Anomalies
Saving, Fungibility, and Mental Accounts

Richard H. Thaler

Economics can be distinguished from other social sciences by the belief that most (all?) behavior can be explained by assuming that agents have stable, well-defined preferences and make rational choices consistent with those preferences in markets that (eventually) clear. An empirical result qualifies as an anomaly if it is difficult to "rationalize," or if implausible assumptions are necessary to explain it within the paradigm. This column will present a series of such anomalies. Readers are invited to suggest topics for future columns by sending a note with some references to (or better yet copies of) the relevant research. Comments on anomalies printed here are also welcome. The address is: Richard Thaler, c/o Journal of Economic Perspectives, Johnson Graduate School of Management, Malott Hall, Cornell University, Ithaca, NY 14853.

Introduction

Last New Year’s day, after a long evening of rooting the right team to victory in the Orange Bowl, I was lucky enough to win $300 in a college football betting pool. I then turned to the important matter of splurging the proceeds wisely. Would a case of champagne be better than dinner and a play in New York? At this point my son Greg came in and congratulated me. He said, “Gee Dad, you should be pretty happy. With that win you can increase your lifetime consumption by $20 a year!” Greg, it seems, had studied the life-cycle theory of savings.

The essence of the life-cycle theory is this: in any year, compute the present value of your wealth, including current income, net assets, and future income; figure out the

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level annuity you could purchase with that money; then consume the amount you would receive if you in fact owned such an annuity. The theory is simple, elegant, and rational—qualities valued by economists. Unfortunately, as Courant, Gramlich, and Laitner observe (1986, p. 279–80), “for all its elegance and rationality, the life-cycle model has not tested out very well.”

The anomalous empirical evidence on consumption falls into roughly two categories. First, consumption appears to be excessively sensitive to income. Over the life-cycle, the young and the old appear to consume too little, and the middle-aged consume too much. Also, year-to-year consumption rates are too highly correlated with income to be consistent with the model. Second, various forms of wealth do not appear to be as close substitutes as the theory would suggest. In particular, households appear to have very low marginal propensities to consume either pension wealth or home equity, compared to other assets. Several potential explanations of the empirical difficulties have been identified. Maybe people aren’t rational enough to calculate present values and annuity payments. Then again, maybe people are hyperrational and altruistic, leading them to calculate not just the present value of their own wealth, but also the wealth of their heirs. Or perhaps credit markets are to blame, with liquidity constraints preventing people from achieving the life-cycle plan they would otherwise choose to adopt. These and other explanations have all received some support and criticism in the voluminous savings literature. In this column, however, I focus on an assumption of the life-cycle model that has not received very much attention, but which, if modified, can allow the theory to explain many of the savings anomalies that have been observed. The key assumption is fungibility.

Fungibility, of course, is the notion that money has no labels. In the context of the life-cycle theory, the fungibility assumption is what permits all the components of wealth to be collapsed into a single number. According to the life-cycle hypothesis, the effect of winning the $300 football pool should be the same as having a stock in which I own 100 shares increase by $3 a share, or having the value of my pension increase by $300. The marginal propensity to consume (MPC) all types of wealth is supposed to be equal, assuming no transactions costs and so on.

A simple way of thinking about how people actually behave with respect to various types of wealth is to assume households have a system of mental accounts. One formulation is to consider three broad accounts, a current income account $C$, an asset account $A$, and a future income account $F$. Roughly speaking, the MPC from $C$ is close to unity, the MPC from $F$ is close to zero, and the MPC from $A$ is somewhere in between. Since the null hypothesis is that all three MPC’s are equal, these predictions are quite strong.

Along with the system of mental accounts, with varying MPC’s, two other modifications to the standard life-cycle theory are in order, both of which were discussed in the previous column on intertemporal choice. First, people are impatient. Especially over the short run, people act as if their discount rate exceeds the interest rate. The presence of high short-run discount rates creates the second problem, self-control. The life-cycle theory assumes that individuals solve for the optimal consumption plan, and then execute it with will of steel. In real life, people realize
that self-control is difficult, and so they take steps to constrain their future behavior. One method is to take irreversible actions, such as joining a pension plan or buying whole life insurance. The Social Security system, perhaps the most popular social policy of this century, is an example of legislated self-control. The other method is to adopt internally enforced rules-of-thumb. Examples of such rules are: keep two months income in the assets account; do not borrow except to make durable goods purchases such as a house, car, or major appliance. Note that households following the latter rule might appear to be liquidity constrained, unable to borrow, whereas they are actually unwilling to borrow. This issue will be discussed in detail below.

