment	5.1	8.0	15.4

COMPARING U.S. SAVING IN THE 1980s TO GERMANY AND JAPAN

The net national saving rate in the United States was lower in the 1980s than in many other industrial countries, especially West Germany and Japan (Table 1).[3] The lower saving rate in the U.S. was accompanied by lower net investment relative to GNP. Net national saving in West Germany, when measured as a share of GNP, was more than three times as large as in the U.S. And in Japan the share was six times that in the U.S.[4] Among the components of national saving, household saving was more than twice as big a share of GNP in West Germany as in the U.S., while in Japan it was

[1]From 1950 through 1989, labor productivity grew at an average rate slightly below 6 percent per year in Japan, at an average annual rate somewhat above 4 percent in Germany, and at a rate averaging just 1.75 percent per year in the U.S. For a technical discussion of the relationship between investment and productivity growth, and a careful examination of the data, see Wolff (1991). Productivity growth rates cited here are from Wolff (1991), updated with data for the 1980s from the OECD *Economic Outlook*, July 1991.

[2]See, for example, "Upbeat Generation," *Barron's*, August 1, 1988, pp. 15 and 30.

[3]The saving, investment, and aggregate income data cited in this article are those available as of November 1991. The data are taken from *National Accounts* and from *Quarterly National Accounts*, published regularly by the Organization for Economic Cooperation and Development (OECD) in Paris. These publications draw on each country's official national income and product accounts. Figures for net investment cited here include net fixed investment spending by governments—spending on capital equipment, buildings, and infrastructure such as roads, bridges, dams, water systems, and airports. Government investment is included in the OECD data for Germany and Japan. Investment spending by governments in the U.S. was estimated using other sources.

[4]Part of a country's saving is used to finance the replacement of buildings and capital equipment that wear out or are abandoned each year. To the extent that saving and investment spending exceed replacement investment, they can contribute to growing labor productivity and a rising standard of living. The definition of saving that corresponds to this concept of funds available to finance growth of the capital stock, or net investment, is net national saving.

nearly three times as big. The government sector in the U.S. ran budget deficits throughout the 1980s, thus reducing national saving. In contrast, governments in West Germany and Japan added to national saving by running budget surpluses in most years. Net business saving (mostly retained earnings) differed much less among these countries.[5]

Not only was net national saving a smaller share of GNP in the U.S. than in West Germany and Japan, but the gaps widened during the 1980s. Household saving declined relative to GNP in all three countries as the 1980s progressed. In Germany and Japan, government sector budget surpluses rose relative to GNP, offsetting the drop in personal saving (and in Germany business saving also rose strongly). But in the U.S., the government sector continued to run budget deficits, thus reinforcing the decline in personal saving relative to GNP.

Differences in government saving largely reflect political decisions about government spending and taxes. Differences in household saving rates between the U.S., Germany, and Japan during the 1980s reflect demographic factors, in part. The way in which demographic factors affect household saving can best be understood by looking at some basic economic theory of saving behavior.

THE FORWARD-LOOKING THEORY OF SAVING

Economic theory has focused on five major reasons why people save: (1) to provide for their retirement; (2) to leave a bequest; (3) to bridge temporary declines in their incomes; (4) to finance unanticipated expenditures such as medical bills; and (5) to finance purchases of durable goods such as furniture and automobiles. The theory of saving behavior is complex, and economists' understanding of saving behavior is still evolving. We can avoid many of the complications, but nonetheless gain a good deal of insight into the effect of demographic factors on saving behavior, by focusing on a somewhat simplified description of the basic forward-looking theory of family saving.

Theory. The basic theory of saving begins by recognizing that real earnings usually are relatively low early in people's careers, peak shortly before retirement, and then fall substantially after retirement. The theory proceeds with the idea that people prefer to spread their consumption of goods and services evenly over their lives to the extent they can do so and, in particular, that people would rather not have their consumption fall sharply when they retire.

From these premises, the theory predicts that younger families actually will spend more than their incomes if they have ready access to credit or an inheritance, so their saving will be negative on average. If they do not have ready access to credit or an inheritance, younger families will save at most a small share of their incomes. Middle-aged families typically will save a larger share of their rising earnings as they prepare for retirement and accumulate an estate. Families headed by retired people typically will save little, if any, of their incomes, and in many cases they will dissave. This predicted pattern of changing personal saving rates over one's lifetime is known as *life-cycle saving*.

