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An Economic Approach to Setting Retirement Saving Goals

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Part II
Developments in Retirement Planning Models

Chapter 4

An Economic Approach to Setting Retirement Saving Goals

B. Douglas Bernheim, Lorenzo Forni, Jagadeesh Gokhale, and Laurence J. Kotlikoff

Effective retirement planning begins with the establishment of appropriate goals for saving. If these goals are set too high, households may sacrifice present wellbeing excessively to sustain future high living standards. If these goals are set too low, households may indulge immediate desires at the expense of future living standards. Thus having inappropriate retirement saving goals may produce undesired and perhaps abrupt changes in living standards. By contrast, with appropriate saving goals, households will tend to "smooth" consumption, thereby avoiding undesirable changes.

Consumption smoothing is a fundamental prediction and prescription of modern economic theory. This theory rests on a *life cycle model* of behavior which posits that each household is motivated by a sense of wellbeing that depends both on current satisfaction and on expectations of future satisfaction. The principle of consumption smoothing follows directly from the law of diminishing returns: individuals are well advised to reallocate dollars from time periods in which they are consuming a great deal (and in which incremental dollars therefore add relatively little to wellbeing), to periods in which they are consuming relatively little (and in which incremental dollars are therefore particularly valuable). To economists, consumption smoothing is the central purpose of saving.

Traditional financial planning methods are inconsistent with, and in some instances antithetical to, standard economic doctrine. The hallmark of these methods is the establishment of an asset target derived from either income or spending objectives. Unfortunately, such objectives are not typically derived from the principles of consumption smoothing. As a result, traditional financial plans frequently guarantee dramatic swings in spending as households age.

Despite this fundamental shortcoming, virtually every financial planning

software package available today embodies the traditional targeted-saving approach. In some instances, users are asked to specify future spending or income targets with reference to current spending or income, but this is a far cry from consumption smoothing. To illustrate, imagine a household attempting to set a spending target. If it selects its target with reference to current spending, and if its current spending is not sustainable over its planning horizon, then it will be told to reduce its current consumption and save more than is required for consumption smoothing. Were the household to follow this prescription, it would experience an undesired surge in spending at retirement. To put it differently, the household would sacrifice too much when young so as to benefit from a higher living standard after retirement. Conversely, if the household's spending is currently less than it can sustain over its planning horizon, it will be told to increase its current consumption and save less than is required for consumption smoothing. Were the household to follow this prescription, it could experience a sudden and undesired drop in living standard at retirement. In other words, the household would deprive itself of a more satisfactory retirement by consuming excessively in earlier years. Setting future income targets with reference to current income is even less likely to generate a sensible path for consumption. A household's current income may fluctuate because of one-time bonuses, temporary unemployment, enrollment in higher education, childcare, and a variety of other factors.

By assuming a spending or income target, traditional financial planning techniques implicitly require households to perform the most complex and important planning tasks by themselves. This is because setting a target consistent with consumption smoothing requires a household to consider a wide range of factors including current and future household composition, the age and likely lifespan of each spouse, current and future labor earnings, special expenditures and receipts, social security benefits, current net worth, income from taxable and nontaxable assets, current and future contributions to retirement accounts, current and future federal and state taxes, asset returns, current housing and future housing plans, and borrowing constraints. Each of these factors interacts with others, and none can be evaluated appropriately in isolation. Consider, for example, future housing plans. Downsizing or upsizing a home alters the future path of housing expenses, mortgage and property tax deductions, saving, capital income, and federal and state taxes. To determine the impact of housing choices on sustainable living standards, one must solve a complex dynamic programming problem. Many individuals will not know how to see this problem when selecting a target for future spending or income.

Mindful of these overwhelming complexities, traditional financial planners often advise households to set their targets using simple rules of thumb, such as 70 percent income replacement. Unfortunately these seemingly straightforward recommendations are often highly inappropriate,

and many households tend to adopt them uncritically, deferring to a planner's expertise. In following such advice, a household smoothes its saving, rather than its consumption, so its living standard could potentially fluctuate wildly from year to year.

The shortcomings of existing financial planning techniques have prompted the development of an economics-inspired financial planning software package known as Economic Security Planner, or ESPlanner.[1] Its underlying algorithm determines a household's maximum sustainable living standard as well as the rate of saving and level of life insurance holdings required to preserve that living standard through time. In order to elucidate how the model works, we first describe its logic and compare our economic approach to financial planning, as embodied in ESPlanner, with a conventional approach as embodied in Quicken Financial Planner. Finally, we expand on Bernheim et al. (2000) by using the software to determine appropriate saving goals for typical Americans approaching retirement.

An Economic Approach to Financial Planning

It is important to realize that the principle of consumption smoothing applies to the individual, rather than to a household. That is, while individuals may smooth consumption, household expenditures will shift with the arrival and departure of family members. Since larger households benefit from economies of scale with respect to shared expenses, consumption smoothing on the part of each individual does not require household expenditures to increase proportionately with household size. Accordingly, our software smoothes a measure of the household's living standard, which depends on consumption per adult-equivalent (based on children's ages), accounting for the economies of scale that are associated with family size.

It is also important to realize that the principle of consumption smoothing does not apply to all household expenditures. Exceptions occur when particular expenditures are either nonrecurring or difficult to modify. Examples might include college tuition and housing expenses (down payments, mortgages, and property taxes). ESPlanner deducts these special expenditures directly from income "off the top," and smoothes the living standard derived from all remaining expenditures. Application of the consumption-smoothing dictum may also be limited by institutional constraints. For example, lenders are often reluctant to extend unsecured credit. To smooth consumption, households with rapidly growing income must borrow against future receipts. If they cannot, then their consumption may rise (and even fluctuate) with income. Accordingly, our model smooths consumption to the greatest extent possible, subject to the limitations on each household's ability to borrow.

The principle of consumption smoothing applies to decisions about life insurance, as well as to decisions about saving. Households use life insur-

ance to moderate the impact of a family member's death on the survivors' living standards. Moreover, decisions about life insurance and saving are inextricably linked. Current budgeted expenses must include an adequate allotment for life insurance premiums, and saving must be sufficient to cover future premiums. Accordingly, in deriving a financial plan, our model solves simultaneously for the ideal levels of saving and life insurance. It thereby ensures that survivors can sustain the same living standard as the intact family, irrespective of which family members die or when they die.

Naturally, many things can change following the death of a spouse. The survivor may move to a new house, change jobs, or return to work. He or she may incur additional child care expenses, or revisit plans to send the child to an expensive private university. To accommodate these important possibilities, ESPlanner encourages *contingent planning*. In particular, each spouse may specify different levels of earnings, special expenditures, and tax-favored retirement contributions in the event that he or she is widowed. Changes in contingent plans often have substantial effects on appropriate life insurance holdings.

Required Information

To apply the principle of consumption smoothing while accounting for the various considerations mentioned above, our software requires several types of inputs:

Demographics. ESPlanner solicits the birth dates of the household head and spouse as well as the birth years of children under age 19. Children are assumed ordinarily to remain in the household through age 18. Each spouse must also specify a maximum length of life, which refers to the limit of the individual's planning horizon (note that this differs from life expectancy). The program smoothes consumption over this horizon, thereby protecting household members from the possibility that they might outlive their resources. Users also identify their state of residence, which is used to determine applicable tax rates.

