

An Economic Theory of Self-Control

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# An Economic Theory of Self-Control

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The concept of self-control is incorporated in a theory of individual intertemporal choice by modeling the individual as an organization. The individual at a point in time is assumed to be both a farsighted *planner* and a myopic *doer*. The resulting conflict is seen to be fundamentally similar to the agency conflict between the owners and managers of a firm. Both individuals and firms use the same techniques to mitigate the problems which the conflicts create. This paper stresses the implications of this agency model and discusses as applications the effect of pensions on saving, saving and the timing of income flows, and individual discount rates.

For many years Christmas clubs paid no interest. Members deposited money each week but could only withdraw the money on December 1. The clubs were very popular, although they seemed to be dominated by simply depositing money in an interest-bearing savings account.

Passbook loans do still exist. These loans allow an individual with \$5,000 in a savings account earning 5 percent interest to borrow at 9 percent using the balance as collateral, instead of at 10 percent with

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no collateral. Obviously the individual could simply withdraw the money from his savings account at an (opportunity) cost of only 5 percent.

Smoking clinics are a new and thriving business. A smoking clinic will help people who want to stop smoking—for a fee of several hundred dollars.

What does economic theory have to say about these institutions? George J. Stigler provides the following analysis:

One can of course explain the participation in a Christmas fund by introducing another item of preference: a desire of people to protect themselves against a future lack of willpower. . . . If we stopped the analysis with this explanation, we would turn utility into a tautology: a reason, we would be saying, can always be found for whatever we observe a man to do. In order to preserve the predictive power of the utility theory, we must continue our Christmas fund analysis as follows. The foregone cost of putting money in a Christmas fund is the interest one could earn by putting the same money in a savings account. If interest rates on savings accounts rise, the cost of buying protection against a loss of willpower rises and less of it ought to be bought. . . . [Stigler 1966, p. 57]

We agree with the remarks above and therefore offer a model that says more about these institutions than the fact that the demand for their services will be negatively related to price. We do so by proposing a simple extension of orthodox models, using orthodox tools, that permits such behavior to be viewed as rational. This rationalization is based on an analysis of the technology of self-control using the theory of agency rather than reliance on ad hoc explanations in which transaction costs, taxes, and income effects play a major role. Our model can predict, in a nontautological way, the circumstances in which these kinds of behavior will be observed. In particular, our new theory of intertemporal choice has important implications for theories of saving behavior. In the last section of the paper we discuss some of these implications and offer empirical evidence in support of our ideas.

## I. The Model

The idea of self-control is paradoxical unless it is assumed that the psyche contains more than one energy system, and that these energy systems have some degree

of independence from each other. [DONALD MCINTOSH 1969]

Why individuals would impose constraints on their future behavior is a problem that has received attention from economists since Strotz's (1955–56) classic paper.<sup>1</sup> Strotz and those who have followed him (Pollak 1968; Blackorby et al. 1973; Peleg and Yaari 1973; Hammond 1976; and Yaari 1977) have analyzed the phenomenon as one of *changing tastes*. In Strotz's formulation a conflict occurs between today's preferences and tomorrow's preferences if the discount function used today is not exponential with a constant exponent.

Our framework differs from the changing-tastes literature in that we model man as having two sets of preferences that are in conflict at a single point in time. This idea is certainly not new. Adam Smith used a two-self model much like ours in his *Theory of Moral Sentiments* (1759). More recently Schelling (1960, 1978) and Buchanan (1975) have recognized the importance of simultaneous conflict in understanding self-control problems. Outside economics the idea is commonplace, with the writings of Freud (1958) and Berlin (1969) deserving special mention.

Nonetheless, to the best of our knowledge our work is the first systematic, formal treatment of a two-self economic man. We have adopted a two-self model because, as McIntosh says above, the notion of self-control is paradoxical without it. Furthermore, we utilize an organizational analogy that leads to both insights into human behavior and a rich explanatory model. We will briefly describe the model here. We do so in order to make explicit the nature of our two-self conceptualization. The model also leads to specific predictions about behavior, which are discussed in Section III below. Further details are available in our more formal companion paper (Shefrin and Thaler 1980).