Evidence. Surveys of consumer spending and finances in the U.S. yield results that are broadly consistent with the life-cycle pattern of earnings and saving discussed above. Average earnings do rise with age, and there is a broad peak in average earnings between ages 50 and

[5]Fumio Hayashi of the University of Pennsylvania argues that Japanese national income accounts understate replacement investment, and thus overstate net national saving and investment, so that the gap between Japanese and American saving and investment shares is smaller than indicated here. But Robert Dekle of Boston University and Lawrence Summers of the World Bank present other data suggesting that the gap really is as large as shown by the official statistics. See Hayashi (1989) and Dekle and Summers (1991).

60. Very young families, those headed by people less than 25 years old, do tend to spend more than they earn (their savings are negative, on average), indicating that they are incurring debts or spending gifts and inheritances. Surveys show that average earnings substantially exceed average spending for families in the peak-earning years. And many families do draw down their savings during retirement; families headed by people over 64 save very little of their incomes, on average. During the mid-1980s, the share of income saved by households headed by people between the ages of 45 and 64 averaged 6 to 8 percentage points higher than the share saved by households headed by people over the age of 64.[6] Surveys of saving behavior in Canada and Japan yield similar results.[7] All of these observations are broadly consistent with the predicted life-cycle pattern of saving derived from a simple forward-looking theory.

The simplest version of the life-cycle saving model, described above, does not explain all of what we observe about family saving. Many families in the peak-earning years save an appreciably larger share of their incomes than do families whose heads are between 25 and 44, but some families save a small and relatively constant share of their incomes throughout their working years. Many older families draw down their savings, but others neither save nor dissave, and those with substantial wealth typically continue to save. These observations are broadly consistent with the life-cycle saving pattern predicted by more complex versions of the forward-looking theory, which incorporate precautionary saving, social security, borrowing constraints, uncertainty about lifespans, and saving to accumulate an estate.[8] Even in these more complicated models, age affects saving behavior.

Demographic factors are not the only determinants of household saving. People's saving also is affected by the tax treatment of saving and interest, by the structure of social security and pension systems, by the variability of incomes, by the extent to which people can insure against unanticipated expenditures or income reductions, by unanticipated changes in wealth, and by the strength or weakness of the economy, among other factors.[9] There also is evidence that household saving is affected by the size of government budget surpluses or deficits. Demographic factors do have important influences on household saving, however.

THE EFFECT OF DEMOGRAPHICS ON HOUSEHOLD SAVING

While there is vigorous debate among economists about how much household saving is generated by each of the five major reasons for saving, there is broad agreement that the age composition of a country's population can af-

[6]Data cited here are based on Tables 3, 13, and 23 in "Consumer Expenditure Survey: Integrated Survey Data, 1984-86", *BLS Bulletin 2333* (August 1989), published by the Bureau of Labor Statistics of the U.S. Department of Labor. The Survey of Consumer Finances, conducted by the Federal Reserve System, yields broadly similar conclusions; see Kennickell (1990).

[7]Saving behavior in Canada and Japan, as well as in the U.S., is examined in Bosworth, Burtless, and Sabelhaus (1991).

[8]For a brief review of economists' knowledge of saving behavior, see Weil (1991). For a more detailed and extensive treatment of the roles of saving for retirement and for bequests, see Kotlikoff (1989). For a discussion of the role of precautionary saving and evidence of its importance, see Carroll (1991). For a focus on borrowing constraints, see Zeldes (1989).

[9]See Boskin and Lau (1988) for a careful discussion of the roles of these and other factors.

[10]A lively exchange between Franco Modigliani of MIT and Laurence Kotlikoff of Boston University summarizes much of the agreement and disagreement. See Modigliani (1988) and Kotlikoff (1988).

fect the share of income that is saved.[10] The "life-cycle saving" theory suggests that a high share of household income will be saved in a country that has a large fraction of its population in the high-saving years from 45 to 64 and a small fraction in the low-saving or dissaving years up to 20 and beyond 64. Household saving would be a relatively large share of GNP as a result. Conversely, the theory predicts that household saving would be a smaller share of GNP in a country that has a small fraction of its population in the peak-saving years from 45 to 65 and a large fraction of its population in the low-saving or dissaving age groups.