To summarize, the household being described can be thought of as following the following prudent rules. First, live within your means. Do not borrow from F or A to increase current consumption, except during well-defined emergencies, such as spells of unemployment. Even then, cut consumption as much as possible. Implication: consumption tracks income (too much). Second, keep a rainy day account equal to some fraction of income. Do not invade this account except in emergencies. Implication: A is small. Third, save for retirement in ways that require little self-control. Implication: most retirement saving is non-discretionary—Social Security, pensions, whole life insurance, and home equity. These rules are sensible, second-best solutions to the saving for retirement problems that humans face.

This column will review a small portion of the empirical savings literature, with the objective of showing how violations of fungibility, and more generally the role of self-control, strongly influences saving behavior.

The Current Income Account: Consumption Tracks Income

A consensus seems to be emerging among economists that consumption is too sensitive to current income to be consistent with a lifetime conception of permanent income. The evidence in support of this view comes from a wide variety of sources, and the conclusion is the same whether one studies so-called low frequency decisions (the shape of the life-time consumption profile) or high frequency decisions (the smoothing of year to year consumption).

Lifetime Consumption Profiles

The heart of the life-cycle theory of saving is a hump-shaped age-saving profile. The young, whose incomes are below their permanent income, borrow to finance consumption; the middle-aged save for retirement; the old dissave. Numerous authors have studied the shape of consumption profiles over the life cycle and have concluded that they resemble income profiles too much to be consistent with both the life-cycle

\footnote{This paper draws heavily on my joint work with Hersh Shefrin, Thaler and Shefrin (1981) and Shefrin and Thaler (1988). Details of a model of savings behavior based on mental accounting and self-control are available in the latter paper.}
theory and rational expectations unless there are important liquidity constraints (Kotlikoff and Summers, 1981; Courant, Gramlich and Laitner, 1986). In a recent look at this question, Carroll and Summers (1989) have evaluated the life-cycle theory from an international perspective.

The permanent income savings model predicts that the consumption growth rate in a country depends primarily on the interest rate. Thus, if interest rates around the world are equalized, then so should long-term consumption growth rates (assuming “tastes”—the degree of impatience—are the same in all countries). Instead, what Carroll and Summers find is that consumption growth rates are highly correlated with income growth rates. They investigate and dismiss the idea that the former result is due to surprises in country growth rates, capital market imperfections across countries, or variations in tastes.

The high correlation of consumption and income growth rates could be consistent with the life-cycle model if everyone in an economy had flat income and flat consumption over their lifetimes. Then, in a fast growing country the young will be much richer than the old, and when an old person dies and is replaced by a young one who consumes much more, aggregate consumption rises. So, the life-cycle theory predicts that the cross-sectional age-consumption profile should be less steeply sloped in a rapidly growing country than in a slowly growing country. At any point in time, the consumption of the young relative to the consumption of the old should be positively correlated with the growth of GNP. Instead, Carroll and Summers find that age-consumption profiles are very similar across countries. Indeed, the profile is steeper in Japan than in the U.S. even though Japan has had much higher growth rates. Again the answer seems to be that consumption tracks income.

Another prediction of the life-cycle theory is that the shape of consumption profiles should be independent of the shape of income profiles, holding levels constant. Casual empiricism suggests that this is not true, since most graduate students, even those with high income expectations such as medical students, consume much less than their permanent income. Hard data give the same impression. Carroll and Summers look at the consumption and income profiles for various occupation and education groups in the U.S. They find that the age-consumption profile is strongly influenced by the income profile. This result is due in part to liquidity constraints, discussed below.

**Short-term Saving**

Both the life-cycle theory and the permanent income hypothesis imply that year-to-year variations in income will be smoothed so that consumption is a constant proportion of permanent rather than current income. Hall and Mishkin (1982) showed that this prediction is violated systematically. Specifically, annual consumption appears to be excessively sensitive to current income. Although this result was described in terms of a modern, rational expectations model of permanent income, the empirical results are quite similar to those obtained by Milton Friedman (1957) in his original work on the consumption function. He estimated the discount rate of
consumers to be between .33 and .40, implying a planning horizon of three years or less, and thus a consumption function that depends strongly on current income.\(^2\)

One way of estimating the importance of income-sensitive behavior is to consider the possibility that there are two types of consumers: one type satisfies the permanent income hypothesis, the other type follows the rule of thumb "spend what you make." Campbell and Mankiw (1989) consider such a model, and estimate the relative proportions to be about 50-50.\(^3\) The permanent income model does not appear to be a good characterization of the representative consumer. (Also, see Flavin, 1981).