Our model is cast in discrete time. Consider an individual with a fixed income stream  $y = (y_1, y_2, \dots, y_T)$ . Think of period  $T$  as retirement and let  $y_T = 0$ . Let the individual choose a nonnegative level of consumption  $c_t$  in  $t$ . Call  $c = (c_1, c_2, \dots, c_T)$  a consumption plan. The conflict between short-run and long-run preferences is introduced by viewing the individual as an organization. At any point in time the organization consists of a planner and a doer.<sup>2</sup> The planner is concerned with lifetime utility, while the doer exists only for one period and is completely selfish, or myopic. The period  $t$  doer is assumed to have direct control over period  $t$  consumption rate  $c_t$ . The

<sup>1</sup> Two important contributions by noneconomists are Ainslee (1975) and Elster (1977).

<sup>2</sup> These terms originated in an early draft of Thaler's (1980).

doer's utility function is given by  $Z_t(\cdot)$ ;  $Z_t$  is taken to be independent of all components of  $c$  except  $c_t$ .<sup>3</sup> Furthermore, suppose initially that  $Z_t$  is strictly increasing and concave in  $c_t$ .

In our model the planner does not actually consume but, rather, derives utility from the consumption of the doers. Therefore the planner's utility function is given by  $V(Z_1, Z_2, \dots, Z_T)$ . Observe that a plan which maximizes  $V$  subject to the present value budget constraint,  $\sum_{t=1}^T c_t \leq \sum_{t=1}^T y_t = Y$ , is considered optimal from the planner's point of view. However, without some method to control the doer's actions, this plan cannot be implemented. Indeed, under the assumptions above, the actual consumption stream chosen would have total lifetime income consumed during the first period, when the period-one doer would borrow  $Y - y_1$  on the "perfect" capital market. In order to prevent this from occurring, the planner requires some psychic technology capable of affecting the doer's behavior. Two main techniques are available for this: (1) The doer can be given *discretion* in which case either his *preferences* must be modified or his *incentives* must be altered, or (2) the doer's set of choices may instead be limited by imposing *rules* that change the constraints the doer faces.

We begin by analyzing the case in which no rules are used. We refer to this case as *pure discretion*. While we do not believe that the pure discretion case is empirically important (most people appear to use at least some kinds of rules), it provides a useful foundation for our model, to which rules are easily added. Furthermore, since this case corresponds closely to that usually considered in economics, it highlights the differences between our model and the standard framework.

Recall that  $Z_t(\cdot)$  was assumed to be unbounded. We now specify that  $Z_t$  depends on a preference modification parameter  $\theta_t$  selected by the planner. The choice of  $\theta_t$  allows the planner to alter  $Z_t$  such that it possesses an internal maximum. By appropriately selecting  $\theta_t$ , any desired  $c_t$  may be obtained; however, the lower the desired  $c_t$  is, the more modification will be required. Furthermore,  $\partial Z_t / \partial \theta_t$  is negative; that is, modification reduces short-run utility and is therefore costly. Finally, we assume that the marginal cost of modification increases with  $\theta$ . Thus successive reductions in  $c_t$  require increasing reductions in  $Z_t$ .

If the planner could exercise direct control over the choice of a consumption plan,  $\theta_t$  would be set equal to zero for all  $t$  (because modification is costly) and  $c$  would be selected to maximize  $V$  subject to the budget constraint. Since under pure discretion this is assumed to

<sup>3</sup> The extreme assumption that doers do not care at all about past or future doers is adopted just for expositional simplicity. Other arguments of  $Z_t$  could easily be added.

be infeasible, the planner must instead choose  $\theta = (\theta_1, \theta_2, \dots, \theta_T)$  to maximize  $V$ . (The solution to the problem is described in Shefrin and Thaler [1980].) Essentially, modification is increased until the marginal utility derived from additional consumption in retirement (period  $T$ ) equals the marginal loss in utility in earlier periods due to modification.