Standard of living index. Economic theory allows for the possibility that a household might prefer either a rising or falling standard of living, over one that is constant over time. A household might also prefer to change its level of consumption upon retirement because it anticipates increased spending on activities that are complementary with leisure, and/or reduced spending on activities that are substitutes for leisure. Our model accommodates these possibilities by permitting users to specify how they would like their living standard to change through time. By adjusting a living standard index from its default value of 100 in any year or collection of years, a user can customize the *shape* of his living standard profile (for example, one can specify that the living standard is to grow at the rate of one percent per year or should decline by 10 percent at retirement). The model then determines

the highest current living standard, as well as the associated financial plan, consistent with the characteristics specified by the user.

Labor earnings. For each spouse, software solicits current labor earnings as well as the amount that he or she would expect to earn if widowed (contingent earnings). Separate information is collected on employee wages and self-employment income. It is necessary to distinguish between these forms of income because they are treated differently under the payroll tax. Each spouse also specifies a retirement date and a growth path for labor earnings up to retirement, as well as a (potentially different) retirement date and earnings growth path that would apply in the event he or she were widowed.[2]

Special expenditures and receipts. Our model also provides users with the ability to specify nonrecurring (or briefly recurring) expenditures and receipts. Each special expenditure must be designated as either deductible or nondeductible and each special receipt is described as either taxable or nontaxable. For each briefly recurring item (such as college tuition), the user provides a start and an end date. Each spouse specifies special expenditures and receipts that would apply in the event that he or she were widowed.[3]

Estate plans. In many instances, people may wish to leave a bequest in excess of the amount required to sustain the surviving spouse's living standard through his or her maximum lifespan, and to sustain the living standard of children through age 18. Accordingly, our model permits users to specify special (incremental) bequests, including resources to defray death-related expenses such as funerals.

Net worth. Information on net worth is essential for accurate financial planning, and accordingly, our software separately solicits data on non-tax-favored and tax-favored assets. In the case of tax-favored accounts, each spouse's holdings are detailed, as well as a) the last year he or she will contribute to the account, b) the first year he or she will start withdrawing from the account, and c) the year he or she will stop withdrawing from the account. Users may select one of two options for withdrawing tax-favored balances: uniform withdrawals, or the smallest legally permissable withdrawals.

Saving. An individual who attaches a high value to liquidity may be reluctant to tie up too much of net worth in tax-favored accounts. Conversely, someone less concerned about liquidity may wish to maximize tax-favored holdings. Accordingly, the model permits the user to determine the composition of saving by indicating current non-tax-favored saving, as well as current and intended future employee and employer contributions to tax-favored accounts (for both joint-survivor and widowed contingencies).

Housing. For most Americans, housing represents both a major expense and an important store of wealth. Accordingly, the softward solicits information on both primary and secondary (vacation) homes. Homeowners estimate current market value, provide information on loans, and detail

current expenses, while renters list housing-related expenses. Users also describe future plans concerning refinancing and moves (including upsizing, downsizing, liquidation of second homes, shifts between homeowner and renter status, and so forth).

Pensions. Accurate financial planning requires detailed information on work-related retirement benefits. The model treats defined contribution (DC) accounts as tax-favored assets. Each spouse separately supplies information on defined benefit (DB) pensions, including the year or years in which benefits will be received, projected amounts (either lump-sum, annual, or both), whether the benefits are indexed to inflation, and the level of benefits received by a survivor.

Social security. Social security remains an important source of retirement and disability income for many Americans. Our software uses past and future earnings in covered employment to estimate benefits for those who are not yet collecting benefits. Its benefit calculator takes into account eligibility rules, early retirement reductions, delayed retirement credits, benefit recomputations, the phased increase in the normal retirement age, the earnings test between ages 62 and 65, family benefit maximums, the wage indexation of Average Indexed Monthly Earnings, and the price indexation of benefits once they are received. All these elements are needed to determine anticipated retirement, spousal, mother, father, child, and widow(er) benefits.

Economic assumptions. Meaningful financial planning requires a variety of assumptions about the economic environment. Our model supplies default values for all critical economic parameters including the inflation rate, nominal rates of return on tax-favored and non-tax-favored assets, the degree of economies in shared living, child-adult equivalency factors, the maximum amount the household can borrow (apart from mortgages), future rules governing payroll taxes and social security benefits, and the share of total non-tax-favored capital income accruing in the form of long-term capital gains. Users are permitted to substitute alternative values for these parameters.

Taxes. Meaningful financial planning requires proper recognition of tax liabilities. Accordingly, ESPlanner calculates federal and state income and payroll taxes for each future year, for each survival state (both spouses alive and husband deceased, husband deceased and wife alive). The model also computes estimated federal income taxes reflecting deductions and exemptions, the partial taxation of social security benefits, the earned income tax credit, the child tax credit, the phase-out of deductions and exemptions at higher income levels, the indexation of tax brackets to the consumer price index, and the preferential taxation of long-term capital gains. In computing deductions, the household is assumed to itemize if eligible expenses exceed the standard deduction (principally mortgage payments, property taxes, state income taxes, spousal support payments, charitable contribu-

tions, and other designated special expenses). Estimated state income tax liabilities (for each year and for each survival state) reflect state of residence, as well as the specific exemptions, deductions, and rate structure appropriate for that state. In computing both federal and state taxable income, the program deducts, as appropriate, contributions to tax-favored accounts and includes, as appropriate, withdrawals from these accounts. Finally, the determination of social security payroll taxes accounts for the ceiling on covered earnings, which applies to the portions of the tax that finance retirement and disability benefits, but not to the portion that finances Medicare.

Model Recommendations

ESPlanner's principal outputs are recommended time paths for consumption expenditure, non-tax-favored saving, and term-life insurance holdings (for each spouse individually, in the case of married couples). All outputs are displayed in current-year (i.e., real) dollars, and recommendations for saving and life insurance are compared with current choices. Although the derivation of the recommended financial plan involves a complex dynamic programming algorithm, reports and recommendations are easily interpreted. Moreover, from an inspection of the reports, it is readily evident that the program achieves the objective of consumption smoothing, thereby identifying the highest sustainable living standard for the household.

In this context, "consumption" refers to all spending over and above "off-the-top" items, including housing expenses, special expenditures, life insurance premiums, taxes, and net contributions to tax-favored accounts. Recommended consumption expenditures vary from year to year when the household's composition changes, and when the household moves into or out of a liquidity-constrained period. Naturally, recommended household consumption may also change over time when the user has expressed a preference for a rising or declining living standard (as discussed above). Recommended taxable saving in any year equals the household's total income (non-asset plus asset income) minus the sum of (a) recommended spending on consumption and insurance premiums, (b) specified spending on housing and special expenditures, (c) taxes, and (d) net contributions to tax-favored accounts (contributions less withdrawals).

Recommended levels for term life insurance are either positive or zero.[4] If recommended term insurance in a particular year is positive for a particular potential decedent (the household head or, if married, the spouse), and if the decedent dies at the end of that year, the surviving household will have precisely the same living standard as the household would have had absent the decedent's premature death. If the potential decedent's recommended insurance in a particular year is zero, the surviving household will have the same or higher living standard if the decedent dies in that year. These

statements are, of course, conditional on complete execution of the recommended financial plan, as well as on the correctness of underlying economic assumptions and information concerning future income, current asset holdings, and special expenditures.

