BY LAURENCE J. KOTLIKOFF

Admit it or not, most of us are no more rational about money than teenage bulimics are about Butterfingers. We save too little, underinsure, invest on hot tips, fail to diversify, max out credit cards – and end up barely surviving on Social Security. Or we do the opposite, pinching every penny and taking no risks – only to wind up in a nursing home with a fat nest egg and no way to enjoy it.

In both cases, we fail to do one key thing: make intelligent decisions about how much to spend and when. Indeed, fully two-thirds of Americans never formulate financial plans, and of the third that do, 40 percent fail to stick to them.

Fear and loathing of money matters largely explain why we stick our heads in the sand. But another reason is that long-term financial planning is an inherently complex undertaking. Indeed, most of us can't even clearly articulate a financial goal, let alone plan for it.

But economists have a pretty good idea of what people have in the backs of their minds. Both theory and common sense tell us that when it comes to consumption, people want a smooth ride. They want to preserve their living standards as they age, and they want to make sure their families enjoy the same living standard if they die prematurely.

Economists derive this preference for consumption-smoothing from the law of diminishing returns – the notion that the extra pleasure received from consumption declines the more we've already consumed. Six-year-olds get this straight. Put them in front of a pile of cupcakes and they'll inhale the first, gulp down the second, struggle through a third and then suggest saving the rest for tomorrow. In econ-speak, the kids' "marginal utility" from eating the first cupcake is very high. But thereafter, it is all downhill.

By opting to save cupcakes, the kids realize that they'll be better off eating the fourth cupcake tomorrow rather than today. Or, as an economist would put it, waiting to consume raises the kids' *lifetime* utility.

Saving for retirement or for a rainy day is, of course, analogous to hoarding cupcakes. It's simply (or not so simply) a matter of squirreling away purchasing power for a time you really need and want to consume. Buying insurance and diversifying one's investments are also part and parcel of consumption-smoothing.

CONSUMPTION-SMOOTHING IN PRACTICE

That said, getting from here to there is no walk in the park. There are many factors to consider, including household demographics, expected earnings and retirement benefits,

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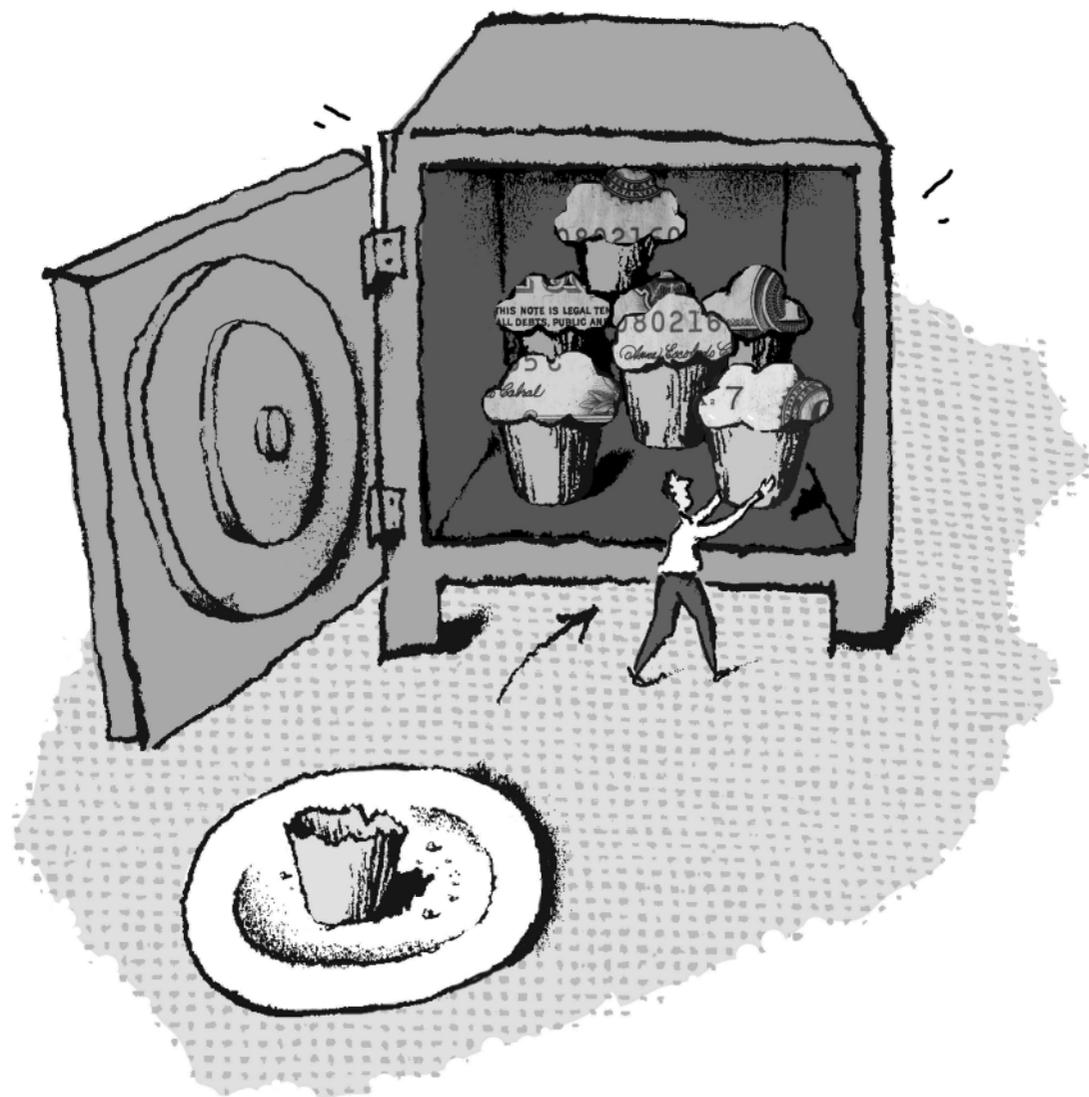
and interest rates. And each of these variables demands consideration under each and every survival contingency (for instance, the possibility a husband will die at 43 while his wife remains alive to 87).