Interpreting the evidence on the time-series properties of consumption is tricky business. However, the excess sensitivity to income point has been demonstrated in a cleverly simple paper by Wilcox (1989). Wilcox studied the effect of changes in Social Security benefits on consumer spending, using monthly data between 1965 and 1985. Over this period there were 17 increases in benefits, all of which were announced at least 6–8 weeks in advance of when they took place. The standard life-cycle prediction for these increases in that consumption should respond to the new (higher) level of permanent income at least by the time the changes are announced.\(^4\) (The Barro-Ricardo (Barro, 1989) prediction is that there will be no change in consumption at any point.) What Wilcox finds is that consumer spending does increase, but only after the benefits start arriving, rather than when they are announced. The effect is particularly strong for durable goods sales.

**Sources of Income, Bonuses, and Windfalls**

Do all changes in wealth produce a similar short-term change in consumption? The mental accounting prediction for the MPC out of windfall gains depends on the size of the gains. Small gains, relative to income, will be coded as current income, and spent. Larger gains will enter the assets account, where the MPC is lower (though still higher than the annuity value). The source of a change in wealth can also matter. Some windfalls, such as unrealized capital gains, are naturally treated as changes in the assets account. Others, such as the sale of a security, could be treated as income. Empirical evidence confirms the reality of this distinction. For example, Summers and Carroll (1987) report that the marginal propensity to save capital gains in the stock market is close to unity. But Hatsopoulos, Krugman and Potterba (1989) find that when takeovers generate cash to the stockholders, consumption does increase. They estimate the MPC from the after-tax cash receipts from takeovers to be .59 (though

\(^2\)In a provocative paper, Deaton (1987) has argued that consumption is actually too smooth, rather than too variable. However, Deaton does not dispute the fact that consumption depends too much on current income. Rather, he argues that innovations in labor income are underestimated changes in permanent income, so consumption changes should be greater than income changes. The correct interpretation depends on the stochastic properties of income.

\(^3\)It is worth noting that even the permanent income consumers in their model have an intertemporal elasticity of consumption of close to zero. A similar result in the context of a permanent income model is obtained by Hall (1988).

\(^4\)Actually, since 1975 the benefit levels were indexed to the CPI, and the changes were quite predictable months before the announcement date.
with high standard error) compared to .83 for disposable income and .03 for household net worth. Also, as discussed below, increases in housing wealth and pension wealth have, if anything, the perverse effects of increasing other saving.

Even cash receipts can enter the assets account if the inflow is in a large enough lump, and not considered regular income. Interesting cases to consider are bonuses and windfall gains. Define a bonus to be a fully anticipated but lumpy payment. One example is the academic institution of summer salary, when it is received with certainty. Consider two professors. John earns $55,000, paid in monthly installments. Joan is paid a base salary of $45,000 paid over twelve months, and a guaranteed extra $10,000 paid during the summer months. The standard theory predicts that the two professors will make identical saving decisions. The mental accounting formulation predicts that Joan will save more for two related reasons. First, since her “regular” income is lower, she will gear her life-style to this level. Second, when the summer salary comes in a lump, it will be entered into the assets account, with its lower MPC. One test of this prediction comes from the analysis of the effect of bonuses on savings in Japan, where workers receive semi-annual bonuses which are quite predictable. Ishikawa and Ueda (1984) estimated the MPC from regular income and bonus income. In non-recession years they found that the MPC from regular income was .685 while the MPC from bonus income was only .437. During the recession-oil shock period 1974–76 the MPC from bonus income jumped to over 1.0, suggesting that the bonuses were used to spread consumption during emergencies.

The best data on consumption from windfalls is in Landsberger’s (1966) examination of the Israeli recipients of German restitution payments after World War II. He studied 297 families who received payments that varied over a wide range. He found that the group that received the largest windfalls (about 66 percent of annual income) had a MPC from the windfall of only 23 percent, while the group that received the smallest windfalls (about 7 percent of annual income) had MPC’s from the windfall in excess of 2.0. Small windfalls were actually spent twice, a phenomenon familiar to all two-spender families.

