# TAX POLICY, LUMP-SUM PENSION DISTRIBUTIONS, AND HOUSEHOLD SAVING

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## Abstract

As of May 1988, over 8 million workers had received their pension benefits as lump-sum distributions (LSDs) when they changed jobs. In 1986 Congress imposed a 10% tax penalty on the amount of LSDs not rolled over into tax-deferred instruments. This paper examines the effects of this tax penalty on the rollover decisions of LSD recipients. The penalty increases the probability of rollover among higher-income recipients; an increase of 1 percentage point in the penalty is estimated to increase the probability of rollover by 1.1 percentage point. However, the penalty has not affected the rollover decisions of lower-income recipients, who are more likely to be liquidity-constrained.

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## 1. Introduction

As of May 1988, over 8 million workers had received a total of $42 billion (1988 dollars) in pre-retirement lump-sum distributions (LSDs) from their pension plans when they changed jobs. Most of these workers did not roll over their LSDs into tax-deferred instruments (e.g., IRAs) which are close substitutes of pension plans. Instead, they saved their LSDs in non tax-deferred instruments, such as savings accounts, or spent them (Fernandez 1992).

Congress is concerned about the low rollover rate, because the spending of LSDs may reduce workers' accumulated retirement savings. Also, the fact that most LSD recipients choose not to save their LSDs for retirement raises the question of whether the recipients ever intended to save their pension money for retirement (Fernandez 1992). Instead, they may have used the pension plans as tax shelters. To encourage the rollover of LSDs, Congress introduced in the Tax Reform Act of 1986 a 10% tax penalty on the amount of LSDs not rolled over into tax-deferred instruments, like the 10% penalty on premature withdrawals from Individual Retirement Accounts (Joint Committee on Taxation 1987).

This paper examines the impact of the 10% tax penalty on workers' decisions to roll over their LSDs.[1] Past studies of individuals' use of LSDs have not examined the impact of the tax penalty on rollovers (Andrews 1991, Piacentini 1990). Estimates of the tax sensitivity of workers' rollover decisions may provide insight into whether a penalty on consumption actually

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[1]This paper does not examine the rollovers of lump-sum distributions received after age 59½, which are called normal or retirement distributions. In 1990, pre-retirement LSDs (i.e., received before the age 59½) accounted for about 60% of all LSDs and 38% of the total amount of LSDs. Normal distributions accounted for about 25% of all LSDs and 34% of the total amount of LSDs in 1990 (Yakoboski 1994).

increases saving. This study may also contribute to the empirical literature on individuals' saving decision.

The paper proceeds as follows. Section 2 provides background information about when workers receive LSDs and how the tax treatment differs according to the particular use of LSDs. It also details changes in the tax treatment of LSDs that occurred in 1986. Section 3 describes the May 1988 Current Population Survey (CPS), which is the primary dataset. Section 4 describes the econometric framework, data limitations, and econometric issues.

The results are presented in Section 5. The results indicate that the tax penalty significantly increases the probability of rollover among higher-income recipients. In contrast, the tax penalty does not significantly affect the rollover decisions of lower-income recipients. Since lower-income recipients comprise the majority of LSD recipients, the tax penalty has raised considerably more tax revenue than Congress anticipated. During 1987-89, the tax penalty raised over $1.9 billion in tax revenue;[2] Congress anticipated $547 million (U.S. Joint Tax Committee 1987).[3] Section 6 summarizes the main findings and concludes the paper with a discussion of the policy implications of the results.

## 2. Background

Workers can receive their pension benefits as LSDs when they change jobs

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[2]This figure is an estimate from the U.S. Treasury Individual Tax Model dataset for 1984-89 and from the Internal Revenue Service *Individual Income Tax Returns* for 1986-88.

[3]The revenue potential of the tax penalty may have motivated a recent change in the administration of the tax penalty. As of January 1993, workers who choose to receive their LSDs are subject to a 20% withholding tax [IRS Taxpayer Services, Janssen (1992), Schultz (1992)]. This withholding tax was included in the July 1992 bill that extended unemployment benefits; it was expected to pay for part of the cost of the extended unemployment benefits.

under two circumstances. First, certain pension plans give workers the option to take their pension benefits as LSDs upon separation. Workers in such plans can exercise the LSD option and thereby receive LSDs when they change jobs. Defined contribution (DC) pension plans typically give workers the LSD option; whereas, defined benefit (DB) pension plans typically do not.[4] DB plans typically pay workers their pension benefits at retirement, even to those who leave the employers before retirement.