Taxation alone is a factor worthy of a supercomputer. Figuring out federal and state taxes when both spouses are alive and in each future survivor state requires determining whether they will itemize deductions, whether they receive any of many potentially available tax credits, whether they will have to pay the alternative minimum tax, whether they will pay taxes on Social Security benefits, whether they will be contributing to retirement accounts or withdrawing from them, and whether they will be in high or low tax brackets.

As if this list weren't bad enough, getting a fix on future taxes involves the solution of a nasty mathematics problem. You can't figure out future taxes until you determine current spending (which determines, in part, future taxable income from savings). But you can't

figure out current spending without knowing future taxes (which determines, in part, what will be available to spend).

Computing Social Security benefits is another nightmare. With 2,528 separate rules in the official Social Security Handbook (www.ssa.gov/OP_Home/handbook/ssa-hbk.htm), figuring out what retirement, dependent, survivor, divorcee, mother, father and child benefits one will get can be maddening.

There are still a handful of old-timers knocking about Social Security's Office of the Actuary who know the details – but when they go, this information may literally disappear. You might think that the computer code generating the hundreds of billions of dollars worth of Social Security's benefit payments each year would provide an easy way to recover this historical knowledge. But this code, I've been told, is documented and written in an ancient computer language that no one left at the Social Security Administration really understands.

Another major challenge in consumption-smoothing is properly differentiating a household's consumption spending from its underlying living standard. For a variety of reasons, consumption-smoothing doesn't imply spending exactly the same amount each year. First, when kids are still at home, there are more mouths to feed. So maintaining consumption per "equivalent adult" during those years means larger grocery bills, more frequent trips to the mall and lots more ski-lift tickets.

Second, you may prefer to have a higher or lower living standard later in life than in the present – perhaps because you no longer value two weeks at the beach to chill out when you are no longer working 50 hours a week in a stressful job. Consumption-smoothing in this context means having your consumption expenditures – and thus your living standard – rise or fall at the right time and by the right amount.