Illustrating the ESPlanner Results

To indicate how the model works we introduce Al and Peg, a married couple, who decide to formulate a detailed financial plan. In the year 2000, Al is 50 years old and Peg is 45, and they reside in the state of New York with two children, Kelly, age 15, and Bud, age 13. Al and Peg each plan to work through age 65, earning respectively $25,000 and $100,000 each year (these figures all all others mentioned in this illustration refer to year-2000 dollars). If Al were to die, Peg would still earn $100,000, but if Peg were to die, Al would switch jobs and expect to earn $40,000. The couple plan to send each child to college for four years, and to spend $30,000 per child per year on tuition. Al and Peg wish to allocate $5,000 each for their funerals. Anticipating a desire to pursue costly leisure activities during retirement, they decide to specify a 10 percent increase in living standard upon Al's retirement. They currently own and live in their home. The house has a market value of $300,000. Annual property taxes are $5,000, annual homeowners' insurance is $750, and annual maintenance averages $1,500. Al and Peg have 25 years remaining on a 30-year mortgage; their current mortgage balance stands at $200,000, and they pay $2,200 each month. They plan to sell their home when Al is 70 years old and rent an apartment for $2,000 per month (in today's dollars). Each spouse works in social security-covered employment and the past covered earnings of each spouse grew smoothly to their current values. The couple wants to set aside $100,000 by 2020 (when Al is age 70 and Peg is age 65) as an emergency fund for medical expenses. If only one spouse is alive in 2020, they plant to put only $50,000 aside.

Table 1 shows our model's annual non-tax-favored saving, consumption, and life insurance recommendations. The couple's future spending, including consumption, housing expenses, special expenditures, life insurance premiums, and funeral expenses is tracked in Table 2, while Table 3 is a balance sheet—it tracks the household's non-tax-favored assets. Al and Peg's income over time is depicted in Table 4, where non-asset income refers to labor income, pension income, and social security benefits. These first four tables all assume that both spouses live to their assumed maximum life expectancy.[5]

Consider first the consumption recommendations in Table 1. Recommended discretionary expenditures equal $58,018 through 2004, the year Kelly goes to college, at which point consumption falls to $49,622. It drops again to $40,486 in 2006 when Bud goes to college. Consumption remains at this level until 2015 when Al reaches age 65. At this point, consumption rises

TABLE 1. Annual Recommendations for Saving, Consumption, and Life Insurance

Year	*Al's Age*	*Peg's Age*	*Non-Tax-Favored Saving ($)*	*Consumption ($)*	*Al's Life Insurance ($)*	*Peg's Life Insurance ($)*
2000	50	45	1,751	58,018	0	468,868
2001	51	46	2,395	58,018	0	452,345
2002	52	47	2,591	58,018	0	431,413
2003	53	48	3,208	58,018	0	408,272
2004	54	49	(18,153)	49,622	0	377,605
2005	55	50	(17,775)	49,622	0	347,278
2010	60	55	21,981	40,486	0	148,952
2015	65	60	23,138	44,534	0	0
2020	70	65	(107,898)	44,534	0	0
2025	75	70	(11,297)	44,534	0	0
2030	80	75	(11,804)	44,534	0	0
2035	85	80	(12,334)	44,534	0	0
2040	90	85	(12,863)	44,534	0	0
2045	95	90	(18,441)	44,534	0	0
2050		95	(20,162)	27,834	0	0

Source: Authors' calculations, based on hypothetical family characteristics for Al and Peg; see text.

by 10 percent to $44,534 in accordance with Al's and Peg's desire to have a 10 percent higher living standard in retirement. Finally, in 2046, when Al is deceased, consumption falls to $27,834, since then only Peg remains in the household. Note that the ratio of consumption when Al and Peg are both alive ($44,534) to the value when only Peg ($27,834) is alive is 1.6. This reflects our assumption that, with the addition of a second adult, spending must increase by a factor of 1.6 (i.e. by 60 percent) to preserve the same living standard.

In contrast to the relatively smooth trajectory for the household's living standard, non-tax-favored saving patterns fluctuate widely. Saving is positive until the children go to college, negative when they are in college, positive after they leave college, and negative once Al and Peg are retired. Note that Al's and Peg's non-tax-favored saving is largest immediately prior to Peg's retirement. This is what one would expect, since in their younger years Al and Peg must pay for a mortgage and college tuition. After these obligations are met, Al and Peg can concentrate on saving for retirement. The largest increment to their liquid assets occurs when they sell their home. Their highest rate of dissaving occurs when they make special expenditures. Likewise, as indicated in Table 2, total spending also fluctuates more than discretionary spending due to changes in special expenditures, housing costs, life insurance premiums, and funeral expenses.

Our model recommends that the couple initially obtain $468,868 in insurance on Peg's life. Over time, Peg's recommended life insurance declines and reaches zero at age 64. For Al, recommended life insurance is zero,

TABLE 2. Annual Decomposition of Spending Patterns

Year	*Al's Age*	*Peg's Age*	*Consumption ($)*	*Special Expenditures ($)*	*Housing Expenditures ($)*	*Al's Life Insurance Premium ($)*	*Peg's Life Insurance Premium ($)*	*Excess Funerals & Bequests ($)*	*Total Spending ($)*
2000	50	45	58,018	0	32,881	0	1,052	0	91,951
2001	51	46	58,018	0	32,135	0	1,080	0	91,233
2002	52	47	58,018	0	31,410	0	1,123	0	90,551
2003	53	48	58,018	0	30,706	0	1,130	0	89,854
2004	54	49	49,622	30,000	30,023	0	1,123	0	110,768
2005	55	50	49,622	30,000	29,360	0	1,115	0	110,097
2010	60	55	40,486	0	26,322	0	760	0	67,568
2015	65	60	44,534	0	23,702	0	0	0	68,236
2020	70	65	44,534	100,000	24,000	0	0	0	168,534
2025	75	70	44,534	0	24,000	0	0	0	68,534
2030	80	75	44,534	0	24,000	0	0	0	68,534
2035	85	80	44,534	0	24,000	0	0	0	68,534
2040	90	85	44,534	0	24,000	0	0	0	68,534
2045	95	90	44,534	0	24,000	0	0	5,000	73,534
2050		95	27,834	0	24,000	0	0	5,000	56,834

Source: Authors' calculations, based on hypothetical family characteristics for Al and Peg; see text.