Is Wealth Fungible?

The life-cycle model is a powerful model because it makes predictions about which variables should have an effect on saving and which should not. To a first

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5It is frustratingly difficult to test the idea that the timing of income flows within the year might influence consumption behavior. Perhaps because of the prediction of economic theory that such matters are irrelevant, no standard data set includes questions about the magnitude and size of irregular income flows such as bonuses.

6The authors argue strongly that the bonuses should not be considered transitory income since they are well anticipated. They also use expectations data to test the hypothesis that workers spend unanticipated bonuses differently than expected bonuses, but find no evidence to support this view.
approximation, the only factors that should affect a household's saving rate are the age of the family members, the family lifetime wealth, and the interest rate. The composition of wealth, holding the present value constant, should not have any effect. For most households, wealth consists almost exclusively of three components: future income, pension and Social Security wealth, and home equity. Abstracting from liquidity considerations, these three types of wealth should be nearly perfect substitutes.

**Pension Wealth**

Consider two people with identical lifetime earnings profiles. One has $100,000 in pension wealth, the other has no pension. The life-cycle prediction is that the person without the pension should have $100,000 more in other savings. That is, there should be a one-for-one offset. The null hypothesis is that if one estimates the change in discretionary savings with respect to a change in pension wealth, it should be $-1.0$.

The earliest work on the effect of private pensions on other saving was done by Cagan (1965) and Katona (1965). Both obtained the surprising result that the effect of pension wealth on other saving was not close to $-1.0$—it was positive! Adding a dollar of pension wealth slightly increased other saving. Could this result be explained by selectivity bias? That is, do people with a taste for saving tend to work for companies that offer pension plans? This hypothesis was tested indirectly by Green (1981). He estimated the pension offset for a subsample that contained only people who had a pension, and again found the offset to be slightly positive. For this result to be explained by selectivity bias people would have to perfectly match themselves (on average) to firms based on pension benefits and saving preferences, which seems implausible. In a life-cycle framework, why shouldn't someone with a taste for saving simply take the best job overall and then adjust his discretionary saving to the optimum level given the firm's pension policy? Other estimates for the pension-saving offset have obtained the “right” negative sign, but none were close to $-1.0$. (See Shefrin and Thaler, 1988, for a summary and references.) People do not appear to treat pension wealth as a close substitute for other wealth.

Similar issues arise with regard to Individual Retirement Accounts, IRAs. The central issue is whether IRAs really generated “new” saving, or whether they just represented “reshuffling” of saving from other (taxable) forms to the new sheltered

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7Most households have little in the way of liquid assets, even when they first reach retirement age. This fact, in and of itself, supports the view that self-control issues are paramount in studying saving. The vast majority of households do virtually no long-term “discretionary” saving.

8There are two important components of pension wealth in the U.S., Social Security benefits and private pensions. There is a large literature in each domain estimating this savings offset. The estimation problems are much more difficult for Social Security wealth because an individual’s Social Security wealth is so highly correlated with age and prior earnings. After controlling for these two factors, there is essentially no cross-sectional variation in Social Security wealth. I will therefore just summarize the literature on private pensions. However, see Barro (1978) (which contains a reply for Feldstein) for a review of Social Security-savings literature.
account. As Venti and Wise (1987, p. 6) put it: “It may be tempting to think of IRAs and conventional saving accounts as equivalent assets, or goods, simply with different prices, in which case one might think of IRAs as only a price subsidy of conventional saving with a limit on the quantity that can be had at the subsidized price. . . . But, . . . the analysis indicates quite strongly that the two are not treated as equivalent by consumers.” Venti and Wise use the Consumer Expenditure Survey to analyze the IRA experience, and conclude (p. 38) that “the vast majority of IRA saving represents new saving, not accompanied by reduction in other saving.” They also find that most IRA contributors had not done much saving before IRAs were introduced.

Feenberg and Skinner (1989) also examine the “new” saving vs. reshuffling hypothesis using a sample of tax returns. If IRAs are primarily reshuffled savings, then IRA users should have lower taxable interest income than non-users. However, they find that within each wealth class the IRA users had higher taxable interest income, suggesting a positive offset similar to that found in the pension studies.