Third, spending the amount needed to smooth consumption may not be feasible if it

requires borrowing against future income. Borrowing constraints complicate financial planning – the goal is no longer just smoothing your consumption, but doing so to the maximum extent possible without going into debt. Indeed, properly dealing with borrowing constraints is particularly challenging. It requires use of a mathematical technique known as dynamic programming.

In sum, doing financial planning properly is closer to rocket science than one might assume. Those who really think about what's involved quickly reach the conclusion that they need professional help and turn to financial planners and investment companies for advice. Unfortunately, doing so is generally a mistake.

TRADITIONAL FINANCIAL PLANNING

One might think that conventional financial planning would, one way or another, calculate sustainable consumption levels and offer advice tailored to those goals. But that's not what it does. Instead, planners ask clients to set their own retirement and survivor spending targets, and then determine the savings rate and insurance needed to meet these targets. The objective in this targeting advice appears to be to achieve the same living standard before and after retirement. The problem, however, in using current spending as the basis for targeting is that it may be higher or lower than the sustainable level – that is, current spending may provide the wrong consumption-smoothing target. And even modest mistakes can lead to major disruptions in living standards when we retire or are widowed.

There are three reasons that the consequences of spending errors tend to cascade. First, the wrong targeted spending level is assigned to each and every year of retirement and widowhood. Second, planning to spend too much (little) in retirement and widowhood requires spending too little (much) before those states are reached. This magnifies the living standard differences. Third, saving and insuring the wrong amounts affect tax

and insurance premium payments, further exacerbating consumption disruption.

Note, too, that standard planning assumes households will spend precisely their targeted amounts year after year, regardless of the returns they receive, unless and until they run out of money. This focuses attention on the

monthly payments of $1,250, along with associated tax, insurance and maintenance expenses. The couple plan to spend $25,000 annually in today's dollars on college tuition and other expenses for each child for four years. Each spouse will retire at age 65 and begin collecting Social Security benefits in that year.

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probability that the plan will work, rather than on the spending consequences if it doesn't. Since riskier investing can raise the probability of a plan's "success," households may be encouraged to take more risk than is appropriate. They may also get the idea that adjusting the riskiness of their investment portfolios, rather than their lifestyle, is the prudent response to disappointing investment returns.

ILLUSTRATING CONSUMPTION DISRUPTION

To appreciate the extent to which traditional financial planning can lead to consumption disruption rather than consumption-smoothing, consider an example of a California household with two children. Each spouse is age 40 in 2006, with one 10-year-old and one 7-year-old. The husband earns $75,000 per year and the wife $50,000. For simplicity, assume that neither spouse has a retirement account, but the couple does have $75,000 in securities. The pair also own a $300,000 home with 20 years remaining on their mortgage. The $125,000 mortgage principal means

The consumption-smoothing solution for this couple entails spending $71,852 annually (in today's dollars) while both kids are still at home, $61,455 after the first child leaves and $50,139 after both children have flown the coop. The underlying living standard per adult is $31,337 annually. To ensure this living standard for survivors, the husband needs $484,947 in life insurance and the wife needs $128,554, with smaller amounts of insurance required as the children grow older.

Now suppose that our stylized household is currently spending 10 percent too much – namely, $79,037. Further suppose that this household uses its current consumption to set its retirement and survivor spending levels, but in setting these targets it appropriately adjusts for changes in the household demographic factors. In this case, the household will specify a retirement consumption target that is 10 percent greater than $50,139, or $55,153. It will also specify survivor spending targets that are 10 percent higher than those generated in this consumption-smoothing computer simulation.

If the household's target is indeed 10 per-

cent too high, it will strive to over-save and experience a $26,289 living standard (per adult) before retirement and a $34,439 living standard (per adult) after retirement. The ratio of the latter to the former amount is 1.31, indicating that the targeting mistake causes a 31 percent increase in living standard at retirement, implying that the plan sacrificed far too much in pre-retirement consumption to get there.

If mistakes of plus or minus 10 percent occur with equal likelihood, the spread in pre-retirement living standards for two otherwise identical households could easily be 49 percent – the difference in the $26,289 and $39,109 pre-retirement living standards of households that set their spending targets 10 percent too high and 10 percent too low, respectively. The corresponding post-retirement spread in living standards is 22 percent.