TABLE 3. Balance Sheet for Non-Tax-Favored Assets

Year	*Al's Age*	*Peg's Age*	*Total Income*	*Net Tax-Favored Payments*	*Total Spending*	*Total Taxes*	*Non-Tax-Favored Saving*	*Non-Tax-Favored Net Worth*
2000	50	45	129,500	3,000	91,951	32,798	1,751	156,251
2001	51	46	129,551	3,000	91,233	32,923	2,395	158,647
2002	52	47	129,621	3,000	90,551	33,479	2,591	161,238
2003	53	48	129,696	3,000	89,854	33,634	3,208	164,445
2004	54	49	129,790	3,000	110,768	34,175	(18,153)	146,292
2005	55	50	129,261	3,000	110,097	33,939	(17,775)	128,516
2010	60	55	125,965	3,000	67,568	33,416	21,981	55,117
2015	65	60	119,113	(4,786)	68,236	32,525	23,138	173,520
2020	70	65	51,777	(24,293)	168,534	15,434	(107,898)	391,369
2025	75	70	47,418	(24,293)	68,534	14,474	(11,297)	338,329
2030	80	75	45,744	(24,293)	68,534	13,307	(11,804)	280,332
2035	85	80	43,994	(24,293)	68,534	12,087	(12,334)	219,729
2040	90	85	42,166	(24,293)	68,534	10,788	(12,863)	156,430
2045	95	90	40,259	(24,293)	73,534	9,459	(18,441)	85,390
2050		95	23,089	(17,507)	56,834	3,924	(20,162)	0

Source: Authors' calculations, based on hypothetical family characteristics for Al and Peg; see text.

Table 4. Components of Income

Year	*Al's Age*	*Peg's Age*	*Al's Non-Asset Income ($)*	*Peg's Non-Asset Income ($)*	*Special Reces ($)*	*Non-Tax-Favored Asset Income ($)*	*Total Income ($)*
2000	50	45	25,000	100,000	0	4,500	129,500
2001	51	46	25,000	100,000	0	4,551	129,551
2002	52	47	25,000	100,000	0	4,621	129,621
2003	53	48	25,000	100,000	0	4,696	129,696
2004	54	49	25,000	100,000	0	4,790	129,790
2005	55	50	25,000	100,000	0	4,261	129,261
2010	60	55	25,000	100,000	0	965	125,965
2015	65	60	14,733	100,000	0	4,380	119,113
2020	70	65	14,733	22,501	0	14,542	51,777
2025	75	70	14,733	22,501	0	10,183	47,418
2030	80	75	14,733	22,501	0	8,509	45,744
2035	85	80	14,733	22,501	0	6,759	43,994
2040	90	85	14,733	22,501	0	4,931	42,166
2045	95	90	14,733	22,501	0	3,024	40,259
2050		95	0	22,501	0	587	23,089

Source: Authors' calculations, based on hypothetical family characteristics for Al and Peg; see text.

since even without life insurance, Peg and the children would enjoy a higher material living standard were Al to die than were he to live.

The balance sheet in Table 3 proves one can readily see that our model's consumption recommendations are affordable. This balance sheet tracks the evolution of the couple's non-tax-favored net worth, which in turn translates into recommended non-tax-favored saving. This flow then equals the difference between the household's income, detailed in Table 4, and the sum of its net contribution to retirement (non-tax-favored) accounts, total spending, and taxes. Note that household net worth is never negative. This implies that the plan is feasible. Note also that net worth is zero when Peg reaches her maximum lifespan, indicating that there are no unused resources. Since it is infeasible to increase consumption in any year without reducing it in another year, the program has identified the highest consumption profile with the characteristics that the couple desires (an unchanging living standard, except for a 10 percent rise at retirement).

One can also verify that a surviving spouse could maintain his or her accustomed living standard in the event of widowhood. For instance, Table 5 details Al's recommended spending assuming that Peg dies at age 46, one year after adopting the plan. Recommended consumption for Al declines when the children leave the household and then rises by 10 percent when Al reaches age 65. Note that when Al is living by himself, the ratio of his consumption in any year to the corresponding value in Table 2 is 1 divided by 1.6. Given our assumption concerning the magnitude of household scale economies, this implies that Al is enjoying the same living standard as a survivor that he would have enjoyed had Peg not died. Similarly the balance sheet in Table 6 shows that consumption recommendations are affordable for Al if Peg dies. This follows from the fact that Al never goes into debt. Note also that net worth is zero when Al reaches his maximum lifespan, implying that there are no unused resources. It is therefore infeasible to increase consumption in any year without reducing it in another year. Upon Peg's death, Al's non tax-favored wealth is $605,992. This amount equals the couple's $158,647 in non tax-favored assets at the end of 2001 plus the $452,345 in term insurance recommended for Peg in 2001, less the $5000 payment for Peg's funeral. Were the couple to purchase less insurance on Peg's life, Al would not be able to finance the same living standard as a survivor.

Limitations of This Approach

Although our model considers many key factors that enter into saving and insurance decisions, it is important to acknowledge that some relevant factors are omitted. Two specific omissions merit discussion. First, the software does not take into account the uncertainty of future income or expenditures on necessities such as noninsured health care costs. Users are required to perform sensitivity analysis to understand the implications of uncertainty,

Table 5. Al's Spending, Assuming That Peg Dies

Year	*Al's Age*	*Consumption ($)*	*Special Expenditures ($)*	*Housing Expenditures ($)*	*Al's Life Insurance Premium ($)*	*Excess Funerals & Bequests ($)*	*Total Spending ($)*
2002	52	45,813	0	31,410	0	0	77,223
2003	53	45,813	0	30,706	0	0	76,519
2004	54	36,261	30,000	30,023	0	0	96,284
2005	55	36,261	30,000	29,360	0	0	95,621
2010	60	25,304	0	26,322	0	0	51,626
2015	65	27,834	0	23,702	0	0	51,536
2020	70	27,834	50,000	24,000	0	0	101,834
2025	75	27,834	0	24,000	0	0	51,834
2030	80	27,834	0	24,000	0	0	51,834
2035	85	27,834	0	24,000	0	0	51,834
2040	90	27,834	0	24,000	0	0	51,834
2045	95	27,834	0	24,000	0	5,000	56,834

Source: Authors' calculations, based on hypothetical family characteristics.

TABLE 6. Balance Sheet for Al's Non-Tax-Favored Assets, Assuming That Peg Dies

Year	*Al's Age*	*Total Income ($)*	*Net Tax-Favored Contributions ($)*	*Total Spending ($)*	*Total Taxes ($)*	*Non-Tax-Favored Saving ($)*	*Non-Tax-Favored Net Worth ($)*
2001	51	605,992	0	0	0	605,992	605,992
2002	52	79,304	1,000	77,223	11,984	(10,903)	595,089
2003	53	79,020	1,000	76,519	11,686	(10,185)	584,902
2004	54	72,526	1,000	96,284	12,801	(37,559)	547,343
2005	55	71,433	1,000	95,621	12,158	(37,346)	509,997
2010	60	48,114	1,000	51,626	8,775	(13,287)	265,283
2015	65	26,897	(18,968)	51,536	3,619	(9,290)	205,066
2020	70	32,303	(23,501)	101,834	8,526	(54,556)	340,862
2025	75	29,648	(25,848)	51,834	10,439	(6,777)	299,850
2030	80	28,303	(25,176)	51,834	8,642	(6,997)	252,835
2035	85	26,767	(19,375)	51,834	6,167	(11,859)	198,010
2040	90	24,592	(12,425)	51,834	2,623	(17,440)	115,284
2045	95	21,474	(8,239)	56,834	1,048	(28,169)	0

Source: Authors' calculations, based on hypothetical family characteristics.

examining a variety of alternative scenarios to assess their exposures and vulnerabilities. Second, the software does not account for possible changes in marital status, such as remarriage after a spouse's death. To some extent, the remarriage option may mitigate financial vulnerabilities associated with the risk of a spouse's death. There are, nevertheless, legitimate reasons to ignore this possibility. Arguably, the choice of whether to remarry should not be dictated by financial necessity. In addition, the economic wellbeing of a remarried individual may be determined by his or her financial status prior to remarriage, insofar as this affects bargaining power within the new marriage (cf. Lundberg 1999). Finally, remarriage after a spouse's death is less common among older individuals.

