

# Do Workers Prefer Increasing Wage Profiles?

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We present survey data challenging the assumption implicit in analyses of labor supply that, all else being equal, workers prefer declining over increasing wage profiles. We test several explanations for our results, including that (a) there is something special about wages (e.g., their association with productivity), as opposed to other types of payments, that induces the preference for increasing wages; (b) utility depends not only on absolute levels of consumption but also on changes in consumption over time; and (c) respondents who prefer increasing wage profiles are irrational and would change their behavior if the rationale for preferring declining wages were explained.

## I. Introduction

The pattern of wages over the life cycle has been subject to extensive theoretical and empirical scrutiny. While the existence of a positive and concave relationship between wages and market experience is well established, the reasons for this relationship are subject to debate. Standard labor economics suggests that the observed pattern of wages reflects optimal

We thank Shmuel Kandel, Bill Lang, Lalith Munasinghe, Chris Paxson, and Richard Thaler for helpful suggestions. Amy McCready's superb research assistance and the support of Joyce Gardella and Sandra McIntyre at the Chicago Museum of Science and Industry are also gratefully acknowledged. This research was supported by grants to Loewenstein from the Alfred P. Sloan Foundation and the IBM Faculty Research Fund at the University of Chicago and to Sicherman by the John M. Olin Foundation through the Center for the Study of the Economy and the State, University of Chicago, and NSF grant SES-8513470.

[*Journal of Labor Economics*, 1991, vol. 9, no. 1]  
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0734-306X/91/0901-0002\$01.50

life-cycle investment in general human capital (Becker 1962; Mincer 1962). Wage growth, therefore, is equivalent to the returns to investment in on-the-job training plus the change (reduction) in the investment from period to period minus depreciation of the stock of human capital (Mincer 1974). Larger amounts of on-the-job training will result in steeper wage profiles.<sup>1</sup>

The introduction of labor-fixed costs (Oi 1962) or firm-specific human capital (Becker 1964) qualifies these predictions. Since investment in firm-specific human capital is assumed to be shared by worker and firm, the resulting wage profiles will be flatter than the path of productivity (Hashimoto and Yu 1980). Therefore, human capital theory suggests that wage profiles are either equivalent to or flatter than productivity growth over the life cycle.

Some of the studies that have tested this relationship empirically, however, have found wage profiles to be steeper than measures of productivity growth.<sup>2</sup> Medoff and Abraham (1980) found that, within job categories, wages tended to rise over time while supervisor performance evaluations (a proxy for productivity) were relatively flat.<sup>3</sup> Taking a somewhat different approach, Frank and Hutchens (1988) showed that, even in professions such as airline pilot and inter-city bus driver, where productivity would seem to be relatively static, workers receive wages that rise substantially with tenure. Similar findings were obtained in an earlier study of “accelerating obsolescence of older engineers” (Dalton and Thompson 1971). Also consistent with the notion that wages rise faster than productivity is the finding of a so-called tenure effect (Mincer and Jovanovic 1981)—the observation that wages within a firm rise relative to alternatives as job seniority increases.<sup>4</sup>

There are several reasons why wage growth might outstrip productivity growth. Deferred compensation may deter shirking by raising the monetary consequences to a worker of being fired (Lazear 1981). Alternately, deferred wages may serve as a self-selection device to discourage workers with high quit propensities from joining the firm (Salop and Salop 1976). Other

<sup>1</sup> For empirical evidence, see Duncan and Hoffman (1978), Topel (1986), Mincer (1988), and Brown (1989).

<sup>2</sup> Estimating the actual relationship between wages and productivity is problematic since productivity cannot in general be measured directly. Hence, most studies rely on indirect measures of productivity, limit the analysis to specific jobs, or ignore promotions and turnover.

<sup>3</sup> This approach was later criticized by Weiss and Landau (1985), who argued that the correlation between wages and productivity within a job category would be attenuated if productivity were used as a criterion for promotion.

<sup>4</sup> The tenure effect has been the focus of recent controversy. A number of economists have argued that the observed seniority premium is a statistical artifact (e.g., Abraham and Farber 1987; Altonji and Shakotko 1987; Marshall and Zarkin 1987), while others have found the effect to be substantial and significant (e.g., Topel 1990).

explanations rely on the assumption that workers are more risk averse than the firms they work for (Harris and Holmstrom 1982) or that firms can earn a higher rate of return on assets than workers. In the latter view, firms invest a fraction of workers' wages early in their careers and dole out the returns in the form of deferred wages.