The over- and under-saving households will also accumulate very different levels of assets and make very different tax payments. At retirement, for example, the household that's induced to over-save will have $488,412 in assets and pay $7,078 in taxes, while the under-saving household will have only $144,405 and pay $2,640 in taxes. In the current year, the over-saving household will be told to save $11,955, or almost 10 percent of current earnings. The under-saving household will be told to spend $810 more than it earns.

TARGETING ADVICE FROM TIAA-CREF, VANGUARD AND FIDELITY

So far we've seen that even a 10 percent targeting mistake can lead to a major consumption disruption for our stylized household. So what kind of targeting advice would this household receive from the Web sites of major financial institutions?

The answer is worse advice – indeed, much worse advice if the goal is consumption-smoothing.

The Retirement Goal Evaluator created by TIAA-CREF, the giant pension association for non-profit institutions, is available to the general public. It recommends a retirement "salary replacement" target equal to 80 percent of annual labor earnings. For our stylized household, this equals $100,000. After adjusting for taxes and housing expenses, the target becomes $89,263. This is 78 percent higher than the appropriate consumption-smoothing household target of $50,139.

Vanguard, the widely respected mutual fund company, offers Financial Engines, developed by William Sharpe, a Nobel laureate in economics, to clients with more than $100,000 in invested assets. But anyone can pay $149.95 per year to use it. Financial Engines recommends estimating pretax retirement income needs by multiplying pre-retirement income by 0.7. For our stylized household, 70 percent of pre-retirement labor income of $125,000 is $87,500. After adjustments, the target is $76,763, which is 53 percent higher than the consumption-smoothing figure of $50,139.

The Retirement Quick Check calculator provided by Fidelity Investment, America's largest mutual fund company, is available only to Fidelity clients. It takes 59.5 percent of annual labor earnings as the household's expenditure target, exclusive of taxes. For the household considered here, this equals $74,375, which, after adjusting for taxes and housing expenses, leads to a $68,375 target for discretionary spending. Compared with the accurate $50,139 smoothing target, this is 36 percent too high. Using a target that's 36 percent too high leads to a more than a 75 percent living standard disruption at retirement, and recommended saving that is more than 13 times too high.

TIAA-CREF'S AND FIDELITY'S LIFE INSURANCE ADVICE

TIAA-CREF provides two life insurance calculators on its Web site. One is called the Simple Life Insurance Needs Calculator and the other, the Detailed Life Insurance Needs Calculator. The simple calculator is, indeed, simple, containing only five questions, while the detailed calculator has 20 questions.

The key question posed by both calculators is the amount of earnings of the potential decedent to be replaced and the number of years over which these earnings are to be replaced. The targeting advice in the simple calculator suggests an 80 percent income replacement ratio, which leads to recommended current-year life insurance holdings for our sample husband and wife of $1.825 million and $1.325 million, respectively. These values are 3.8 times and 10.3 times the respective amounts needed for consumption-smoothing – namely $484,947 and $128,554.

TIAA-CREF's detailed calculator's extra questions include the ages of the husband and wife, the ages of the children, the expected rate of inflation and the expected rate of return on investments. This calculator recommends $1.054 million in life insurance for the husband and $777,790 for the wife. These recommendations are 2.2 and 6 times the consumption-smoothing values, respectively.

In the consumption-smoothing case, the couple spends $983 in 2005 on life insurance premiums. If the couple were to follow TIAA-CREF's detailed calculator's recommendations, they would pay close to $3,000 in premiums – 2.3 percent of their combined 2005 earnings. If the couple followed the simple calculator's advice, they would end up spending more than $5,000, or 4 percent of their salaries. This is a lot to spend on something the couple doesn't need.

The fact that TIAA-CREF provides two calculators is, in itself, noteworthy. There aren't really two answers to the question of how much life insurance a household needs to sustain living standards in the long run. So if TIAA-CREF believes that $1.825 million is the right life insurance holding for the husband in our stylized household, why does it offer its detailed calculator, which can lead the husband to drastically underinsure by purchasing only $1.054 million in life insurance? Alternatively, if TIAA-CREF believes that $1.054 million is the right coverage, why does it provide the simple calculator, which can lead the husband to drastically overinsure?