Second, workers may receive LSDs as a result of unilateral cashouts by their employers. The Employee Retirement Income Security Act of 1974 (ERISA) allowed employers to cash out employees with small accrued benefits unilaterally. In other words, employers can give LSDs to workers upon separation regardless of whether the workers want to receive them or not, provided that the amount of accrued benefits is less than the legal maximum unilateral cashout limit. The current maximum unilateral cashout limit is $3,500 (Fernandez 1992).

Workers can allocate their LSDs in three ways: (1) leave the money with the firms they are leaving for future withdrawal, (2) receive checks for the amount of the LSDs and save or spend as they please, or (3) arrange to have the money rolled over into their new employers' DC pension plans.[5] Taxes may affect individuals' choices among these options.

The tax treatment of LSDs has changed over the years. Prior to 1987, individuals paid income taxes on the amount of LSDs that they did not invest in tax-deferred instruments such as Individual Retirement Accounts (IRAs),

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[4]About 10% of DB plans and between 80-90% of DC plans give workers the option of taking LSDs upon separation (Fernandez 1992).

[5]Few pension plans offer workers the option of transferring money from former employers' pension plans.

insurance annuities, or their new employers' pension plans. Investment of LSDs in such instruments is called **rollovers**. Not investing LSDs in tax-deferred instruments will be referred to as **non-rollovers**.

The Tax Reform Act of 1986 (TRA) changed the tax price of non-rollovers in two ways. First, it changed the structure of federal personal income taxes, generally lowering the marginal tax rates[6] and reducing the number of tax brackets. Second, it imposed a 10% penalty in addition to income taxes on the amount of LSDs not rolled over within 60 days of receipt (Joint Committee on Taxation 1987).

Certain workers are exempt from the 10% penalty on non-rollovers of LSDs. For example, workers who receive LSDs because they are totally or permanently disabled are not subject to the penalty. Workers who receive LSDs due to medical expenses which are deductible are also not subject to the penalty. For the purposes of this paper, the exception of interest is that workers who receive LSDs during or after the year they turn 55 years of age are not subject to the 10% penalty (Joint Committee on Taxation 1987). Thus, the penalty raised the tax price of non-rollovers for only younger recipients (under the age of 55).

The following discussion will focus on married recipients filing joint returns. Single recipients experienced similar changes in the tax price of non-rollovers. Figure 1 illustrates the marginal tax price of non-rollovers for married recipients before and after TRA and across age groups (younger and older than 55). Figure 1 shows that in general older recipients faced a lower

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[6]For example, in 1986 the top marginal tax rate for married taxpayers filing joint returns was 50%; in 1987, 38.5%; and in 1988, 33% (Coopers and Lybrand 1986, *Statistical Abstract of the United States* 1982-90 editions).

marginal tax price of non-rollovers in 1987 than in 1986. For older recipients, the change in the structure of the federal income tax rates was the sole source of variation in the tax price of non-rollovers before and after 1986, since they were not subject to the 10% penalty.

Like older recipients, younger recipients faced a marginal tax price of non-rollovers equal to the federal income tax rates in 1986. After 1986, younger recipients were subject to the 10% penalty, such that their marginal tax price of non-rollovers equaled the federal income tax rates plus 10 percentage points. For most levels of taxable income, the net effect of lower marginal tax rates and the 10% penalty has been an increase in the marginal tax price of non-rollovers for younger recipients (Figure 1). In fact, the marginal tax price of non-rollovers increased more for younger recipients with lower taxable income than for those at the high end of taxable income.

## 3. Data

The analysis in this paper is based primarily on data from the May 1988 Current Population Survey (CPS), which includes a supplement on employee benefits. The supplement questions were asked of adults in one-half of the basic CPS sample who were employed for pay at the time of the interview. Out of 109,192 adults in the basic CPS sample 27,701 workers answered the supplement questions. Like the basic CPS data, the supplement data provide weights that allow adjusting the sample to be representative of the U.S. population.