In the more general case when both rules and preference modification are permitted, the planner may also alter the budget constraint facing each doer. This allows the planner to reduce  $c_t$  without incurring modification costs. However, since available rules are imperfect (see next section), the planner will have to trade off modification costs with the opportunity costs associated with using second-best-type rules. Rules are formally incorporated into the planner-doe model in Shefrin and Thaler (1980).

## II. Techniques to Reduce Conflicts in Individuals and Organizations

We have characterized self-control as an internal conflict resembling the principal-agent conflict between the owner and manager of a firm (see Ross 1973; Jensen and Meckling 1976). In this section we describe the actual techniques used by individuals and firms to mitigate these conflicts. The techniques fall into the two categories highlighted in the model: rules and incentives. We provide many illustrations of the methods individuals use because these are in essence part of our model. When individuals use rules it is impossible to characterize their behavior simply with first-order conditions. The limits on the kinds of rules which individuals will find feasible lead to the specific predictions about saving behavior discussed in Section III. In this section we also compare the techniques individuals use with those used in firms. The close correspondence we find lends intuitive support to our principal-agent model.

### A. *Methods to Alter Incentives*

Individuals use three basic techniques to alter the doer's incentives. First, the doer's preferences can be modified directly. Some individuals consider saving a good in and of itself.<sup>4</sup> In this case doer myopia does not inhibit saving. Second, inputs to a saving or dieting program can be explicitly monitored via weekly budgets or calorie counting

<sup>4</sup> This idea has been suggested by Scitovsky (1976). The importance of norms in controlling individual behavior is also stressed heavily by Adam Smith (1759, p. 326) and by Irving Fisher (1930).

(customers of diet clinics and credit counselors are advised to do this). Simply keeping track seems to act as a tax on any behavior which the planner views as deviant. Third, incentives can be explicitly altered: Alcoholics take the drug Antabuse which makes them ill if they take a drink; academics agree to give a paper at a conference to provide a proximate incentive to write it.

Firms use the same three methods. First, profit-sharing plans are quite popular even though they offer only trivial financial incentives to all but the highest executives. We believe firms adopt them because they help create an atmosphere in which the employees' preferences are more similar to those of the owner. Second, firms monitor departmental inputs through cost accounting and then tie compensation to these input measures. Third, departmental profits are measured and used as performance measures for managers.

### *B. Methods to Alter Opportunities: Rules*

If the costs of monitoring and persuasion are high, individuals will resort to rules that restrict the doer's opportunities. In the extreme, all doer discretion can be eliminated using what Strotz referred to as the strategy of precommitment. Such behavior is rational in our model if the rule can approximate the choices that the planner would select. Market precommitment institutions are observed, as we would predict, in such areas as saving and dieting. For example, people pay to go to "fat farms" which essentially are resorts that promise not to feed their customers.

Less extreme rules can limit the *range* of doer discretion, usually through the use of self-imposed rules of thumb. In the savings context several such rules appear to be commonly used. These rules alter the budget constraint faced by the doer in much the same way as credit limits imposed by lenders do.<sup>5</sup> A simple first departure from pure discretion is a ban on borrowing, the so-called debt ethic. A somewhat weaker rule which seems common is to prohibit borrowing except for specific purchases, like houses and automobiles. Another rule of thumb is a prohibition on dissaving combined with limits on borrowing. Using this rule of thumb, a person might borrow and lend simultaneously in spite of a substantial difference in the interest rates, as in the case of the passbook loan. The loan allows him to transfer consumption across time periods while it provides a regimented repayment scheme.

<sup>5</sup> While it is difficult to document the extent to which these precise rules are used, 85 percent of Cagan's (1965) sample of Consumers Union members reported using one of these or similar rules to determine monthly saving.