Another striking feature of TIAA-CREF's calculators is that both are focused on setting retirement spending relative to the decedent spouse's earnings. Neither calculator asks about the surviving spouse's earnings. Nor do they account for Social Security survivor benefits, private pensions or retirement accounts. If the goal is to preserve the living standard of survivors, these figures are essential. Suppose, for example, that the wife made $1 million per year, rather than $50,000. In this case, the husband would have no need to buy life insurance to protect the wife. On the contrary, since the husband is basically living off the wife's earnings, his death would raise, not lower, his survivors' living standard and represent for them a fortuitous event in purely economic terms.

Fidelity's 10-question life insurance calculator does ask about the surviving spouse's earnings. But it ignores the decedent's earnings, thereby abandoning any possibility of determining directly the household's sustainable living standard and appropriate survivor-spending target. Instead of asking how much of the potential decedent's earnings are to be replaced, Fidelity's calculator prompts users to enter 70 percent of current spending

as the insurance target. Based on the consumption-smoothing level of recommended current spending, Fidelity's calculator recommends $250,000 in life insurance for both our husband and wife. For the husband, $250,000 is far below the $484,947 needed under consumption-smoothing analysis. For the wife, $250,000 is far above the $128,554 needed.

CONVENTIONAL PORTFOLIO ADVICE

Conventional planning's use of somewhat arbitrary spending targets also distorts its portfolio advice. Given the household's retirement spending target and portfolio mix, conventional planning runs so-called Monte Carlo simulations, which determine the household's probability of running out of money if investments turn sour or if survivors live longer than actuarial tables predict. These simulations assume that households make no adjustment whatsoever to their spending as a result of doing especially well or badly on their investments.

But consumption-smoothing dictates such adjustments and, indeed, precludes running out of money – that is, ending up with literally zero consumption. It is precisely the range of these potential living standard adjustments that households need to understand to assess their portfolio risk. Conventional portfolio analysis not only answers the wrong question; it may also improperly induce excessive risk-taking since, paradoxically, riskier investments may lead to a

lower probability of financial exhaustion.

To see this point in its starkest form, consider a single 60-year old named Joe, whose only economic resource is $500,000 in assets. Assume that Joe can't possibly live past 95 and that he faces no taxes of any kind. Suppose Joe sets his spending target at $30,000 per year. Also assume that Joe holds only Treasury inflation-protected securities (TIPS) – government bonds that always yield 2 percent after inflation. These bonds are essentially riskless and permit Joe to consume $20,413 in today's

Using a target that's 36 percent too high leads to a more than 75 percent living standard disruption at retirement, and recommended saving that is more than 13 times too high!
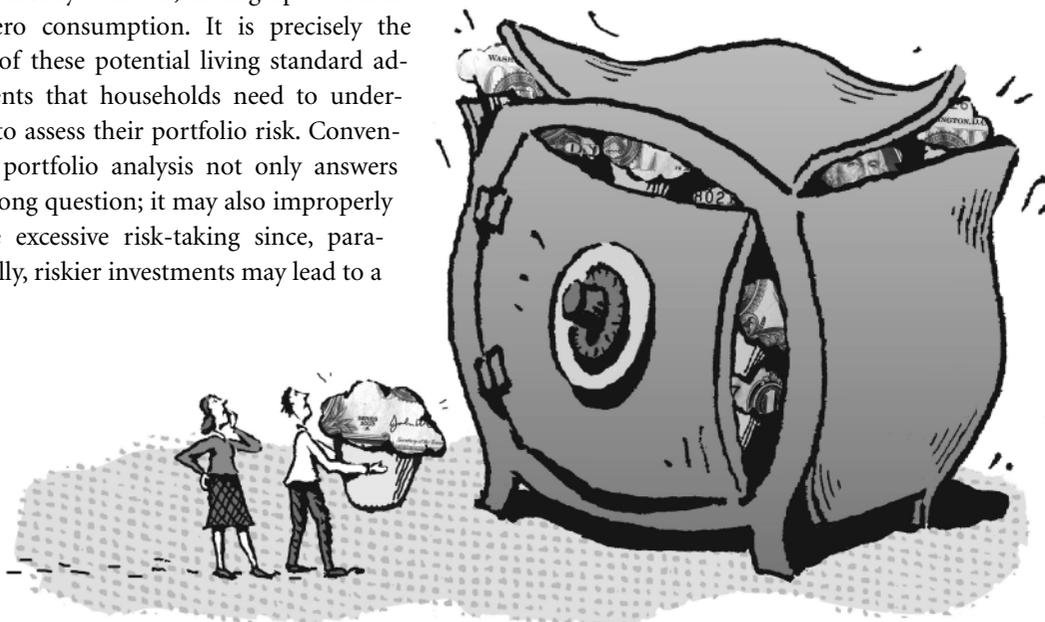
dollars each year (assuming the bonds can't be liquidated). What's Joe's probability of meeting his target – $30,000 – each year? It's zero, of course, since spending $30,000 will drive Joe broke unless he is fortunate enough to die beforehand.