This article offers an additional explanation for the observed life-cycle pattern of wages. We argue that many workers actually *prefer* increasing wage profiles over flatter or decreasing wage profiles of greater monetary present value. Only a minority of the respondents in our survey made choices consistent with present-value maximization. Below we present our findings, explore alternative explanations for the observed preference for increasing wage profiles, and consider broader implications for economic behavior.

## II. Theory

A common assumption in analyses of labor supply is that workers maximize the present value of expected lifetime earnings.<sup>5</sup> If this is the case, then, given a positive real rate of interest, a worker presented with alternative income sequences  $X \equiv (x_1, \dots, x_n)$  and  $Y \equiv (y_1, \dots, y_n)$  for otherwise identical jobs, where  $\sum x_i = \sum y_i$ ,  $x_i > y_i$  for  $i = 1, \dots, j$ , and  $y_i > x_i$  for  $i = j + 1, \dots, n$ , should select  $X$  over  $Y$ . Additional realistic assumptions, such as borrowing constraints, a possibility of layoff or of quitting prior to the end period, should only increase the relative appeal of  $X$ . Sequence  $X$  dominates  $Y$ ; by selecting  $X$  and saving appropriately, workers could enjoy greater consumption in every period. Any choice that does not conform to present value maximization violates dominance—a fundamental axiom of choice.

Given the apparent force of this argument, why might workers prefer more steeply increasing wage profiles over flatter or decreasing wage profiles with higher present values? We suggest four possible reasons. First, workers may associate wages with productivity and derive utility from a feeling of mastery when wages increase. Robert White (1959) argued that people derive satisfaction from the perception that they have mastered their environment. One obvious proxy for mastery is productivity and wages. Even in situations where wages are unrelated to productivity, the association may be so deeply ingrained that a link is nevertheless (perhaps unconsciously) assumed.

There is a simple way to determine whether mastery underlies an observed preference for increasing wages. If such a preference is motivated by the desire for mastery, we would not expect a similar preference to apply to payments not linked to personal effort. Therefore, we can test

<sup>5</sup> Of course, a more general formulation would include other forms of compensation and leisure considerations.

the mastery argument by comparing preferences toward wage sequences with preferences for payment sequences that are unrelated to personal accomplishment.

Second, workers could anticipate a need for increased future expenditures (e.g., due to an expanding family) but could experience difficulty controlling spending in early periods. The problem of self-control has received considerable attention from economists and psychologists. A basic finding in experimental work on time preference is that people do not exhibit constant exponential discounting but tend to value disproportionately consumption options that are immediately available (Ainslie 1975). As Strotz (1955) demonstrated, such a discount function implies “time-inconsistent” behavior: individuals will consistently consume more in the present than called for by earlier plans. Strotz’s contribution has spawned a substantial literature on time consistency and on the tactics that individuals use to control their own consumption behavior (Kanfer 1970; Schelling 1984). This work helps to shed light on otherwise anomalous phenomena such as Christmas clubs (Stigler 1966), overwithholding on taxes, and simultaneous saving and borrowing at a higher rate of interest (Thaler and Shefrin 1981). In the context of our experiment, we would interpret a preference for upward sloping nonwage payments as evidence of a self-control problem since without such a problem a less sloped payment profile could provide greater consumption in every period of an optimal consumption plan.

Third, a preference for increasing wages or payments could be explained by a self-control problem combined with a utility function that depends positively on changes in as well as absolute levels of consumption (Scitovsky 1965; Frank and Hutchens 1988; Frank 1989). Berlyne’s “activation theory” (1967) states that people adapt to a certain level and pattern of stimulation from the environment and derive satisfaction from moderate positive deviations from that level (see also McHose 1970). Other research, on decision making under uncertainty (Markowitz 1952; Kahneman and Tversky 1979) and intertemporal choice (Loewenstein 1988), suggests that people are concerned with losses and gains or deviations from some adaptation level, either instead of, or in addition to, absolute levels of consumption or wealth. A preference for increasing levels of consumption could lead to a preference for increasing payments if workers experience self-control problems that prevent them from saving adequately in early periods to finance the desired increases.