Empirical research largely bears out these expectations. The strongest demographic effect appears to result from an increase in the share of the population that is beyond retirement age, accompanied by a decrease in the working-age share of the population. Researchers estimate that a 1-percentage-point increase in the ratio of the population over the age of 64 to the working-age population, holding constant other factors that affect saving, has been associated with a reduction in the ratio of household saving to GNP by an amount in the range from 0.4 to 1.4 percentage points, for an average estimate of 0.9 percentage point. There also is evidence that an increase in the ratio of the under-20 population to the working-age population reduces household saving relative to GNP, but this effect appears smaller—perhaps half as big.[11]

COMPARING U.S. DEMOGRAPHICS IN THE 1980s TO GERMANY AND JAPAN

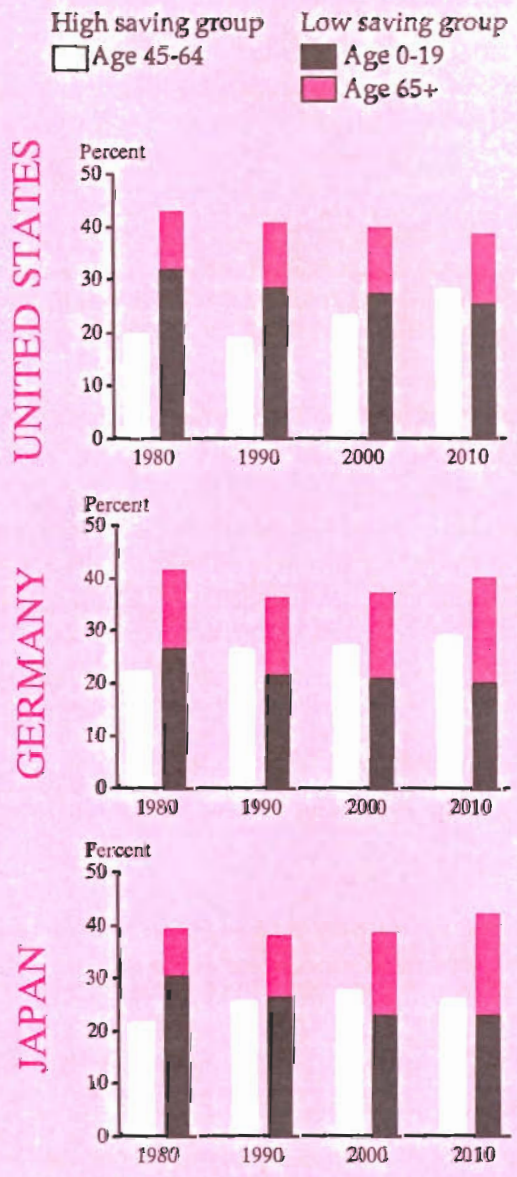
The share of the U.S. population in the high-saving age group from age 45 to 64 was appreciably lower than in Germany and Japan in both

FIGURE 1

Population Shares

(percent)

The share of the U.S. population in the high-saving age group fell in the 1980s, but will rise more strongly during the next 20 years than in Germany and Japan. The share of the U.S. population in the low-saving age groups will continue to fall during the next 20 years, but will rise in Germany and Japan.



[11] For a summary of the results of these studies, see Table 9 in Heller (1989). The numbers presented here correspond to those presented by Heller, but here they are presented as shares of GNP rather than as shares of national income.

1980 and 1990 (Figure 1). And the share of the U.S. population in that high-saving age group declined during the 1980s, while it rose strongly in Germany and Japan. In addition, the total share of the U.S. population in the low-saving age groups was larger at both the beginning and the end of the 1980s than was the case in either Germany or Japan.[12]

On average during the 1980s, 19 percent of the U.S. population was in the high-saving group from age 45 to 64—about 4.5 percentage points lower than in Japan and nearly 5.5 percentage points lower than in Germany. The ratio of 65-and-over to working-age populations in the U.S. averaged roughly 4 percentage points lower than in Germany during the 1980s, but 4 percentage points higher than in Japan. The ratio of under-20 to working-age populations also was higher in the U.S., averaging 12 percentage points higher than in Germany and about 4 percentage points higher than in Japan. In total, an average of nearly 42 percent of the U.S. population fell into the two low-saving age groups during the 1980s, about 3 percentage points higher than in Germany and Japan.