Now suppose that Joe were to invest in large-capitalization stocks rather than in TIPS. Since 1926, the real return on large-caps has averaged 9.16 percent annually. Were Joe able to earn this return for sure, he'd be able to spend $48,264 per year. But large-cap stocks are risky. Nonetheless, there's still a good chance – indeed a 33 percent chance, if future average returns and the variability of returns tracks past performance – that Joe will be able to spend $30,000 per year. So if Joe uses a standard Monte Carlo portfolio analyzer, he'll find that investing in TIPS fails completely to meet his goal, but that investing in stocks will meet his goal part of the time. Joe may view this as a pretty good bet, given the way this investment outcome information is being presented.

Suppose, then, that Joe invests all his assets in large-caps and experiences the real returns recorded in 1999, 2000 and 2001 in large cap stocks – namely minus 12.1 percent, minus 13.2 percent and minus 23.9 percent. Will Joe continue to spend $30,000 per year and remain in the stock market, given that his wealth after three years has dropped from $500,000 to $217,600? Probably not.

At that the end of three years, he may well switch his holdings to just inflation-protected bonds and be forced to live on only $9,469 per year. In failing to show such large and
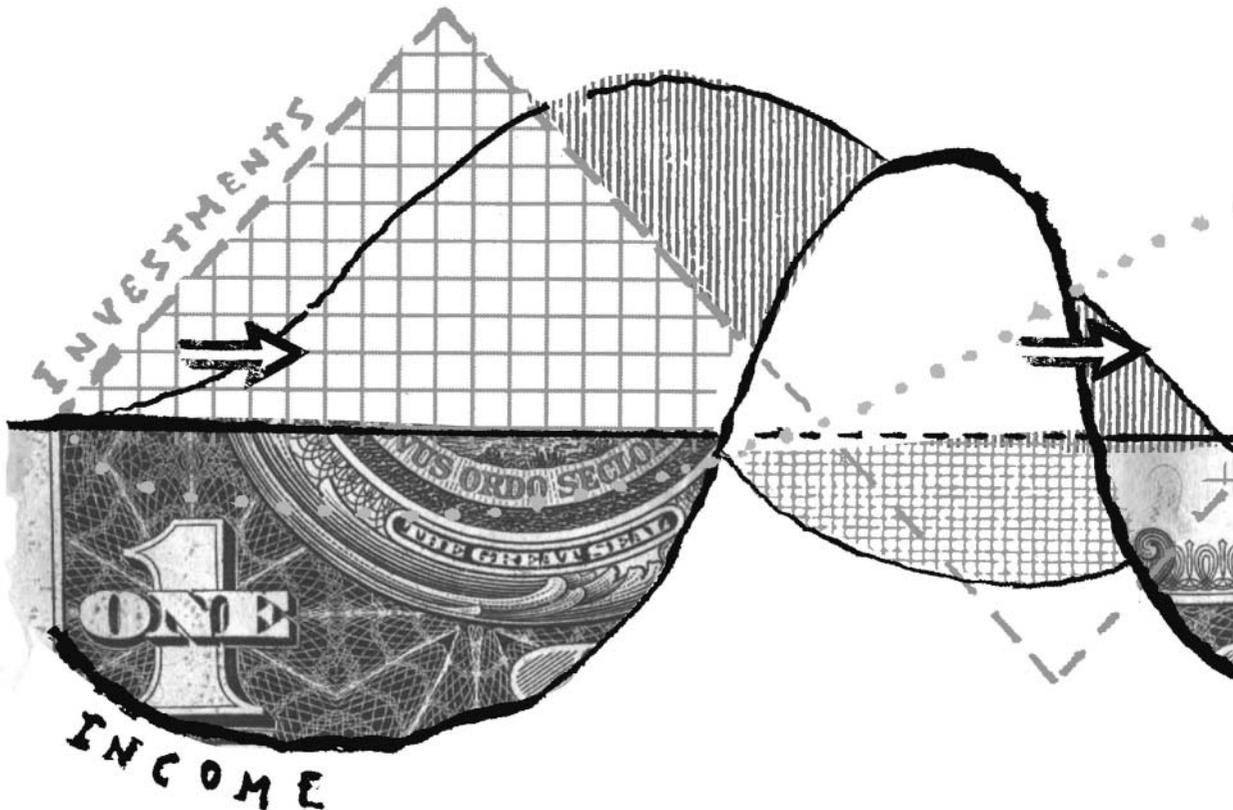
sudden living standard adjustments, conventional planning seems to encourage more risk-taking than is appropriate. This concern is heightened by the prospect that many households may be induced, as part of the same planning exercise, to set their future spending targets at higher levels than is appropriate for their circumstances.