Rules can also eliminate discretion over a specific *class* of decisions for which the conflict is particularly acute. Dieters try not to keep cheesecake in the refrigerator and will refuse invitations to lavish dinner parties; problem gamblers avoid Las Vegas. Also, many smokers pay more for their cigarettes by buying them by the pack instead of the carton—it helps enforce a self-imposed ration such as one pack a day.

Again, the same types of rules are observed in organizations.<sup>6</sup> “Pure” rules are observed most often in bureaucratic organizations because the costs of monitoring output are so high. Rules that limit managerial discretion over a particular range are frequently in the form of guidelines (e.g., a plant manager can adapt any investment that exceeds some stated rate of return). Similarly, rules may prohibit discretion over a specific class of decisions; loan officers, for example, might need approval for loans to relatives or friends.

We wish to make three other points about internal rules of thumb. First, it is useful to consider these rules as learned as much as chosen. Rules like the debt ethic are learned from parents and other models, which suggests that there will be differences in the use of rules depending on social class, education, and age. Second, rules of thumb are likely to become habits. By establishing a routine, the doer decision process can be avoided. Third, to the extent that the rules do become habits, there will be rigidities built into the individual’s behavior.<sup>7</sup> The implications of these observations are discussed in the next section.

### III. Implications

We now turn to a discussion of the implications of the planner-doer model. What predictions about behavior can be made with our model that are inconsistent with the standard model? Some of these predictions are obvious. We predict that people will rationally choose to impose constraints on their own behavior. Furthermore, we predict that such precommitments will occur primarily for those goods whose benefits and costs occur at different dates. We present here some less obvious predictions based on our model.

Because our framework is richer than the standard theory, vari-

<sup>6</sup> For a discussion of firms imposing constraints on their future financial policies, see Myers (1977).

<sup>7</sup> Habits can be formally introduced in two stages. At first stage  $Z_t$  can also be made a function of  $\theta_s$ ,  $s < t$ , to reflect the fact that self-control at the early dates renders self-control at later dates less costly. At the second stage,  $Z_t$  can also be parameterized on the adopted rule. In this case the function  $Z_t$  could exhibit an internal maximum in  $c_t$  when  $\theta_t = 0$ . It is interesting to note that modification would now be required in order to break the rule. This would tend to explain miserliness, for instance.



ables that the standard theory treats as irrelevant differences in form we model as differences in substance. In Sections IIIA and IIIB we consider how differences in the form of payment (holding the level constant) affect saving decisions, and in Section IIIC we present variables other than borrowing and lending rates that determine individual marginal rates of time preference.

### A. *Pensions and Saving*

Consider two identical individuals with the same total income and wealth. Assume that they both save some fraction  $s$  of their income. Now give one a mandatory pension plan that forces him to save  $p < s$ . What will happen to total saving? Though it is difficult to get a specific prediction from the standard model (see Feldstein 1977), a first-order prediction would be that total saving is unaffected. Other forms of saving should fall by the approximate amount of the pension.

Our model has a different prediction: The pension plan produces saving at no psychic cost. Modification costs occur only when saving is voluntarily withheld. This is what we call “discretionary saving.” Thus since the marginal cost of saving is lower at the old saving level, we expect total saving to go up. (In other words, the offset in other saving will be less than the size of the pension.)

Furthermore, in two cases the offset will be essentially zero: (1) The individual uses a saving rule such as “save  $s$  percent of disposable income” which is not changed when the pension is introduced (total saving increases by  $[1 - s]py_t$ ), and (2) the individual uses discretion but treats saving as a good for its own sake rather than as a transfer to future consumption. In this case discretionary saving and retirement saving are not perfect substitutes as in the standard model; in fact, their cross-elasticities of demand could be zero.<sup>8</sup>