On balance, these demographic ratios imply somewhat higher personal saving relative to GNP in Germany than in the U.S. during the 1980s, and much higher household saving relative to GNP in Japan, as we in fact observed. Taken together, the demographic differences can account for roughly one-third of the gap in personal saving relative to GNP between Germany and the U.S. during the 1980s and roughly two-thirds of the gap between Japan and the U.S.[13]

Demographic factors help explain not only why household saving in the U.S. was lower relative to GNP than in Germany and Japan but also why household saving shares declined during the 1980s. As the ratio of the 65-and-over to working-age populations grew in the U.S. from 1980 to 1990, personal saving declined relative to GNP (Table 2). Similarly, the sharp rise in the ratio of 65-and-over to working-age populations in Japan from 1980 to 1990 helps explain why personal saving declined relative to GNP in that country.

Demographic factors, by themselves, do not entirely explain the decline in household saving during the 1980s.[14] Personal saving in Germany did not rise relative to GNP, for example, even though the ratio of 65-and-over to working-age populations declined. Other factors that may have reduced household saving shares include expanded coverage by pension, social security, and medical insurance systems, large capital gains in equity and housing markets, and declining birthrates. While demographic factors are not the sole determinant of household saving behavior, the fact that saving by households was roughly twice as large relative to GNP in Germany as in the U.S. during the 1980s, and roughly three times as large in Japan, does reflect differences in the age composition of these countries' populations.

PROJECTED DEMOGRAPHIC CHANGES AND FUTURE SAVING RATES

Demographers project that the age composition of the U.S., German, and Japanese populations will change markedly during the next 20 years. Those changes have the potential to raise personal saving relative to GNP in the United States and to reduce it in Germany and Japan.

Population Shares Will Change Markedly. Demographers project that the share of the U.S. population in the high-saving years from 45 to 64 will rise by half from 1990 to 2010, to nearly 28 percent from about 18.5 percent, as the baby-

[12]Population data and projections cited in this article are taken from United Nations (1982).

[13]Based on the average size of the estimated effects found by the studies cited in Table 9 of Heller (1989).

[14]See Kennickell (1990) and Boskin and Lau (1988) for evidence on this point.

TABLE 2

Ratio of 65-and-Over Population to Working-Age Population and Household Saving

	1980	1985	1990
United States:			
65-and-over/working-age (%)	19.9	20.3	21.4
household saving/GNP (%)	5.0	3.1	3.3
Germany:			
65-and-over/working-age (%)	26.8	23.9	24.1
household saving/GNP (%)	8.3	7.2	8.2
Japan:			
65-and-over/working-age (%)	13.0	16.9	19.0
household saving/GNP (%)	12.7	10.7	9.4*

*This number for Japan is for 1989. Japanese saving data for 1990 were not yet published when this article went to press.

boom generation ages (Figure 1). The working-age share of the population will grow as well. The share of the U.S. population over the age of 64 is projected to be roughly constant during the next 20 years, and the share under the age of 20 is projected to decline.

In Germany and Japan, in contrast, the share of the population in the high-saving age group is projected to change much less during the next 20 years. But demographers project that the share of the population over the age of 64 will rise by one-third in Germany, to nearly 21 percent. In Japan, the share of the population 65 or older will rise by two-thirds, to nearly 20 percent in 2010. While the share of the population under the age of 20 is projected to shrink about as much in each of those countries as in the U.S., the working-age share of the population also is projected to shrink in Germany and Japan, in contrast to the U.S.

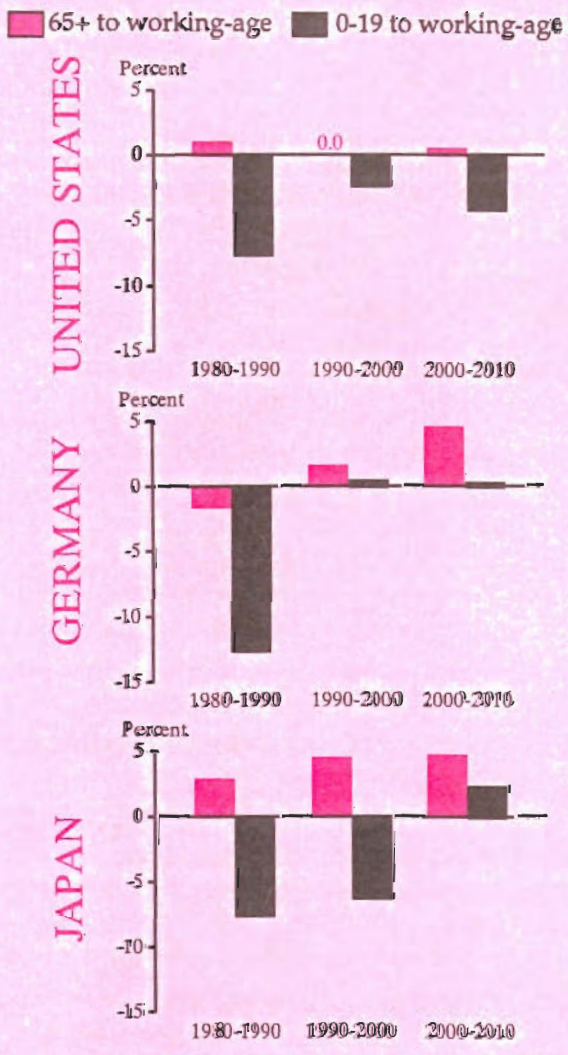
People who will be older than 20 during the next two decades have been born already, and major industrial countries have reasonably accurate census data. As a result, demographers' projections of changes in the age composition of those countries' populations over the next 20 years are likely to be fairly accurate. There is uncertainty about future birthrates and about how much average lifespans may increase. Even so, population projections for the next two decades are unlikely to be far off unless birthrates or death rates change dramatically—or unless migration occurs on a larger scale than observed in recent decades. The possibility of larger-than-usual immigration to Germany is quite real, considering ongoing developments in Eastern Europe. Should large-scale migration occur, the working-age population in Germany might not shrink as projected. For the U.S. and Japan, however, larger-than-usual immigration seems unlikely.