THE CONSUMPTION-SMOOTHING APPROACH TO PORTFOLIO ADVICE

The consumption-smoothing approach to portfolio choice doesn't focus on the chance of running out of money based on a fixed spending target. People with common sense and the ability to safeguard their resources by, for example, buying TIPS, would never arrange to starve. Instead, an economically realistic approach focuses on the range of living standard adjustments that might arise under alternative portfolio allocations. These adjustments are made continuously in consideration of what assets one now has and all the possible returns that may be received in the future. In response to poor performance, households more averse to risk will lower their spending and invest more in safer assets like TIPS than will households prepared to bear risk. To properly choose among portfolios, households need to see how particular portfolio allocations will affect variations in living standards at each point in time.

IS THERE AN ECONOMIST IN THE HOUSE?

The above calculation of the saving and insurance implications of small targeting mistakes uses ESPlanner, a financial planning
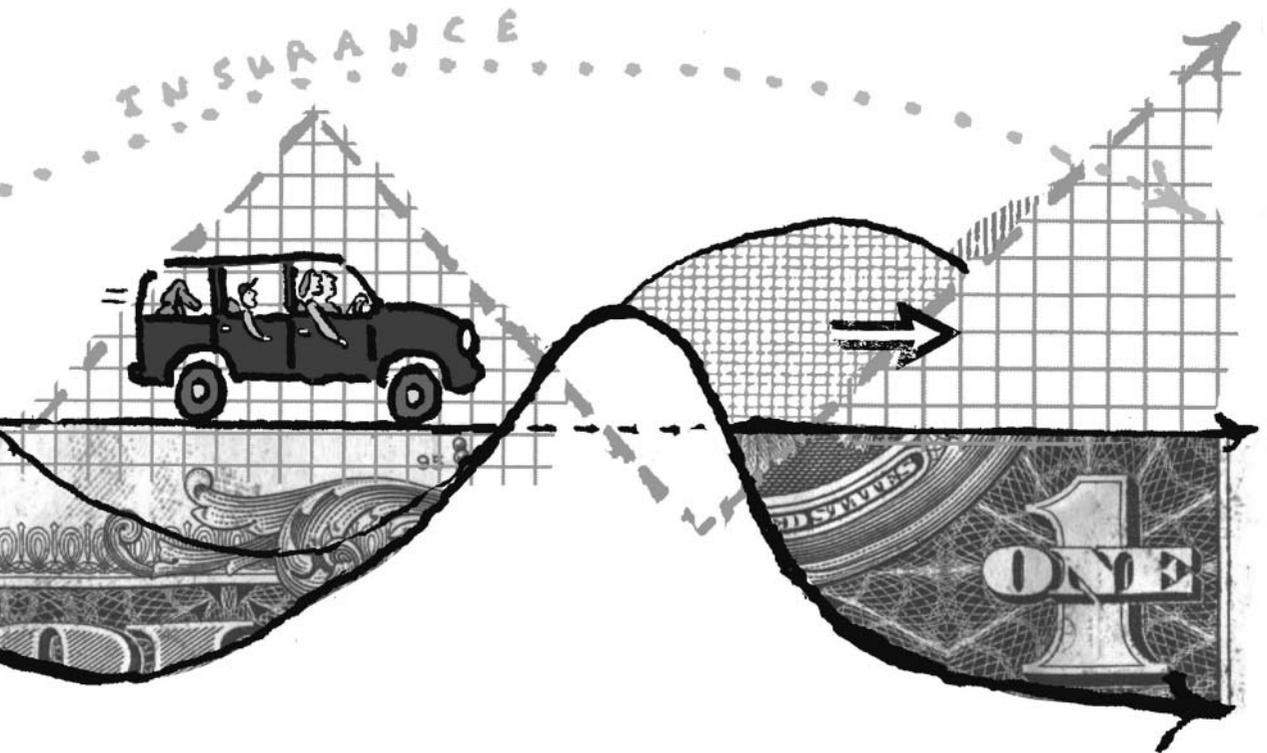
software tool that I developed with Jagadeesh Gokhale (an economist at the Cato Institute) and sell at www.esplanner.com. Unlike conventional software, ESPlanner uses dynamic programming to smooth households' living standards subject to borrowing constraints and makes careful tax and Social Security benefit calculations.

As part of these calculations, the program determines the annual levels of saving and life insurance holdings needed to preserve the household's living standard through time and across survival states. ESPlanner also uses dynamic programming to show how different time-dated investment strategies affect the variability of a household's living standard each year.

Since there is a unique solution to the consumption-smoothing problems considered here, ESPlanner should be viewed as simply a tool to find that solution. Stated differently, there is nothing subjective about the method: if one were to construct another consumption-smoothing algorithm that could handle all the inputs considered by ESPlanner, that alternative would find the same solution.

How can one check that ESPlanner is actually smoothing consumption? The answer is by looking at its reports.