Some other facts about IRA usage suggest that mental accounting and self-control factors are important. Since IRAs sheltered interest income, a rational person would purchase an IRA at the earliest possible date, so that the income would be sheltered as long as possible. This would be particularly true for someone who was just shifting assets from a taxable account to an IRA. According to the law, however, taxpayers could make tax deductible purchases for a given year up until April 15 of the following year. Summers (1986) reports that for the 1985 tax year, nearly half of the IRA purchases were made in 1986. Also, Feenberg and Skinner find that, holding everything else constant, an important predictor of whether a household will purchase an IRA is whether they would otherwise have to write a check to the IRS on April 15. Those who owed money were more likely to buy an IRA than those who were getting refunds. This result begs for a mental accounting interpretation. (“I would rather put $2000 in an IRA than pay the government $800.”) Feenberg and Skinner also found that wealth was a more important predictor of purchase than was income, suggesting that those households with liquid assets were more likely to buy IRAs.

If IRA purchases often come out of liquid assets, why do IRA purchases increase total saving? One reason is that money in the IRA account becomes both less liquid (it is subject to a special 10 percent tax surcharge if withdrawn before the purchaser reaches 59½ years old) and less tempting. Funds in an IRA are regarded as “off-limits” except for the most dire of emergencies. As Venti and Wise (1989, p. 11) note, “Some persons of course may consider the illiquidity of IRAs an advantage: It may help insure behavior that would not otherwise be followed. It may be a means of self-control.” Also, if households have a desired level of their A account, then the purchase of the IRA will only decrease the account temporarily. Similarly, those who borrow to purchase an IRA will normally pay the loan off fairly quickly (certainly before they reach retirement age) and thereby increase net saving.

The experience with 401-k tax-deferred retirement plans illustrates that people may value illiquidity for retirement saving. Some plans permit withdrawals for “hardships,” while others do not. The Government Accounting Office reports (GAO/PEMD-88-20FS) that participation rates and deferral rates are if anything higher in the plans that do not permit any withdrawals.
Housing Wealth

As in the case of pension wealth, the life-cycle theory assumes that home equity is fungible and therefore is a good substitute for other forms of wealth. To evaluate this part of the theory, it is useful to begin with some simple facts. Krumm and Miller (1986) use the Panel Survey of Income Dynamics between 1970–79 to study the effect of homeownership on other savings. They find the following pattern. Young households accumulate liquid assets in order to make a down payment on their first house purchase, then draw down those assets when they buy the home. Soon thereafter, they begin to accumulate liquid assets again. At the same time they are building up home equity by paying off their mortgage and accumulating capital gains on their home. If the wealth in their home is a good substitute for other savings, then one would expect homeowners to have less savings in other assets, holding everything else constant. However, just the opposite is true. Comparing those households in the panel who owned a house continuously from 1970–1979 to those who never bought a house, homeowners' non-house savings were $16,000 higher, ceteris paribus. In addition, they had $29,000 in home equity. For a similar result, see Manchester and Poterba (1989).

Another way of looking at the fungibility question is to estimate the MPC from housing wealth. Skinner (1989) takes this approach. He first runs a simple regression of the change in real consumption from 1976 to 1981 on the change in housing wealth for those people in his sample who owned a house and did not move. The estimated coefficient was not significantly different from zero. In more complex models, one set of regressions obtained a small but significant effect, while another set that corrected for individual differences across families suggested that shifts in house value had no effect on consumption.

Could these results be explained by Barro-Ricardo style intergenerational transfers? If house prices go up, then people want to save more to give their kids money to buy a house. To check this, Skinner tries a housing wealth × family size interaction term, but finds that it also has no effect on consumption. Also, if Barro were right then everyone (on average) would respond to an increase in house prices by saving more for their heirs, not just homeowners.

The low MPC from housing wealth is reflected in another life-cycle anomaly, namely that the elderly do not dissave fast enough. This is an additional aspect of the consumption tracks income issues addressed above. The young and the old consume too little, relative to the life-cycle prediction. While the behavior of the young could plausibly be explained by capital market imperfections, the behavior of the elderly is more puzzling, especially for homeowners. Homeowners over 65 rarely have any mortgage debt, and so have considerable home equity they could draw down. The reluctance to spend home equity appears to be voluntary, as shown by Venti and Wise (1989) in a paper entitled, “But They Don’t Want to Reduce Housing Equity.”