Comparing the Economic Approach and the Traditional Approach to Financial Planning

In prior research Gokhale et al. (1999) compared the economic approach, embodied in the ESPlanner, with a more traditional approach, as embodied in Quicken Financial Planner (QFP). Table 7 reports consumption, saving, and life insurance recommendations for three households—a low-income, young married couple with no children; a upper-income, middle-aged married couple with two children; and a high-income, older married couple with adult children.

In deriving financial plans with the Quicken Financial Planner software, Gokhale et al. (1999) attempted to emulate the manner in which a somewhat sophisticated household might use the program. After soliciting current spending levels, QFP asks the user whether he or she wishes to spend the same amount in the future. We assume that most households would, at least initially, answer this question in the affirmative. Using information on income and net worth, the program then determines whether desired expenditures are feasible. If planned spending is not feasible, the user must adjust planned expenditures downward. If planned spending is feasible, the user can choose to adjust planned expenditures upward. A sophisticated household could follow this procedure iteratively until it determined the highest feasible level of consumption, though this manual process of "trial and error" is time consuming. Consequently, it is unlikely that even sophisticated households would further fine tune their expenditure plans to accommodate changes in household composition (such as the arrival and departure of children from the household), borrowing constraints, or other factors that our model handles automatically.

Case A: A Young, Low Income Couple

For this case we assume that both spouses are 35 years old in 1999 and both retire at age 65. They plan to have two children, one in 2001 and one in

TABLE 7. Comparing Recommendations From ESPlanner (ESP) and Quicken Financial Planner (QFP)

A. A Young, Low Income Couple

Age of Husband	Age of Wife	Consumption (Living Expenses)		Taxable Saving		Taxes		Taxable Assets		Wife's Tax-Deferred Assets		Husband's Life Insurance		Wife's Life Insurance	
		QFP	ESP	QFP	ESP	QFP	ESP	QFP	ESP	QFP	ESP	QFP	ESP	QFP	ESP
35	35	26,920	26,866	7,863	5,424	19,901	20,355	21,683	19,845	4,419	4,380	340,000	242,122	340,000	236,396
45	45	26,920	38,500	16,947	3,447	19,222	16,812	132,998	46,839	18,400	17,984	N.C.	169,566	N.C.	197,139
65	65	26,920	26,866	21,667	(797)	16,439	312	374,766	43,794	64,356	59,321	N.C.	25,735	N.C.	31,197
85	85	26,920	26,866	(16,730)	(2,414)	3,083	96	266,097	11,375	35,592	15,489	N.C.	9,477	N.C.	10,813
90	90	13,460	26,866	0	(1,030)	3,316	7	0	0	3,013	0	N.C.	0	N.C.	0

B. A Middle-Aged, Upper Income Couple

Age of Husband	Age of Wife	Consumption (Living Expenses)		Taxable Saving		Taxes		Taxable Assets		Couple's Tax-Deferred Assets		Husband's Life Insurance		Wife's Life Insurance	
		QFP	ESP	QFP	ESP	QFP	ESP	QFP	ESP	QFP	ESP	QFP	ESP	QFP	ESP
39	40	39,390	48,909	102,508	57,063	48,366	70,217	324,909	289,328	262,661	262,162	960,000	474,795	0	0
45	46	39,390	48,909	21,883	4,526	30,154	28,969	494,700	366,871	411,295	411,486	N.C.	184,907	N.C.	0
65	66	39,390	35,925	0	0	11,804	7,364	0	0	843,756	675,978	N.C.	0	N.C.	0
85	86	39,390	41,823	(623)	194	10,191	7,468	1,489	3,130	343,461	288,373	N.C.	0	N.C.	0
95	Deceased	21,008	28,683	0	0	5,781	6,710	0	0	1,325	0	N.C.	0	N.C.	0

C. An Older, Very High Income Couple

Age of Husband	Age of Wife	Consumption (Living Expenses)		Taxable Saving		Taxes		Taxable Assets		Couple's Tax-Deferred Assets		Husband's Life Insurance		Wife's Life Insurance	
		QFP	ESP	QFP	ESP	QFP	ESP	QFP	ESP	QFP	ESP	QFP	ESP	QFP	ESP
64	57	186,880	204,510	(138,380)	(317,615)	237,681	182,449	2,608,876	2,566,384	835,135	835,135	0	0	0	0
75	68	186,880	204,510	64,289	(64,357)	110,389	131,659	2,474,844	1,815,234	1,005,179	1,086,296	N.C.	0	N.C.	0
85	78	186,880	204,510	(37,627)	(133,145)	74,006	55,720	1,958,129	799,840	748,607	980,869	N.C.	0	N.C.	0
Deceased	90	24,917	127,819	0	(118,883)	8,961	46	0	0	7,131	0	N.C.	0	N.C.	0

Source: Gokhale, Kotlikoff, and Warshawski (1999).
Notes: N.C. — not computed. QFP does not allow employer's matching contribution to a tax-deferred account to reflect inflation-induced pay increases.

2003. The husband earns $43,000 initially, declining by 2001 to $35,000 and staying constant in real terms thereafter. The wife earns $37,000 in 1999, zero in 2000, $35,000 in 2001, $36,000 in 2002, $37,000 in 2003, and $38,000 thereafter. The husband receives a gift from his father of $10,000 in 1999 and 2000 (in current dollars). Special expenditures include truck loan payments of $4,500 in 1999 and 2000. The couple also plan to spend $20,000 on college tuition for each child between the ages 19 and 22. The couple allocate $5,000 for each spouse's funeral, but do not wish to leave incremental bequests over and above the level necessary to assure survivors of an undiminished living standard. The couple's current assets include $14,000 in taxable accounts as well as $3,000 in an IRA under the wife's name. The wife intends to contribute $1,200 to her IRA annually until she retires. She will begin withdrawing funds from her IRA at age 65 in equal annual installments. The couple purchases a house in 1999 for $150,000, making a down payment of $15,000 and taking out a $135,000, 30-year mortgage. Monthly mortgage payments total $990 including principal and interest. Annual housing expenses include $2,500 in property taxes, $400 in homeowner's insurance payments, and $2,000 in maintenance. Both spouses will begin collecting social security retirement benefits at age 65. All calculations presented incorporate ESPlanner's default assumptions concerning economic parameters, including a 6 percent nominal interest rate on taxable and nontaxable assets, a 3 percent inflation rate, and a nonnegativity constraint on nonhousing wealth (equivalently, no unsecured borrowing).