Finally, a preference for increasing payments could arise if workers derive utility in the present from anticipating future consumption. Increasing sequences offer high end-of-sequence payoffs that can be “savored” in each of the preceding periods. Loewenstein (1987) presents evidence that savoring and dread—that is, utility from anticipation—affects economic decisions in predictable ways. For example, the commonly observed tendency

to get unpleasant outcomes over with quickly, rather than deferring them as positive time preference would predict, can be viewed as an attempt to shorten the period of dread that would otherwise precede the outcome. Like the previous explanation, this one assumes that workers have a self-control problem that prevents easy transformation of decreasing payment into increasing consumption sequences.

An important question concerns whether violations of present-value maximization (and hence dominance) should be treated as errors in decision making or as rational manifestations of a preference function that includes arguments other than absolute levels of consumption. This question is analogous to the debate over the status of Savage's independence axiom. While few have argued that independence accurately *describes* decision-making behavior, several social scientists, including Savage himself, have argued that if people understood independence they would want to satisfy it. Hence, they argue, violations of independence can be viewed as unintentional errors in decision making. To address this question, Slovic and Tversky (1974; see also MacCrimmon 1968) presented subjects with arguments for and against the independence axiom, had them rate the arguments' persuasiveness, and then make further choices to determine whether they had been affected by the arguments. Below we adopt an analogous approach.

### III. The Study

We approached eighty adults who were visiting the Museum of Science and Industry in Chicago and asked them to fill out a questionnaire. Respondents were paid \$3.75 for participating. The age range of our sample was from 17 to 77 (median = 32). Forty-nine percent of the sample were male, 42% were married, and the median and modal yearly income was from \$30,000 to \$40,000. Twenty-six percent of the sample were high school graduates, 23% had some college, 31% had graduated from college, and 20% possessed an advanced degree.<sup>6</sup>

Respondents were given one of two questionnaires. One asked them to rank alternative payment options for a job; the other elicited rankings of alternative payment options for rental income from a small apartment building. The job questionnaire stated, "Imagine that you are not working now, but have been offered a five year job, and are presented with a choice between different payment options. Assume you are certain that you will work at this job during the next five years and that the payment option

<sup>6</sup> This survey is the third we have conducted on wage preferences using a similar questionnaire and the second using respondents at the Museum of Science and Industry in Chicago. Although we restrict our discussion to the second survey, which eliminates certain ambiguities of interpretation, it should be noted that the current results closely parallel those from the first two. The total number of individuals interviewed is above 250.

you select will not affect future jobs in any way. The wages from this job will be your only source of income over the next five years.”

The rental income questionnaire stated, “Imagine that you are not working now and your only source of income is a small apartment building that you recently inherited. You have agreed to lease the building to a real estate broker for the next five years. The broker has offered you seven different payment options. Assume that these payments will be your only source of income during the next five years.” The rental income questionnaire was introduced to test the “mastery” explanation for preferring increasing wage payments. Since such payments are unrelated to individual effort, any preference for increasing payments cannot be explained by satisfaction derived from mastery.

After introducing the payment source (wages or rental income), the remainder of both questionnaires were identical. Both then asked respondents to rank seven different payment options from 1 (the one they liked best) to 7 (the one they liked least). All options involved the same undiscounted total payoffs but differed in slope. One had a decreasing slope, one had a constant slope (yearly payments of \$25,000 over 6 years), and there were five increasing profiles with different slopes. Table 1 summarizes the seven options. Alternatives were presented to respondents in the form of bar graphs as in figure 1.

Given a positive discount rate, the present value of a payment stream is decreasing with the slope of the payments profile. Therefore, a present-value maximizer will rank the decreasing profile highest, followed by the flat profile, and so on, where the steeper the profile the lower the rank. In the first stage of the experiment, we asked respondents to rank all seven profiles (1 for the most preferred to 7 for the least preferred).

In the second stage of the experiment, respondents were presented with an increasing and decreasing payment sequence, each depicted graphically (see fig. 2), and were asked which sequence they would prefer. They were then asked to explain, in words, their preference between the two sequences. Their responses were transcribed by the experimenter.