The supplement includes a set of questions about the receipt of LSDs from pension plans on prior jobs. LSD recipients answered questions only about their most recent LSDs. They were asked to report the year they received their most recent LSDs and the amount.

About 8% of the supplement sample, or 2,162 workers, reported having received at least one LSD from a prior job. This translates into a weighted figure of approximately 8.5 million workers who received LSDs. They received a total of approximately $42 billion. This total is in 1988 dollars, as are all dollar figures in subsequent tables.

The distribution of LSD recipiency is not uniform across age or family income (Table 1). Over half of the recipients were under the age of 35 when they received their most recent LSDs. About 45% of individuals who received LSDs had a family income less than $30,000 in 1987. Since younger and lower-income workers are more likely to be liquidity-constrained, Table 1 suggests that liquidity constraints may affect the rollover decisions of most LSD recipients.

The last two columns of Table 1 indicate that the LSDs of younger recipients were small. Recipients under 35 comprised 61% of the recipients yet received only 37% of the total amount of LSDs, a disproportionately low percentage of the total amount. Similarly, individuals with family income less than $30,000 in 1987 received a disproportionately low fraction of the total amount of LSDs.

The distribution of the size of LSDs also is not uniform across age or family income (Table 2). The average amount of LSDs rises with the age at the time of receipt and with the recipients' 1987 family income. While the average LSD was $5,989, the median was $2,451. This discrepancy between the average and the median LSD is due to the fact that most LSDs were small; about 40% of the LSDs were less than $1,000.

The dataset contains yes/no responses to whether individuals allocated any of their LSDs to various uses. An overwhelming majority of recipients

(86.5%) did not roll over <u>any</u> of their LSDs into tax-deferred instruments (Table 3). In fact, approximately 41% of the recipients did not save any of their LSDs.[7] Weighted by dollars, roughly three-fourths of the total amount of LSDs were not allocated to tax-deferred instruments.[8]

Table 3 shows that about 16% of the recipients allocated at least some of their LSDs toward investments such as starting or buying a business, buying a house,[9] or paying educational expenses. About 7% of the recipients reported using some of their LSDs to pay expenses incurred during unemployment. Lastly, slightly over a quarter of the recipients used some of their LSDs for uses not specified in the CPS questionnaire.

Table 3 also shows that the percentage of recipients who save at least part of their LSDs in non tax-deferred instruments (e.g., savings accounts) is substantially higher than the percentage who rolled over their LSDs. Approximately 14% of the recipients invested at least some of their LSDs in tax-deferred instruments; whereas, 24% invested at least some of their LSDs in non tax-deferred instruments. In terms of dollars, the percentage of the

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[7]I defined saving as allocating at least part of an LSD to financial instruments or paying off debt.

[8]The May 1988 CPS supplement does not provide the exact amount of LSDs allocated to various uses. A range of the amount of rollovers was inferred based on the number of uses reported. If a recipient reported more than one use for the LSD, then he/she was assumed to have allocated a minimum of $1 and a maximum of the entire amount to each reported use. Summing across these minimum and maximum figures across recipients produces a range of the total amount rolled over. The median value of the range of rollovers is $9.4 billion or about 22% of the total amount of LSDs.

[9]Buying a house can be considered a form of saving for retirement, since individuals can use the value of the house to obtain financial resources via instruments such as home equity loans and reverse mortgages; however, Venti and Wise (1989) show that the elderly are reluctant to reduce housing equity. This suggests that financing consumption during retirement may not be the main motivation for buying a house.

total amount allocated to non tax-deferred instruments is around 23%, which is about the same as the percentage allocated to tax-deferred instruments.

## 4. Econometric Framework and Issues

### *4.1. Econometric Framework*

The estimation procedure is based on the probit model. Data limitations compelled the use of a discrete dependent variable. The ideal dependent variable is the amount of the LSD rolled over into tax-deferred instruments, such that the effect of the penalty on the amount rolled over can be estimated. The May 1988 CPS does not provide information on the amount rolled over but yes/no responses to whether any of the LSD was allocated to particular uses. The dataset allows inference about whether recipients rolled over none, some, or all of their LSDs.