The effect of pensions on saving has been investigated with individual data by Cagan (1965), Katona (1965), and Munnell (1974, 1976). All obtained similar results. Cagan used a sample of Consumers Union members. He found that for those members with a mandatory pension plan, other saving actually was higher than for those without pensions (see Cagan 1965, p. 21). Munnell (1974) replicated Cagan’s study using the same data source. She used a different measure of saving, replaced before-tax income with after-tax income, and restricted her analysis to a subset of observations she thought to be more reliable. She then regressed the nonpension saving to income ratio on several variables including a pension dummy. Her basic result

<sup>8</sup> A formal treatment of the effect of pensions on saving appears in Shefrin and Thaler (1980).

was that the pension had no effect on other saving (i.e., a zero offset). The coefficient of the pension dummy was never significant. Its highest  $t$  value occurred for the 55–65 age group ( $t = 1.2$ ), for which those with pensions saved 3 percent less than those without pensions. Though other explanations (such as selectivity bias) have been offered for these results, we find that they lend support to our model.

### *B. Saving and the Timing of Income Flows*

The importance of current disposable income (as opposed to permanent income) yields another prediction from our model that differs from the standard theory. Consider two identical individuals, S and B; S receives a salary of \$12,000 per year paid in 12 monthly installments of \$1,000, while B receives a salary of \$10,000 per year paid in monthly installments plus a guaranteed bonus of \$2,000 paid in March each year. Standard theories of saving behavior would predict that these two individuals would save the same amount. Our model predicts that, on average, B will save more.

Although we know of no test of this hypothesis,<sup>9</sup> there is one bit of circumstantial evidence. In Japan, where there is a very high saving rate, bonus schemes are quite common. We think this is no coincidence. A test would be possible, given the right data. We predict that individuals who are paid a portion of their salary via a lump-sum bonus will have higher saving rates than those who receive their compensation in a smooth pattern. How does this follow from the model?

We have characterized saving behavior primarily as a set of self-imposed rules of thumb and externally enforced saving plans. For an individual like B, those rules and plans will be based on his regular monthly income. Contributions to pension plans, payments on whole life insurance policies, mortgage payments, and so forth must be made on a regular basis. Furthermore, most individuals prefer to have their monthly inflows and outflows roughly balance.<sup>10</sup> For B to act like S, he could deposit the bonus in the bank and draw it down gradually during the year (as if his salary were \$12,000), or he could borrow the \$2,000 over the course of the year and repay the loan when the bonus is paid. However, we feel that neither of these behavior patterns is likely to be widely observed. Notice that they violate either the ban on borrowing or the ban on dissaving. To the extent that these rules of thumb are used, imitating the behavior of S will be difficult. We

<sup>9</sup> However, a related issue is investigated by Landsberger (1966).

<sup>10</sup> This explains why many teachers sacrifice interest by electing to receive their academic-year salary paid in 12 monthly installments (September–August) rather than 10 (September–June).

believe that for the typical individual much of the bonus will end up being saved, especially through the purchase of durable goods. This amounts to the use of an auxiliary rule regarding the disposition of bonuses received. We expect that total saving for B will exceed that for S because of the technology of self-control. By paying the bonus the firm is acting as an external self-control device (much like parents who tell children that money gifts at Christmas must go into a savings account). Temptations to spend during the year will be overcome because the smaller monthly salary will make them seem beyond the individual's means. This technology seems to have been recognized by the millions of taxpayers each year who claim too few exemptions in order to assure a tax refund.<sup>11</sup> Obviously some self-deception (doer deception) is necessary for this device to work, but doers can apparently be deceived quite easily. How else can one explain the not uncommon practice of knowingly setting one's watch a few minutes ahead ("in order to get to places on time")?

As the analysis in this section suggests, the shape of the income stream will affect the type of saving strategy adopted. Those individuals with variable and uncertain incomes will find a discretionary rule such as saving  $s$  percent each month difficult to enforce in the low-income months. Without a mandatory saving plan, they would have to adopt some more complex strategy to save effectively. Similarly, those individuals whose incomes are expected to decline (such as professional athletes) would prefer to save a large proportion of their high current incomes and a smaller (perhaps negative) proportion of their lower future incomes. For both, a mandatory pension plan is particularly likely to increase total saving. A more sophisticated analysis of the effect of pensions on saving might detect differences of this sort.