If the couple follows ESPlanner's recommendations, Table 7 shows it will never encounter liquidity constraints nor will it ever accumulate a significant stock of taxable assets. The couple is advised to consume $26,866 initially, and $38,500 when both children are present. QFP, on the other hand, recommends constant consumption of $26,920 as long as both spouses are living, irrespective of whether children are present. We would propose that our model's recommendation is more reasonable since spending and saving decisions account for the costs of childrearing. Both programs indicate that husband and wife should have similar life insurance holdings, reflecting their similar economic contributions to the household. Nevertheless ESP recommends significantly less life insurance than QFP.

Case B: A Middle-Aged, Upper Income Couple

For this case, we assume that the wife is 40 years old and the husband 39, in 1999. The couple reside in Massachusetts with two children, one born in 1991 and the other 1993. The wife does not work, while the husband earns $200,000 in 1999 and 2000. Starting in 2001 and continuing until his retirement at age 55, the husband expects to earn $100,000. They plan to send each of their children to college for four years at a cost of $30,000 per child per year. They allocate $5,000 for each spouse's funeral, but they do

not wish to leave incremental bequests above the level necessary to assure survivors of an undiminished living standard. The couple's taxable assets are $225,500. The wife has an IRA with a 1999 balance of $84,700, and the husband has a 401(k) with a 1999 balance of $148,000. Both plan to withdraw their nontaxable assets (thereby making them subsequently taxable) at age 59. The couple currently saves $11,765 per year in taxable forms. The husband plans to contribute $9,500 to his 401(k) plan each year and expects his employer to contribute $6,000. The wife does not intend to make additional IRA contributions. The couple owns a $475,000 house with annual property taxes of $5,200, annual maintenance of $1,500, and annual homeowner's insurance of $500. They have 29 years remaining on a 30-year mortgage; their current mortgage balance stands at $170,000 and they pay $1,131 per month. Each spouse intends to begin receiving his/her social security retirement benefits at age 62.

QFP's and ESPlanner's recommendations for consumption, taxable saving, and life insurance differ dramatically, as is clear from Table 7. For example, QFP recommends more than twice as much insurance on the husband's life, and this is traceable to several factors. First, ESPlanner recomments that spending should decline sharplyw hen the children leave the household, so initial consumption (with children present) exceeds that recommended by QFP. Second, ESPlanner's estimate of the couple's short-term tax liabilities is significantly higher than QFP's, due to our treatment of Massachusetts income taxes, which impose high rates on capital income. Third, QFP does not allow the employer's matching 401(k) contribution to rise with inflation-induced increases in pay, while our model does. Finally, QFP's social security benefit estimates are lower than ours.

Case C: An Older, High Income Couple

In this case, the husband is 64 years old, the wife is 57, and the husband intends to work for two more years, earning close to $400,000 over this period. The couple have a variety of large special expenses in the short run, including an expensive home renovation. The husband has two pensions providing almost $200,000 (nominal) annually; he expects to begin receiving this income as soon as he retires. The couple each allocates $5,000 in funeral expenses, and the couple also wants to provide gifts or bequests for the children totaling $2 million as of 2025. The couple's taxable net worth is close to $3 million. The wife has a small IRA account, and the husband has a 401(k) account worth close to three-quarters of a million dollars. Each spouse elects to withdraw the smallest amount of funds permitted by law from these tax-favored accounts. The couple own a house with a market value of $1.2 million; annual property taxes, maintenance, and homeowner's insurance total $6,000, $13,000, and $1,000, respectively. They have 25 years remaining on a 30-year mortgage; their current mortage balance is

$525,000, and they pay $3,318 per month. The couple plans to sell its home in 2025 and thereafter rent a home for $4,000 per month.

Neither model prescribes life insurance for either spouse in this case, but recommendations for consumption and saving diverge considerably. According to our software, the household can spend $204,510 in 1999 (on items other than housing, taxes, life insurance premiums, and special expenditures), whereas QFP indicates that it should spend no more than $186,880. This discrepancy is mainly attributable to the treatment of taxes: ESPlanner's estimate of the couple's 1999 tax liabilities is $182,449, whereas QFP's estimate is $237,681. This 30 percent difference is apparently attributable to the deductibility of certain special expenditures which ESPlanner recognizes, while QFP does not. ESPlanner's estimate of the couple's tax liabilities actually exceeds QFP's by the time the husband reaches age 75, but then it falls below QFP's. Due in part to the presence of very large, short-term special expenditures on home remodeling not captured by QFP, ESPlanner recommends that the couple dissave $317,615 in 1999. In contrast, QFP recommends that the couple dissave only $138,380.

Implications

As these results demonstrate, it is extremely difficult to achieve consumption smoothing with traditional financial planning tools, even when one uses these tools in a relatively sophisticated way. Households that rely on these tools could easily experience significant, predictable, unintended, and avoidable changes in living standards over the course of their lives. We must also underscore the importance of accurate financial planning. Economic research indicates that people are able to change their financial decision making in response to information and guidance, particularly when provided through employers.[6]

How Much Should Americans Save as They Approach Retirement?[7]

Over the next two decades, a significant fraction of Americans belonging to the 75-million-member baby boom generation will reach retirement age. Impending retirement magnifies the importance of saving, particularly for those who are currently over age 50. Moreover, in planning for retirement, boomers must recognize the possibility that fiscal pressures may eventually force cuts in social security benefits. Short-term surpluses notwithstanding, the social security system is seriously underfunded. That is, benefits may have to be cut to ensure system solvency within baby boomers' lifetimes.

To understand how this may influence baby boomer needs for retirement saving, Bernheim et al. (2000) apply the ESPlanner model to a sample of individuals drawn from the Health and Retirement Study. Recommended

levels of saving are contrasted under two alternative policies. In the first, a "base case" scenario Congress avoids reductions in social security benefits. In the second, "fiscal distress" scenario, Congress is forced to reduce benefits by 30 percent in 2015.

The Health and Retirement Study (HRS) Sample

The 1992 wave of the Health and Retirement Study (HRS) collected information on a nationally representative sample of Americans age 51–61 and their spouses of any age. The survey contains a great deal of economic and demographic data, and additional information required by ESPlanner is imputed following Bernheim et al. (1999). The analysis is restricted to households satisfying the following criteria: (1) the head's age was between 51 and 61 in 1992; (2) information on social security earnings in past covered employment is available for both the head and the spouse (if any); and (3) the respondent answered all critical survey questions. We excluded an additional 141 because their economic resources were insufficient to cover their housing costs and other off-the-top expenditures. Our analysis consists of 1,714 married couples and 1,145 single individuals.

Recommended Saving Rates

Our median recommended saving patterns for HRS households appear in Table 8. The saving rate is defined as non-tax-favored saving divided by income; we note that this measure of saving excludes contributions to, or withdrawals from, retirement accounts. Our measure of income also excludes net contributions to tax-favored accounts. We sort heads into two age groups — 50–55 and 56–61 — and then further stratify the sample based on household income, marital status, race, and education. We present results for both social security policy scenarios. Our calculations assume a 6 percent nominal interest rate and a 3 percent inflation rate.