If the household is not limited in its capacity to borrow in lean years, ESPlanner's recommendations will show the same living standard per equivalent adult in each year that either the household head or spouse/partner is alive – and, if recommended life insurance for decedents is positive, in each survivor state. The reports also show that no resources are being left on the table – that is, the household dies broke if the head, spouse/partner or both make(s) it to what amounts to the oldest possible age.

Finally, the reports show that all user inputs (for instance, housing expenses) are being considered by the program. Indeed, the only output in ESPlanner's reports that do not directly reflect user inputs is the calculations of taxes and Social Security benefits.

Although ESPlanner is the only consumption-smoothing financial planning program that is commercially available at the current time, others will surely be developed. Indeed, the program shows that economists can play a role in prescribing appropriate financial choices as well as describing financial behavior.

CONCLUSION

Purveyors of financial advice have an ethical as well as a legal responsibility to ensure that their advice is sound.

Unfortunately, the prevailing view seems to be that any relatively conservative advice is better than no advice. I would argue that protecting family finances is very serious business that requires careful analysis and a real commitment of time. It also requires planners to pose the right question – namely, how to preserve the family's living standard through time and in unforeseen, but not unforeseeable, circumstances.

Conventional planning attempts to achieve consumption-smoothing by having households set targets based on their current spending or income, a practice that is virtually guaranteed to provide highly misleading saving, insurance and investment advice, and to exacerbate consumption disruption rather than smooth consumption. None of us would go to a doctor for a 60-second checkup. Nor would we elect surgery by meat cleaver over surgery with a scalpel. Long-term financial planning, like surgery, must be extraordinarily precise if it is to be useful. Small mistakes and use of the wrong tools can cause, and, no doubt, are causing major and irreversible financial damage. ⊠