The case of athletes points up the extreme differences in behavior that self-control can produce. Their declining income stream creates a difficult self-control problem in the high-income years. Some athletes hire agents to invest their incomes and limit their current spending, and many of them become rich. Others rely on discretionary strategies and end up bankrupt. Both types of behavior are possible in our model, depending on the degree of planner control and the types of precommitment strategies available. The best predictors of which individuals will fall into which groups are probably related to family background, since the family is the most likely place for the individual to learn (or not learn) the rules and norms necessary to overcome the self-control problems.<sup>12</sup>

<sup>11</sup> E.g., in 1969, 55 million taxpayers received refunds while 18 million owed taxes. In dollars, overpayments exceeded underpayments by 39 percent.

<sup>12</sup> The last two paragraphs were prompted by a suggestion from Sam Peltzman. Irving Fisher also discussed some of these issues. He notes that some individuals spend

### *C. Individual Marginal Rates of Time Preference*

The orthodox theory of intertemporal choice as formulated by Irving Fisher produces a very strong result. Each person should equate his marginal rate of time preference (MRTP) with the relevant after-tax interest rate.<sup>13</sup> Thus the theory predicts that all individuals who face the same after-tax interest rate will make the same marginal intertemporal choices: Specifically, they will act as if they used the after-tax interest rate as their discount rate. This follows because individuals are assumed to use capital markets to arbitrage away any difference between what Fisher called their “rate of impatience” and the interest rate. It should be noted, however, that this result can fail to hold if capital markets impose quantity constraints on borrowers (capital rationing). In this case borrowers may be forced to stop borrowing even though their rate of impatience exceeds the interest rate.

In exactly the same fashion, self-imposed borrowing constraints such as those discussed in Section IIB prevent the complete internal arbitrage from taking place. Thus in our model, in which such constraints play an important role, the presumption that individual MRTPs will equal the interest rate no longer holds. Indeed, we expect to observe behavior that implies an MRTP greater than the interest rate and at the same time an unwillingness to engage in additional borrowing. Two points need to be raised about this implication. First, once rules are incorporated into the analysis, the failure to equate the MRTP to the interest rate may not violate an optimality condition. If rules are used it is because they lead to higher levels of utility than pure discretion would. The inequality created is costly, but the cost arises from the necessity of using a second-best technology. Because rules by nature must be simple, rules that select the precisely correct consumption bundle in every situation are infeasible. Second, notice that if a quantity constraint is binding, whether internally or externally imposed, observed MRTPs will be equal to or greater than the interest rate.

Attempts to measure individual MRTPs appear in studies by Kurz, Spiegelman, and West (1973) and Hausman (1979). Hausman studied families' purchases of room air conditioners. The trade-off between initial outlay and operating costs permitted him to estimate implicit MRTPs. The mean MRTP in his sample was about 25 percent, clearly above any relevant interest rate. Kurz et al. obtained similar results

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their weekly paycheck at the “grog house.” (Others, we believe, avoid the grog house precisely on those days.) He attributes much of the observed differences in behavior to social class. Our differences with Fisher are discussed in the next section.

<sup>13</sup> We define the MRTP to be the marginal rate of substitution between tomorrow's consumption and today's consumption minus one.

by asking hypothetical questions of participants in the Seattle and Denver Income Maintenance Experiments. They asked a sample of participants a series of questions of the following sort: What size bonus would you demand today rather than collect a bonus of \$100 in 1 year? Several different forms of this type of question were asked, and the results were striking. For whites the mean rate of time preference implied by their answers varied between 36 and 76 percent. For blacks the rates varied between 40 and 122 percent. Of particular interest for present purposes is the fact that this sample included only those respondents who said they could borrow either \$500 to make an installment purchase or \$1,000 in cash. Furthermore, 81.3 percent of this subsample reported that they would not borrow \$1,000 at current interest rates. (The mean perceived rate was generally less than 20 percent.) This strongly suggests the use of self-imposed borrowing constraints.