**Table 1**  
**Yearly Income Offered by Different Jobs (In Thousands of Dollars)**

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	P.V.*
Job 1 (decreasing)	27	26.2	25.4	24.6	23.8	23	120.8
Job 2 (flat)	25	25	25	25	25	25	119.8
Job 3	24	24.4	24.8	25.2	25.6	26	119.2
Job 4	23	23.8	24.6	25.4	26.2	27	118.7
Job 5	22	23.2	24.4	25.6	26.8	28	118.2
Job 6	21	22.6	24.2	25.8	27.4	29	117.6
Job 7	20	22	24	26	28	30	117.1

\* P.V. = present value assuming an annual discount rate of 10%.

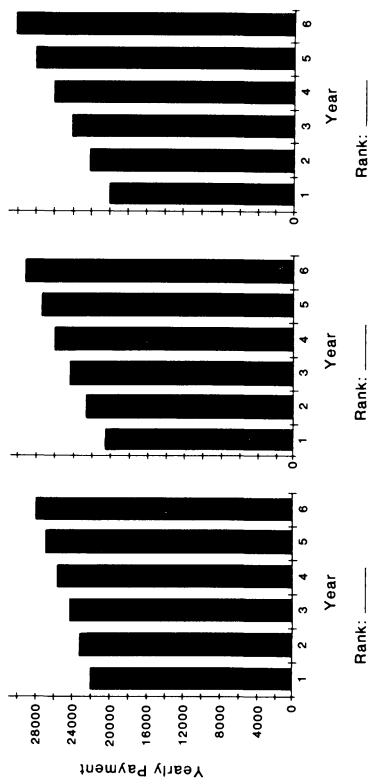
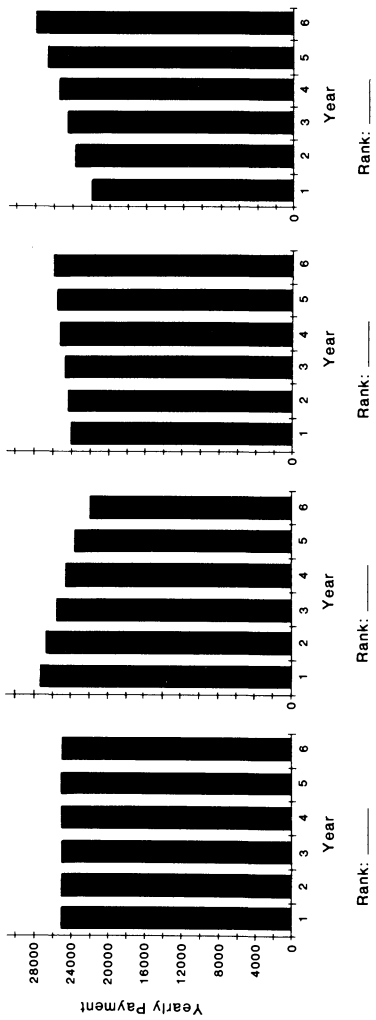


FIG. 1.—Graphical depiction of seven alternative payment options

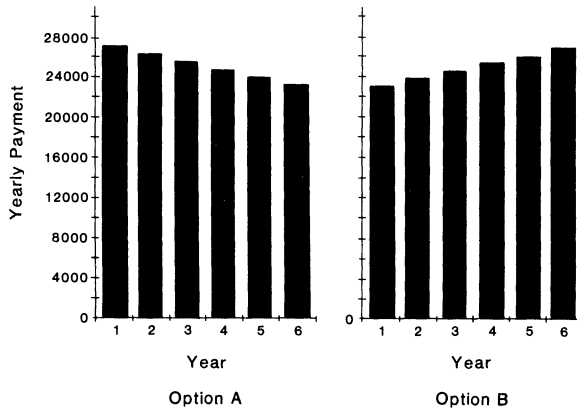


FIG. 2.—Graphical depiction of increasing and decreasing payment options

Next, respondents were presented with the same two sequences, depicted graphically, and with conflicting arguments why they should prefer one or the other. The argument favoring decreasing payments read, “Some researchers believe people should prefer option A [the declining sequence]. Their argument is that you can put part of the extra money you get at the beginning into the bank and withdraw it with interest later on. In fact, by choosing option A you could have more money every year.”