Consider first the base case policy scenario which involves no social security benefit cuts. If we focus for the moment on Panel A, for the 50 to 55 year-old age group, we note that the median recommended saving rate for those with incomes below $15,000 is very small — only one percent. For those with incomes over $100,000, the median recommended saving rate is fairly high, 17 percent. For middle income households, those with incomes between $15,000 and $45,000, and those with incomes between $45,000 and $100,000, the median recommended saving rates are 13 and 14 percent respectively. The strong positive relation between recommended saving rates and income is, in large part, attributable to the progressive structure of the social security benefit formula, which provides lower income individuals with significantly higher rates of earnings replacement. In the older subsample (ages 56–61), we find again that median recommended saving rates

TABLE 8. Median Recommended Non-Tax-Favored Saving Rates in the HRS (ratio of non tax-favored saving to income by income and demographic group)

	$0 to $15,000			*$15,000 to $45,000*			*$45,000 to $100,000*			*Over $100,000*		
	Full Benefits	*Benefit Cut*	*N*	*Full Benefits*	*Benefit Cut*	*s*	*Full Benefits*	*Benefit Cut*	*N*	*Full Benefits*	*Benefit Cut*	*N*
A. Age 50–55												
Total Sample	.01	.06	243	.13	.20	533	.14	.19	502	.17	.20	116
Married	.00	.10	37	.09	.17	272	.14	.19	429	.17	.20	111
Single	.01	.05	206	.17	.24	261	.20	.24	73	.28	.29	5
Non-White	.02	.06	126	.19	.25	169	.18	.22	61	.21	.23	17
Non-College	.01	.05	226	.13	.20	445	.16	.21	317	.18	.21	52
B. Age 56–61												
Total Sample	.00	.03	320	.17	.23	582	.20	.25	454	.23	.25	109
Married	−.11	.01	48	.14	.21	310	.20	.25	408	.23	.25	99
Single	.02	.03	272	.23	.28	272	.23	.26	46	.19	.20	10
Non-White	.01	.02	153	.23	.29	153	.24	.30	56	.06	.08	8
Non-College	.00	.03	303	.18	.24	474	.22	.27	290	.23	.26	50

Source: Bernheim et al. (2000) using HRS 1992 data.

increase sharply with income. With the exception of the lowest income group, these rates also rise steeply with age; they range from 17 percent for older households with incomes of $15,000–$45,000, to 23 percent for older households with incomes over $100,000.

To some extent, households can achieve these saving rate targets by reinvesting income earned from previously accumulated assets. It is therefore natural to wonder whether reinvested capital income is sufficient to reach the targets, or whether households must also put away significant fractions of take-home pay. To examine this issue, we calculate recommended rates of saving for non-asset income. Specifically, we adjusted the recommended saving rates by subtracting non-tax-favored capital income from both the numerator and the denominator of the ratio. For the lowest and second lowest income segments of both age groups, median recommended saving rates are essentially unchanged. For households with incomes from $45,000–$100,000, the adjustment reduces the median recommended saving rate among younger households from 13 percent to 12 percent, and leaves the median recommended saving rate among older households unchanged at 17 percent. Hence, our model indicates that most older households do need to save significant fractions of non-asset income.

Rcommended saving rates tend to be higher for single individuals, nonwhites, and those without college education. For example, among nonwhite households aged 56–61 with incomes of $15,000–$45,000, the median recommended saving rate is 23 percent. This is six percentage points higher than the corresponding rate for whites and nonwhites combined. Likewise, in the same age and income group, the median recommended saving rate is 23 for single households, compared with 14 percent for married couples. Though these systematic differences are important, we note that they also mask considerable variation within groups.

The impact of potential social security benefit cuts. We have also completed recommended saving rates for the second "fiscal distress" policy scenario, in which social security benefits are cut by 30 percent as of 2015. The results in Table 8 differ dramatically from those of the base case scenario. Consider, for example, married households in the lowest income category. The median recommended rate of saving rises by 10 percentage points for the younger age group, and by 12 points for the older group. In the second lowest income group, recommended saving rates rise by eight and seven percentage points, respectively, for the younger and older age groups. Among high income households, the increases are smaller but still important. Recommended rates of saving out of non-asset income also rise sharply; for the middle income groups, these rates range from 16 to 22 percent.

Alternative assumptions: lifespan, market performance, retirement, and nursing home care. Table 9 explores the sensitivity of results to several alternative assumptions.[8] First, we recalculate recommended saving rates assuming a maximum lifespan (for both the respondent and the spouse) of 100, rather

TABLE 9. Median Recommended Non-Tax-Favored Saving Rates with Alternative Assumptions (Ration of Non-Tax-Favored Saving to Income by Income and Demographic Group)

	Annual Income			
	$0–$15,000	*$15,000–$45,000*	*$45,000–$100,000*	*Over $100,000*
Married Age 50–55				
Base Case	.00	.09	.14	.17
Fiscal Distress	.10	.17	.19	.20
Max. Age = 100	.01	.10	.15	.19
Assets Drop 30%	.01	.10	.15	.20
Ret. 2 Yrs Early	−.01	.14	.17	.19
Nursing Home	.20	.18	.18	.20
All of the Above	.39	.32	.29	.29
Married Age 56–61				
Base Case	−.11	.14	.20	.23
Fiscal Distress	.01	.21	.25	.25
Max. Age = 100	−.09	.16	.21	.24
Assets Drop 30%	−.09	.14	.22	.24
Ret. 2 Yrs Early	−.12	.15	.19	.23
Nursing Home	.19	.25	.25	.25
All of the above	.31	.35	.32	.32
Single Age 50–55				
Base Case	.01	.17	.20	.28
Fiscal Distress	.05	.24	.24	.29
Max. Age = 100	.03	.18	.21	.30
Assets Drop 30%	.01	.19	.21	.32
Ret. 2 Yrs Early	.03	.23	.24	.31
Nursing Home	.19	.23	.23	.29
All of the Above	.31	.36	.32	.39
Single Age 56–61				
Base Case	.02	.23	.23	.19
Fiscal Distress	.03	.28	.26	.20
Max. Age = 100	.07	.24	.24	.21
Assets Drop 30%	.02	.24	.27	.31
Ret. 2 Yrs Early	.00	.23	.23	.22
Nursing Home	.32	.29	.26	.20
All of the Above	.33	.37	.33	.39

Source: Authors' calculations based on HRS (1992).

than 95. Second, we assume that there is an immediate 30 percent decline in the market value of stocks and other financial assets, after which these assets earn the same return as in our base case. Third, for each household, we accelerate retirement by two years. Fourth, we assume that respondents and spouses must each accumulate a reserve fund sufficient to defray the costs of nursing home care at $15,000 per year for five years (in current dollars). We recognize that the cost of nursing home care may exceed $15,000 per year; however, other spending presumably declines when an individual is institutionalized, so the $15,000 figure is intended to represent the net increment to total expenditures. Finally, we consider the combined effects of all of these assumptions, along with the fiscal distress scenario examined previously.[9] For purposes of comparison, Table 9 also summarizes findings for the base case and fiscal distress scenarios, where the latter requires a social security benefit cut.