If demographic projections prove correct, the ratio of 65-and-over to working-age populations will rise by 6.4 percentage points in Germany and by 9.5 percentage points in Japan during the next 20 years, but will remain essentially unchanged in the U.S. (Figure 2). During the same period, the ratio of under-20 to working-age populations is projected to fall by about 7 percentage points in the U.S., but to rise roughly 1 percentage point in Germany and to reverse course and begin rising in Japan. Clearly, projected changes in the age composition of

FIGURE 2

Changes in Ratios of 65-and-over and Under-20 Populations to Working-Age Population

The ratio of low-saving, 65-and-over population to higher-saving, working-age population in the U.S. will remain essentially unchanged over the next 20 years, but will rise strongly in Germany and Japan. And the ratio of low-saving, under-20 population to higher-saving, working-age population will continue to decline in the U.S., but not in Germany and Japan.



these three countries' populations have the potential to raise household saving in the U.S. and to lower it in Germany and Japan.

Changes in Population Shares Will Affect Household Saving. There is widespread agreement on this point among economists who have studied the issue, but there is disagreement on how large those changes are likely to be. Taking the average of earlier-cited estimates of the effects of changes in population ratios on household saving behavior, and multiplying that average by the projected changes in population ratios, one might conclude that demographic trends, by themselves, have the potential to raise the ratio of household saving to GNP in the U.S. by 3.5 to 4 percentage points by the year 2010, and to reduce the ratio by 6 to 6.5 percentage points in Germany and by 7 to 7.5 percentage points in Japan. Changes in saving shares are unlikely to be so large, however.

Because the U.S. baby-boom generation is so large relative to previous generations, it is difficult to predict just how much baby boomers' incomes and saving will rise as they enter their peak-earning years. Their peak incomes may not exceed the incomes they earned earlier in their lives by as much as was the case for earlier generations simply because so many baby boomers are competing for jobs. Also, if labor productivity in the U.S. continues to grow as slowly as it did during the 1980s, baby boomers' incomes will not rise as rapidly over the remainder of their working lives as was the case for earlier generations. Both of these possibilities suggest that U.S. baby boomers' saving rates may not rise as much when they enter their peak-earning years as was the case for earlier generations. In Germany and Japan, though, the shrinking working-age populations may cause the incomes of those entering their peak-earning years during the next two decades to rise more rapidly than was the case for earlier generations. In addition, if lifespans continue to grow longer, those now at work in all three countries may postpone retirement

and may save more as they prepare for a longer retirement. Thus longer lifespans may raise aggregate personal saving.