The argument favoring increasing payments was, “Other researchers believe people should prefer option B [the increasing payment profile]. Their argument is that, first, it is satisfying to get a bigger payment each year. Second, even though you *could* save money in the first few years, it is often difficult to save money. Option B gives more spending later without worrying about putting money away in the first few years.”

Respondents specified which argument they found more convincing, or whether they found both arguments equally convincing. Finally, they were asked to rerank the seven payment sequences in light of the arguments.

#### IV. Findings

To begin with, we focus on rankings made prior to exposure to the arguments. For wage payments, only 7.3% of the sample (three out of 41) based their choice solely on present-value consideration (i.e., they ranked the declining sequence first, the flat sequence next, etc.). For rental income, 23.1% (nine out of 39) of choices conformed to present-value maximization. The difference between the two groups is significant ( $\chi^2(1) = 3.9, p < .05$ ). If we look more broadly at the number of respondents who ranked the declining profile highest, a similar pattern emerges. For wage payments, 12.2% of respondents preferred the declining profile over all other options. The comparable figure for rental income payments is 33.3%. On average,



the third steepest increasing wage profile received the highest rank for wages (mean rank = 3.4), and the shallowest positively sloped profile was the most highly ranked rental income option (mean rank = 3.5). Comparing only the decreasing payment sequence and its mirror image increasing counterpart, a majority of respondents preferred the increasing sequence: 83% (34 out of 41) of those who responded for wages, and 56% (22 out of 39) for rental income.

Another way to analyze departures from present-value maximization is to examine the amount of money that respondents would sacrifice in terms of present value if they received their most preferred payment option rather than the present-value-maximizing decreasing profile. Assuming a discount rate of 10%, the present value of the declining payment option is \$120,829, while that of the most steeply increasing option is \$117,121, a difference of \$3,708. Respondents whose questionnaires referred to wages were willing to sacrifice, on average, \$2,351 to obtain their preferred payment option rather than the present value-maximizing declining payment option. Those who dealt with rental income were willing to sacrifice \$1,764. The difference between these amounts is marginally significant ( $t(78) = 1.8$ ,  $p < .07$ ).

Two important patterns emerge from these results. First, contrary to the prediction of conventional discounting theory, a majority of respondents in both conditions expressed a preference for increasing payment sequences. Second, this preference was more pronounced for wage payments than for rental income. There does seem to be something special about wages that contributes to, but is not the sole cause of, the preference for increasing payments.

### The Effect of the Arguments

The observation that most respondents preferred increasing over decreasing payments raises an important question: are observed preferences for increasing wages (and to a lesser extent, rental payments) due to errors of decision making or to informed choices that incorporate psychological factors not included in conventional formulations of life-cycle optimization? We explore this issue by examining respondents' reactions to the economic and psychological arguments favoring increasing and decreasing payments and by evaluating the effect of the arguments on their subsequent choices.

Turning first to the respondents' reactions to the arguments, 68% responding to wages found the argument favoring increasing wages more persuasive, 30% found the argument favoring decreasing wages more persuasive, and 3% (one subject) found the arguments equally persuasive. For rental income, 40% found the argument favoring increasing payments more convincing, 57% were more persuaded by the arguments favoring decreasing payments, and 3% (one subject) found the arguments equally convincing. The proportions of respondents in the wage and rental income

conditions who found the argument favoring increasing payments more convincing are significantly different ( $\chi^2(1) = 5.8, p < .02$ ); on average, respondents found the psychological argument favoring increasing payments more convincing for wages but the economic argument favoring decreasing payments more convincing for rental income.

Exposure to the arguments had a marginally significant impact on respondents' rankings. Aggregating over wage and rental income conditions, respondents were willing to sacrifice less in present value (\$1,865) after exposure to the arguments than before (\$2,065) ( $t(79) = 1.75, p < .08$ ) to obtain their most preferred payment option. However, surprisingly, given the greater judged persuasiveness of the economic argument for rental income, the shift of preferences was more marked in the wage condition. For wages, choices consistent with present-value maximization increased from 7% to 22% after exposure to the arguments. For rental payments, the increase was from 23% to 28%. Possibly this unexpected difference reflects the lower initial percentage of present-value maximizers in the wage condition. Not only does exposure to the arguments increase preferences for the declining profile, it also reduces the discrepancy between preferences regarding wage and rental income.