The evidence reveals that the fourth assumption, saving for nursing home care, has the largest impact on recommended saving rates. It is particularly important for those with the lowest levels of income, raising recommended median saving rates by 18 to 30 percentage points. These figures may be somewhat exaggerated, in that low income families are more inclined to rely on Medicaid, even though this tends to reduce the quality of care received. Nevertheless, our results suggest more generally that low income families may need to save at high rates if they wish to establish nontrivial emergency funds. Increasing the maximum lifespan from 95 to 100 years has a more modest effect on median recommended saving rates, which generally rise by 1 to 2 percentage points, with the exception of older, low income, single individuals, for whom the increase is 5 percentage points. A 30 percent decline in asset values also has a relatively small effect on recommended savings rates, except among high-income households. Finally, accelerating retirement by two years has a sizable impact on recommendations for particular subgroups. For example, the median recommended saving rate rises by five percentage points for married couples between the ages of 50 and 55, with incomes between $15,000 and $45,000. In some groups, recommended saving stays constant or declines. This occurs because the acceleration of retirement renders some households unable to cover housing expenses and other off-the-top commitments.

When we consider the combined effects of all four assumptions, along with the benefit cut scenario, recommended median saving rates rise dramatically for all subgroups, from 30 to 40 percent. For example, among the lowest income married couples, the median recommended saving rate increases from zero to 39 percent. Moreover, the numbr of households with infeasible planning problems (that is, those who can no longer cover off-the-top expenditures) rises from 141 to 346. This statistic sheds additional light on the degree of undersaving and financial vulnerability among HRS households.

Comparisons with Prior Studies

Previous studies have explored the adequacy of saving patterns using different data and/or alternative methodologies.[10]

Kotlikoff et al. (1983) compare the level of consumption that a household could have sustained over its entire lifetime given its total resources, with the level of consumption that it can sustain over its remaining lifetime given its remaining resources. Absent Social Security, they conclude that a significant fraction of the elderly will suffer a decline in living standard during old age. Actual asset profiles among baby boomers are compared with recommended asset profiles generated by a stylized life cycle model by Bernheim (1994), and there typical baby boomers are found to be saving only one-third of what is required to maintain living standards. Bernheim and Scholz (1993) compare changes in wealth and asset profiles with the predictions of a life cycle model, and they find evidence of inadequate saving among individuals without college education. Warshawsky and Ameriks (2000) use Quicken Financial Planner to assess saving adequacy, concluding that more than half of the households examined would run out of money prematurely if they tried to maintain the living standards that they enjoyed in 1992.

A paper closely related to the resent analysis Moore and Mitchell (2000), which calculates saving needed to maintain preretirement living standards for a sample of HRS households. Their methodology differs from ours in that they assume that people treat housing as a fungible store of wealth, whereas we assume that older individuals retain their homes until death. The available evidence is sparse but favors the latter assumption: thus Venti and Wise (this volume) conclude that "very little reduction in home equity . . . can be construed as converting home equity to liquid assets for purposes of supporting non-housing consumption." Likewise, Caplin (this volume) finds that few individuals use reverse mortgages to convert housing equity into income streams for the purpose of supporting consumption expenditure. Despite this difference (and others), Moore and Mitchell's principal finding—that the median HRS household needs to save 16 percent more of its income to preserve its living standard—is consistent with our results.

Conclusions and Discussion

Traditional financial planning models are based on targeted saving. This approach requires a household to choose future spending or income levels, and then to save to meet associated targets. Since setting an appropriate target is a highly complex problem, households are often encouraged to rely on rough rules of thumb, even though this may not produce a smooth and sustainable living standard. Our alternative method of financial planning is rooted in economic theory and does not require households to

undertake complex aspects of planning by themselves. Instead, our software derives a saving target for each household by determining its highest sustainable living standard, as well as the levels of saving and life insurance needed to preserve that living standard.

It is interesting that this economic approach to financial planning, embodied in our ESPlanner package, generates different recommendations from the traditional approach (typified by Quicken Financial Planner). Although the differences in saving recommendations are large, they are not systematically high or low. For some households, the traditional model recommends far too little saving compared with our model; for others, it recommends far too much. Differences in life insurance recommendations are also typically large, but they tend to be more systematic, with the traditional approach generally overstating life insurance requirements. Applying our model to a sample of several thousand households, we find that most older Americans approaching retirement need to save at quite high rates—rates that are much higher than those commonly observed. Our conclusion is strengthened once we account for potential cuts in social security benefits, gains in longevity, stock market declines, and the costs of nursing home care.

Notes

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1. The developers of the ESPlanner software package are Douglas Bernheim, Jagadeesh Gokhale, Laurence Kotlikoff, and Lowell Williams and the product is available through Economic Security Planning, Inc. at MIT Press. For additional information see ⟨www.esplanner.com⟩. This paper draws on and extends Gokhale et al. (1999) and Bernheim et al. (2000).

2. To speed data entry, users may elect a default that sets the contingent earnings path equal to the joint-survivor path. Users may specify future income in either present-year (real) dollars, or future-year (nominal) dollars.

3. To speed data entry, users may elect a default that sets the contingent expenditures and receipts equal to the joint-survivor values. Users may specify future expenditures and receipts in either present-year (real) dollars, or future-year (nominal) dollars.

4. Negative life insurance is formally identical to the purchase of an inverted life annuity, that is, the receipt of annual payments for life purchased by the estate of the deceased in a predetermined lump sum amount.

5. ESPlanner produces several main reports including current recommendations, annual recommendations, non-tax-favored balance sheet, income, spending, non-asset income (for each spouse), housing, taxes, tax-favored balance sheets (for each spouse), estate reports (for each spouse and for couples if both spouses die in the same year), social security benefit reports (for the household and for each spouse). ESPlanner's survivor reports are essentially the same as the main reports.

6. See Bernheim and Garrett (1999); Bayer, Bernheim, and Scholz (1996); Bernheim (1998); and Clark and Schieber (1998).

7. This section draws and extends on Bernheim et al. (2000).

8. Qualitatively similar conclusions follow for plausible alternative values of the key economic parameters. For example, with an 8 percent nominal (5 percent real) rate of return, the median recommended saving rates for 50–55-year-olds are respectively 1, 11, 11, and 10 percent for the first through fourth income categories. The corresponding figures from Table 8 are 1, 13, 14, and 17 percent. For 56–61-year-olds, median recommended saving rates with the higher rate of return are respectively 1, 16, 17, and 20 percent for the first through fourth income categories. The comparable figures from Table 8 are 0, 17, 20, and 23 percent. Thus, recommended saving rates are lower with the higher interest rate. However, recommendations are still highly sensitive to assumptions about social security benefits. For our second policy scenario, median recommended saving rates among 56–61-year-olds are respectively 4, 17, 16, and 12 percent for the first through fourth income categories, assuming a nominal return of 8 percent. Among 50 to 55 year olds, the comparable figures are 3, 21, 21, and 22 percent. Each of these rates is significantly higher than the corresponding figure for the base case policy scenario.

9. Another important possibility is that tax rates may rise in the future, particularly if the social security system runs into fiscal problems. This consideration would magnify the need for saving, thereby reinforcing our conclusions.

10. Some research disputes the view that U.S. households tend to save too little. For instance, Manchester (1994) concluded that members of the baby boom generation accumulated wealth more rapidly than did their parents, while Hubbard et al. (1994) argue that low saving may be optimal for many low income households, in that saving may adversely affect eligibility for Medicaid and other income-support programs. Engen et al. (1999) point out that apparent instances of low saving sometimes result from transitory periods of low income. They also claim that the age trajectory of median net worth matches or exceeds the predictions of a stylized life cycle model.

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