Within the context of the probit model, the observed discrete choice of recipient $i$ to roll over at least some of his/her LSD is assumed to be the outcome of an unobservable process:

$$S_i = \begin{cases} 1 \ if \ s_i^* > 0 \\ 0 \ if \ s_i^* \leq 0 \end{cases} \tag{1}$$

where $S_i$ denotes the observed rollover decision of the recipient; and $s_i^*$, the unobservable desired amount of LSD rollover. $S_i$ has been defined as equal to 1 if a recipients rolls over at least some of his/her LSD and 0 otherwise.[10] Based on the probit model, the following equation is estimated:

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[10] $S_i$ can also be defined as equal to 1 for recipients who roll over all of their LSD and 0 otherwise. The results using this measure of $S_i$ are similar to those presented in the paper. I also estimated ordered probit equations, where $S_i$ equals 2 for rollover of the entire LSD, 1 for partial rollover, and 0 for no rollover. The similarity in the results is not surprising, since 79% of recipients who rolled over any of their LSDs actually rolled over their entire LSDs.

$$Pr(S_i=1) = \Phi(\beta' x_i) \tag{2}$$

where $\Phi(.)$ is the cumulative distribution function for a standard normal distribution; and $x_i$, a vector of observable characteristics of the recipient and of the LSD.

The following factors may influence the rollover decision and have been included in the vector $x_i$: (1) the amount of the LSD in 1988 dollars, (2) the federal income tax rates (MTRs), (3) the 10% tax penalty,[11] (4) age at the time of receipt of the LSD, (5) family income, (6) years of schooling completed, (7) gender, and (8) marital status. The means and standard deviations of the variables used in the probit estimation are in Table 4.

I allowed the MTRs and the tax penalty to have separate effects on the probability of rollover, because their effect on rollovers may differ according to the income of the recipients. For example, Figure 1 shows that there are fewer tax brackets at the higher end of taxable income than at the lower end. This implies that the 10% penalty is the major source of variation in the marginal tax price of non-rollovers for higher-income recipients. This is especially true for the recipients in the top tax bracket, for whom the 10% penalty is the only source of variation in the marginal tax price of non-rollovers. For lower-income recipients, both the MTRs and the penalty generate variations in the marginal tax price of non-rollovers.

Changes in the tax price of non-rollovers imposed by the Tax Reform Act of 1986 (TRA) make possible the identification of the effect of MTRs on rollover decisions. Because the MTRs are a nonlinear function of family income, without the 10% penalty the effect of MTRs on rollovers cannot be

[11]The tax penalty variable equals 0.1 for younger recipients after 1986 and 0 for all other recipients.

identified from the effect of family income on rollovers.[12]

The imposition of the tax penalty on younger recipients provides a natural experiment, whereby recipients with similar characteristics faced different tax prices depending on their age and whether they received their LSDs before or after TRA. The older recipients serve as the "control" group, since they were not subject to the 10% penalty. The younger recipients were subject to the 10% penalty after 1986 and thus are the "treatment" group.[13] Difference-in-difference probit equations can be used to test whether the penalty had any effect on the "treatment" group relative to the "control" group. Rollovers should have increased more among younger recipients than among older recipients after 1986, all else being equal.

The sample for the probit equations has been limited to workers who received LSDs between 1984-88. Not including years earlier than 1984 is an attempt to control for aggregate conditions. Ideally, the sample would include the two years before and two years after 1986, the year the Tax Reform Act of 1986 was passed. Given that the CPS was taken in May 1988, the sample includes data for only about 1½ years after the passage of TRA.

### *4.2. Data Limitations*

The advantage of using the May 1988 CPS dataset is that it provides detailed information about pre-retirement LSDs for a representative sample. From the CPS, workers who were subject to the 10% tax penalty can be accurately identified. However, the CPS does present several data limitations for the computing the federal income tax rates. The most severe limitation is

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[12]Feenberg (1987) gives a clear discussion of this identification issue.

[13]For a discussion of difference-in-difference estimation, see: Gruber (1992).

the availability of family income only for 1987.