It thus appears that for some respondents choice of the increasing sequence was an error that was corrected when they understood its objective consequences. However, the majority of respondents continued to favor increasing payments, even following exposure to the arguments. Averaging over both groups, only 25% of respondents' choices conformed to present-value maximization after exposure to the arguments, and increasing payment options still received the highest mean rankings in both the wage and rental income condition. After exposure to the arguments, the most preferred payment option was the least steeply sloped increasing profile for wages (mean rank = 3.4) and the second least steeply sloped increasing option (mean rank = 3.5) for rental income. The preference for increasing payments cannot be dismissed as a decision error.

Another way to examine rationality is to compare the behavior of respondents who, a priori, we would expect to behave more or less rationally. Such respondents would include those who are older (and more experienced), more educated, and, possibly, those with higher incomes. Intuitively, these respondents might be more likely to understand and be familiar with the concept of present value. To determine whether these characteristics were related to payment preferences, we estimated logit regressions of age, school, yearly income, gender, and marital status against a binary variable equal to one for second-stage (postargument) present-value maximizers and zero for all others. The estimation results for the full sample and for the wage and rental income conditions analyzed separately are presented in table 2.

**Table 2**  
**Relationship between Present Value Maximization and Individual Characteristics, Maximum Likelihood Logit Estimation**

	Full Sample	Wages	Rental
Intercept	-4.9 (1.7)	-4.15 (2.3)	-8.9 (3.8)
Age	.066 (.03)	.037 (.036)	.20 (.08)
College graduate	.827 (.60)	.96 (.92)	.71 (.98)
Yearly income	.00002 (.00001)	.00001 (.00002)	.00002 (.00002)
Gender (1 = female)	-1.19 (.62)	-.22 (.83)	-4.2 (1.8)
Married	1.35 (.75)	.98 (.98)	2.4 (1.5)
No. of observations	80	41	39
-Log likelihood	38	20	14

NOTE.—Standard errors are in parentheses.

The coefficients for age, education, and income all have the predicted sign for both wages and rental income, although few of the effects are significant. Older individuals, college graduates, and people with higher incomes are more likely to be present-value maximizers, though the effects are far more significant for rental income than for wages. These findings suggest that individuals who are more informed do conform more closely to present-value maximization, although the relationships are weak. Males and married persons are also more likely to maximize present value.

#### Analysis of Respondents' Verbal Explanations for Their Choices

The finding that most respondents still prefer increasing payments after exposure to the arguments suggests that such preferences cannot be dismissed as mistakes. How, then, can we explain this preference beyond speculating that self-control, sensitivity to changes in consumption, and utility from anticipation play a causal role? The second stage of our study, in which respondents gave verbal explanations for their choices, provides an additional means of examining the determinants of payment preferences. Although such verbal accounts are generally disparaged in economics, recently they have been employed with increasing frequency in attempts to understand phenomena, such as rigidity in wage and price setting (Blinder and Choi 1988) and speculative bubbles (Shiller 1988), that are difficult to study with conventional methods.

Table 3 presents a classification of respondents' explanations for their choice between payment options, broken down by wage versus rental income and by preference for increasing versus decreasing options. When

**Table 3**  
**Self-reported Explanations for Choice of Payment Options**  
**(Numbers of Respondents)**

Respondents Who:	Wages	Rental Income	All
Preferred decreasing:			
Present value considerations	5	9	14
Immediate spending needs	2	5	7
Uncertainty of future payments	0	3	3
Preferred increasing:			
Pleasure from increase	20	9	29
Savoring (pleasurable anticipation)	0	3	3
Self-control	2	3	5
Inflation	10	8	18
Aversion to decrease	10	0	10
Motivation, esteem at job	2	0	2
Future spending needs	3	7	10
Insurance against uncertain future	4	4	8

respondents gave more than one explanation for their choice, each reason provided was counted separately. On average, each subject provided 1.3 explanations.