Once individual differences in MRTPs are anticipated, it becomes interesting to ask what factors determine those differences. A detailed examination is beyond the scope of this paper, but the model predicts that those factors determining individual rates of impatience will (for the reasons stated above) also affect observed MRTPs. These factors are discussed at length by Fisher (who draws on the writings of John Rae and Eugen Bôhm-Bawerk). Fisher believed that age, income, and marital status affect the rate of impatience (in obvious directions). He felt that the shape of the income stream as well as the level was important; if income were expected to rise, the rate of impatience would be higher. Six "personal characteristics" were also deemed to be important: foresight, self-control, habit, expectation of life, concern for the lives of other persons, and fashion.<sup>14</sup>

In principle, the planner-doer model can be tested against the standard model quite simply. Observe some intertemporal choice that implies a discount rate (such as Hausman's study of air conditioners). Then regress the implied discount rate on the factors above *and* the individual's borrowing rate. The standard framework implies that only the borrowing rate will be a significant predictor. Our model implies that the other factors will also be important. Hausman did test one such variable. The implied rate of discount was computed for six income classes. His results appear in table 1. Clearly the variation in discount rates cannot be attributed solely to variations in borrowing rates.

We would also expect age and social class to be important in predicting individual intertemporal choices. The young behave impatiently in part because they have yet to master the techniques of

<sup>14</sup> Fisher 1930, p. 81. On this topic also see Maital and Maital (1977).

TABLE 1

ESTIMATED DISCOUNT RATES USING MEAN POPULATION ESTIMATES

| Income Class<br>(\$/yr) | Observations ( <i>N</i> ) | Implied Discount<br>Rate (%) |
|-------------------------|---------------------------|------------------------------|
| 600                     | 6                         | 89                           |
| 10,000                  | 15                        | 39                           |
| 15,000                  | 16                        | 27                           |
| 25,000                  | 17                        | 17                           |
| 35,000                  | 8                         | 8.9                          |
| 50,000                  | 3                         | 5.1                          |

SOURCE.—Hausman 1979.

self-control. To the extent that these techniques are learned from parents, class differences will be observed. Most important, our model stresses the theoretical admissability of these variables. Only further empirical work can establish their relative explanatory power.

IV. Summary and Conclusion

We now briefly recapitulate our argument. We have investigated intertemporal choice as a problem in the economic theory of self-control. As the quotation at the beginning of Section I states, the concept of self-control is paradoxical unless some kind of multiself model of man is adopted. We have introduced self-control into a formal model of intertemporal choice by modeling man as an organization with a planner and many doers. Conflict occurs because the doers are myopic (i.e., selfish). This conflict is fundamentally similar to the agency relationship between the employer and the employee, and individuals use many of the same strategies that organizations adopt to deal with their “conflicts of interest.” These strategies can involve doer/employee discretion while their incentives have somehow been altered, or they may entail the implementation of precommitment (a rule) to avoid the doer/employee decision process altogether.

The close correspondence between the solutions to control problems adopted by organizations and individuals provides strong support for our model. Although our model is nontraditional, our tools are strictly traditional. Formally, our model closely resembles that used by Ross (1973) in his study of the theory of agency. Finally, we note that ours is a theory of rational behavior, just as Ross’s theory is of profit-maximizing behavior.

Many applications of the model are possible, and we have discussed a few briefly. The most important applications are in the study of

individual saving behavior. Our hypotheses are quite different in spirit from the permanent income and life-cycle hypotheses that currently dominate the literature. On the basis of the evidence presented here, we feel these theories of saving should be reevaluated.

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