Although it is difficult to forecast just how much household saving behavior will change as a result of projected demographic changes, some recent economic research provides at least a rough idea. Taking into account projected changes in the ratio of 65-and-over to working-age populations and in the ratio of under-20 to working-age populations, and also taking into account the changes in real wages and in income distribution that seem likely to result, Paul R. Masson of the International Monetary Fund and Ralph W. Tryon of the Federal Reserve estimate that demographic shifts during the next 20 years have the potential to raise the ratio of household saving to GNP in the U.S. by roughly 2 to 2.5 percentage points by the year 2010. In contrast, they estimate that demographic shifts can lower the ratio of household saving to GNP by roughly 1.5 to 2 percentage points in Germany and by roughly 3.5 to 4 points in Japan.[15]

Changes in Population Shares May Affect Government Saving. Changing age distributions may affect government budget balances as well as private saving. As the number of people aged 65 and over in Germany and Japan grows rapidly during the next 20 years, their governments' spending on medical care, pensions, social security systems, retirement housing, and other programs for the elderly is likely to grow rapidly too. On the other hand, spending on education may decline as the number of children shrinks. One careful study undertaken by the OECD estimates that, on balance, projected demographic shifts would increase government spending in Germany by an amount equal to nearly 5.5 percent of GNP by 2010, and in Japan by 9.5 percent of GNP—if there are no changes in government pension or benefit programs.[16] At the same time, the working-age population in those two countries is projected to decline, making it more difficult for governments to raise additional revenues. Thus government saving in Germany and Japan may well shrink relative to GNP during the next two decades and could become negative, although governments are likely to offset at least part of the effect of demographic changes on their budgets.

In the United States, by contrast, the number of people 65 and older is projected to grow slowly during the next 20 years. Over the same period, the working-age share of the population is projected to rise. Thus in the U.S., the demand for government services for the elderly is likely to grow less rapidly during the next two decades than it did during the previous two. The OECD study cited in the preceding paragraph estimates that demographic shifts could reduce government spending in the U.S. by an amount roughly equal to 1.5 percent of GNP over the next 20 years. Over the same period, changing demographics are projected to generate large and growing surpluses in the U.S. Social Security System. Government dissaving in the United States could well shrink as a result.

Over the next two decades, then, projected changes in the age distribution of populations are likely to lower personal saving relative to GNP in Germany and Japan and perhaps re-

[15]Masson and Tryon (1990) undertake a careful empirical investigation of the effects of projected demographic changes in these three countries. For studies focusing on the U.S., see Kennickell (1990) and Auerbach and Kotlikoff (1989).

[16]For a discussion of the implications of projected demographic changes for social policy and the demand for government services, see *Ageing Populations: The Social Policy Implications*, published by the OECD (Paris, 1988). Several other estimates of the likely size of changes in demand for government services are summarized in Heller (1989) and in Table 2 of Masson and Tryon (1990).

duce government saving as well. In the United States, by contrast, demographic trends are likely to increase personal saving relative to GNP—and perhaps raise government saving, too.

Beyond 2010, however, the share of the U.S. population over 65 is projected to rise and the share in the high-saving, peak-earning years is projected to gradually decline as the baby-boom generation begins to enter the retirement years. Thus the projected rise in national saving relative to GNP in the U.S. may prove temporary. Demographers project that the ratio of over-65 to working-age populations will continue to rise in Germany and Japan, although more gradually. The projected decline in national saving relative to GNP in those two countries may prove longer lasting.

SUMMARY

From 1980 to 1990, both personal saving and net national saving were much smaller relative to aggregate income in the U.S. than in Germany or Japan. The lower ratio of personal saving to GNP in the U.S. partly reflected the age composition of the three countries' populations: an appreciably smaller share of the U.S. population was in the peak-earning, high-saving years from age 45 to 64 than was the case in Germany and Japan; and the share of the U.S. population in the low-saving years before people enter the labor force and after they retire was larger than for the other two countries. In addition, the government sector in the U.S. ran budget deficits throughout the 1980s, thus reducing net national saving, while the government sectors in Germany and Japan ran budget surpluses.

Looking ahead, demographic projections suggest that personal saving will rise relative to GNP in the U.S. during the next 20 years as the share of the U.S. population in the high-saving years rises by half and the share in the low-saving age groups declines. Demographic projections also suggest that personal saving will fall relative to GNP in Germany and Japan during the same period, as the share of their populations that is over the age of 64 rises sharply and the working-age share of their populations shrinks.

The projected changes in the age composition of the German and Japanese populations seem likely to reduce government saving as well as household saving. But in the U.S., demographic changes are likely to contribute to smaller budget deficits—and possibly to budget surpluses.

Overall, projected demographic changes are likely to narrow the gap between high national saving relative to GNP in Germany and Japan and low national saving relative to GNP in the U.S. But demographic trends seem unlikely to raise U.S. saving rates to levels observed in Germany or Japan during the 1980s. The projected narrowing of saving gaps during the next 20 years will result as much from lower saving shares in Germany and Japan as from a higher saving share in the U.S.

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