Turning first to those who preferred decreasing payment sequences, it can be seen that the most common explanation was present-value considerations—for example, “the interest I can earn on the larger sum of money earlier would be compounded, so I’d make money rather than getting less at the beginning.” Note that respondents had not heard the arguments favoring the two alternatives at the time they provided explanations for their choice. The second most common rationale for selecting the declining option was an immediate need for money due to a variety of reasons (e.g., an impending marriage). Finally, a small number (three) of respondents expressed worries that later payments might not be forthcoming and, as a result, opted for greater payments up front.

There was a much wider range of explanations provided by those who opted for increasing payments. A large number (29) of respondents cited the pleasure of experiencing an increasing payment stream—“I like increments,” “I’d rather increase than go down in the amount of money coming in,” “Things would get better in the future; you’d know you’d get more money.” The preference for increasing consumption was cited more frequently for wages (by 20 respondents) than for rental income (nine respondents).<sup>7</sup> The second most common explanation (18 respondents) was that inflation causes a decline in the standard of living that the increasing sequence would compensate for—“The rate of inflation; it would make sense to get more money as the years progress rather than making less,”

<sup>7</sup>This discrepancy reflects, in part, the larger number of people in the wage condition who opted for increasing sequences.

“Inflation, and because I’d rather have more money coming, I’d rather just get by in the first years and have more money as I get older.” Inflation can be viewed as a special case of the first explanation, in which respondents implicitly expressed a preference for an increasing (or nondeclining) standard of living. Not a single subject mentioned the possibility that inflation could cause the real rate of interest to become negative.

Third in order of frequency (10 respondents) was an aversion to decreases in income or consumption and future spending needs. The aversion to decreasing payments was entirely concentrated in the wage condition, suggesting a connection with mastery, though such a connection is not directly evident in respondents’ verbal explanations: “I don’t like a decrease,” “If you get accustomed to spending money in Option A, you’d be cutting yourself down. In Option B you’d be saving more. You wouldn’t get used to living in high style.” The fourth and fifth most frequently cited explanations were future uncertainty (eight respondents) and self-control considerations (five respondents). Finally, three cited the pleasure of anticipating future consumption, and two mentioned that they would have difficulty maintaining motivation at work if their pay were to decline.

#### Trade-offs between Pecuniary and Nonpecuniary Benefits

Decisions often involve trade-offs between pecuniary and nonpecuniary costs and benefits. For example, in negotiations, a settlement that makes a party better off in absolute terms may make him or her worse off in relative terms. Such a settlement entails pecuniary gains coupled with nonpecuniary losses in terms of envy or a feeling of having been exploited. Recent research (Loewenstein, Thompson, and Bazerman 1989) suggests that, for many people, relative comparisons of rewards may have a powerful effect on satisfaction with negotiated outcomes.

In decision making under uncertainty, an option that offers a higher expected value may also expose the decision maker to greater potential regret (Bell 1982; Loomes and Sugden 1982) or disappointment (Bell 1985). The effect of regret on decision making has also recently been demonstrated empirically (Cagno and Hey 1988).

In the current situation, many respondents seem to derive positive utility from receiving an increasing sequence of payments or negative utility from a decline in payments, independent of the consumption levels that could be derived from the stream. This preference applies to rental income as well as wages, suggesting that it is not simply due to the association of pay increments with mastery or performance at a job. The taste for increments is strongly evident in the explanations that respondents offered for their preference for increasing over decreasing payments. The most commonly mentioned reason for choosing the increasing payment sequence was a taste for increasing payments. Moreover, three other categories of response—savoring, inflation, and aversion to decrease—are closely related.

Together, these four categories account for a total of 60 out of 84 explanations offered.

A simple model of preference for alternative wage or payment sequences would make utility a function of the discounted present value of a payment sequence and some measure of the gradient. If the marginal rate of substitution between these factors is diminishing, as we would expect if there were declining marginal utility from consumption and declining marginal utility from increases in the rate of change of payments, then preferences for payment streams should exhibit a property psychologists call "single peakedness" (Coombs and Avrunin 1977). Single peakedness, in this context, means that each individual would have a most preferred payment option and that preference would decline monotonically as the slope of the payment profile diverged in either direction from this optimal point (holding undiscounted value constant). In the ranking task our respondents performed, if we focus only on the declining, flat, most extreme, intermediate and least extreme positively sloped profiles, there are a total of 120 possible rankings, of which 13% ( $N = 16$ ) satisfy single peakedness. In our sample, in the first stage of the experiment, 84.6% of rental income responses and 87.8% of wage responses satisfied single peakedness, both proportions being significantly different from 13%. The comparable figures for second-stage responses were 87.2% and 95.1%, respectively. Thus, far more respondents satisfied single peakedness than would be expected on the basis of chance alone.