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10 It was pointed out to me in a seminar I presented at the University of Chicago that such tests are not conclusive. A childless family might still have nieces and nephews. I should add that this remark from the audience did not elicit any laughter.
Venti and Wise study this question using the six Retirement History Surveys, from 1969 and 1979. They make use of the fact that those members of the sample who sell one house and buy another can adjust the level of their home equity at low cost, so the desired level of housing equity can be inferred from their behavior. Their behavior suggests that the mean difference between desired and actual house equity was very small, only $1010. To put this in perspective, the desired proportion of wealth in housing equity was .53. The difference between the current and desired proportions was .0107. There was essentially no effect of age on desired housing equity. Also, whether the family had children or not had no effect on desired home equity, rendering a bequest explanation suspect. Venti and Wise conclude (p. 23): “Most elderly are not liquidity constrained. And contrary to standard formulations of the life-cycle hypothesis, the typical elderly family has no desire to reduce housing equity.”

Liquidity Constraints or Debt Aversion?

In the face of much of the evidence on household consumption, many economists have developed models in which a portion of the population are assumed to be liquidity constrained, in that they cannot borrow to smooth consumption (Hayashi, 1985; Zeldes, 1989). In a model for underdeveloped countries which has much in common with the view presented here, Deaton (1989) assumes that the representative household is impatient and cannot borrow. Such models are important and illuminating. However, I believe that another important source of liquidity constraints are self-imposed rules used by households who simply do not like to be in debt.

The evidence presented by Venti and Wise is consistent with this view. The elderly who move do not want to take on a new mortgage if possible. Reverse mortgages (in which a bank buys a house from an elderly family, lets them live in it, and pays them an annuity) have been extremely unpopular, in part, I think, because they are called mortgages.

As a group, homeowners are certainly not liquidity constrained. Manchester and Poterba estimate that in 1988 there was about $3 trillion in home equity in the U.S., about $2.5 trillion of which could be borrowed against on a tax-deductible basis even under the new (more stringent) law. (To give some sense of how big this number is, the total unsecured debt plus vehicle debt in 1985 was $405 billion.) Manchester and Poterba report that when people do take out second mortgages, they do so primarily to make investments rather than to increase consumption. Roughly half the second mortgages are used to make home improvements, which keeps the funds in the same mental sub-account.11

11My colleague Jack Knetsch tells me that in British Columbia, Canada, homeowners over age 65 may, if they wish, postpone real estate taxes until they die or sell their home. At that point, the taxes (plus interest at a below-market rate) become due. Though many elderly seem cash constrained and are sitting on
Another relatively untapped source of liquidity is the cash value of whole life insurance. Most whole life insurance policies have a provision that policy holders can borrow against the proceeds, and in older policies the lending rate was very attractive. For example, in 1979 the average policy loan rate was 5.65 percent, while the short-term rate on Treasury bills averaged 9.5 percent. While policy holders could not get rich by borrowing against their policies, they could certainly borrow at a negative real rate. Warshawsky (1987), using 1979 data, found that less than 10 percent of those eligible to use such loans did so. He also examined the hypothesis that people gradually became aware of the arbitrage opportunity. He concluded that if policy holders were learning, they did it very slowly. According to his estimates, it would take 9 years for policy holders to make half of the appropriate adjustment.

The foregoing remarks should not be taken as a claim that liquidity constraints are not important for a significant portion of the population. Instead, I am arguing that there are two important sources of liquidity constraints: those imposed by capital markets, and those imposed by individuals on themselves. The latter source may well be more important.

Commentary

Economists of prior generations offered much more behavioral treatments of saving behavior. For example, Irving Fisher (1930) stressed the roles of foresight, self-control, and habits. Even Friedman's (1957) permanent income hypothesis was a far cry from rational expectations. He said, "The permanent income component is not to be regarded as expected lifetime earnings. ... It is to be interpreted as the mean income at any age regarded as permanent by the consumer unit in question, which in turn depends on its horizon and foresightfulness."12 The modern theories of saving have made the representative consumer increasingly sophisticated. Expectations are taken to be the same as those which would be held by a sophisticated econometrician. The problem seems to be that while economists have gotten increasingly sophisticated and clever, consumers have remained decidedly human. This leaves open the question of whose behavior we are trying to model. Along these lines, at an NBER conference a couple years ago I explained the difference between my models and Robert Barro's by saying that he assumes the agents in his model are as smart as he is, while I portray people as being as dumb as I am. Barro agreed with this assessment.

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12 This point is stressed by Carroll and Summers (1989), who quote this passage.
References