## V. Discussion

Our findings have several implications for labor economics. First, they challenge the general applicability of discounted present-value maximization. For wages, only a small minority of respondents and, for rental income, less than half the respondents exhibited preferences compatible with present-value maximization. Even after exposure to arguments favoring the decreasing payment option, a majority of our respondents ranked increasing payments higher than decreasing payments.

The widespread preference for increasing wages can explain why observed wage profiles might be steeper than what would be predicted by existing theories. Like other theories that imply deferred payments, ours requires some form of explicit or implicit contract guaranteeing long-term employment. Only with such a guarantee will both parties be able to benefit from the mutual gains offered by asymmetric preferences of workers and firms. However, it should be noted that a counterclockwise present-value-reducing tilt of the wage profile does not necessarily imply a net monetary transfer from workers to employers. In equilibrium, a tilt of the wage profile will be accompanied by an increase in labor demand and a resultant upward shift in wages.

An important question, in light of the choice shifts following exposure to the arguments, is whether preargument or postargument choices more accurately reflect respondents' "true" preferences—those that would predict actual choice behavior. In real life, respondents are rarely confronted with the pro and con arguments, suggesting that preargument ratings might be more predictive. However, there are often opportunities to learn from experience. Whether people typically behave more in line with pre- or postargument responses depends, therefore, on whether a person who opts for the increasing profile becomes aware of the sacrifice. Since people are rarely presented with what would have happened if they had made alternative choices, we believe it is unlikely that people receive negative feedback when they opt for increasing payment options. In any case, responses to our survey suggest that such learning, if it occurs, is not sufficient to induce a widespread preference for declining payments.

The finding of a preference for increasing payments—commensurate with negative time preference—raises the intriguing possibility that such preferences may extend beyond wage preferences to other types of economic decisions. Is there evidence of negative discounting in other domains of economic behavior? For some types of consumer choices, there is evidence of the opposite, namely extremely high discounting. For example, studies of appliance purchases that examined the trade-off between immediate purchase price and delayed energy payments have estimated discount rates ranging from 17% (for air conditioners) to 243% for electric water heaters (Ruderman, Levine, and McMahon 1986). At the same time, however, there are a variety of findings that are consistent with widespread negative discounting of the future. Several studies of life-cycle consumption have found that consumption tends to increase over time until retirement beyond what can be explained by factors such as increased family size, medical costs, and so forth (see, e.g., Courant, Gramlich, and Laitner 1984). Moreover, a large fraction of taxpayers significantly overwithhold taxes from their paycheck, and many academics given the option of being paid in nine or 12 monthly salary installments opt for the latter. Finally, recent studies of real interest rates have revealed rates in the negative range (Mishkin 1981) for long periods. Thus, while the evidence is not entirely consistent, the possibility of widespread negative time discounting can not be dismissed out of hand.

Given the wide range of discounting behavior observed in even a single individual's behavior,<sup>8</sup> however, perhaps the question of whether people discount the future positively or negatively is moot. As a research agenda, it may be more fruitful to address the more nuanced question of why

<sup>8</sup> For further evidence of individual variability in time discounting, see Loewenstein and Thaler (1989) and Loewenstein and Prelec (1990).

intertemporal choice behavior is so variable and to attempt to uncover the situational determinants of time preference.

Our study raises the larger issue of the role of psychology in economics. We have shown that an axiom of choice as basic as dominance is freely violated by respondents, even when informed of their apparent error. Respondents do not see themselves as violating any such fundamental property because they see no contradiction in deriving satisfaction from increasing payments, despite the effect on total consumption. Whether the observed preference for increasing payments is treated as rational or as a mistake depends on whether we are willing to accept a more complex utility function than has generally been assumed.

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