To estimate the recipients' family income and their federal marginal tax rates (henceforth, MTRs) at the time of receipt of the LSDs, I assumed that real family income at the time of receipt was highly correlated with family income in 1987. This assumption will be too strong if most workers receive their LSDs as a result of being laid off and experience large unexpected drops in income in the year they received their LSDs.

Tabulations from the CPS data suggest that only about 10% of workers who received LSDs as a result of layoffs in 1987.[14] Furthermore, only 7% of recipients used their LSDs to pay expenses while unemployed (Table 3). These tabulations suggest that most workers do not experience large unexpected drops in their income when they receive their LSDs.

Other considerations pertain to the validity of the assumption. First, MTRs apply to brackets of income; therefore, the MTRs computed from the true income in the year of LSD receipt may not differ much from the MTRs computed from income in 1987. Second, the analysis is limited to the period 1984-1988. Thus, the difference in time between the time of LSD receipt and 1987 is at most three years. These considerations suggest that the assumption may not be too unreasonable.

The second data limitation is the availability of the 1987 family income in brackets. To compute MTRs, I assumed the recipients had 1987 family income equal to the median value of the income brackets. In other words, if a

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[14]This figure is based on workers who received their LSDs in 1987 or 1988. For this group of workers, the May 1988 CPS provides enough information to infer whether they received their LSDs as a result of quits or layoffs. Results from probit equations estimated for this group indicate that whether a worker was laid off in 1987 did not have a significant effect on the rollover decision.

recipient reported having a family income in 1987 between $30,000-34,999, he/she was assumed to have had family income equal to $32,500 in 1987.

Other assumptions were required to compute MTRs. First, the marital status of the recipients as reported in 1987 was assumed to be the same in the year they received the LSDs. Second, married recipients were assumed to file joint returns. Third, recipients were assumed to take the standard deductions and not to itemize deductions. Lastly, single recipients were assumed to take one personal exemption; and married recipients, two personal exemptions. The number of dependent exemptions was based on the assumption that the number of children in the year of LSD receipt was the same as the number of children reported in the May 1988 CPS.[15]

### *4.3. Self-Selection Bias*

Using the CPS data to estimate the effect of the tax penalty on the rollover of LSDs raises the issue of self-selection bias. A self-selection bias may be present, because the sample consists of only workers who received LSDs and does not include all workers who had the LSD option. The total effect of the tax penalty on rollovers consists of two components: (1) the effect on the decision to exercise the LSD option and (2) the effect on the decision to roll over an LSD that has been received.

With a sample of LSD recipients, the second effect is estimated without taking into account the first effect; this will produce a self-selection bias. Because individual-level data are not available with which to separate workers with and without the LSD option (i.e., belong to pension plans that allow

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[15]Results from probit equations with and without personal and dependent exemptions are not substantively different.

LSDs),[16] econometric "corrections" for self-selection bias (e.g., Heckman's two-step procedure) cannot be utilized.[17]

Although I cannot correct for the self-selection bias, the direction of the self-selection bias makes the estimated effect of taxes in Section 5 more plausible. If the tax penalty induced many workers to leave their pension money with their former employers, then the estimated effect of the tax penalty on the rollover decisions of workers who chose to receive LSDs will be lower than the true effect for all workers who had the LSD option. In other words, since leaving the money with the employers is equivalent to rollovers, my sample underrepresents the number of rollovers due to the penalty. Thus, if a self-selection bias is present, then the estimated effects of the MTRs and the tax penalty in Section 5 are lower bounds on their true effects for all workers eligible for LSDs.

## 5. Results

### *5.1 Aggregate Evidence*

Aggregate data indicate that the 10% tax penalty has not increased rollovers to the extent that Congress expected. Hence, it has raised more tax revenue than Congress anticipated. Congress anticipated raising $547 million in revenue from the tax penalty during 1987-89. The next table shows that the

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[16]A Gallup survey conducted during February-June 1991 provides the only available figures on the number of workers who left their pension money with their former employers. It indicates that only 17% of individuals between the ages 18 and 54 who had the LSD option chose not to exercise the option. The sample consisted of 327 individuals. David Wray at the Profit Sharing Council kindly provided the survey results.

[17]For a description of Heckman's two-step procedure, see Chapters 8 and 9 in Maddala (1983).

tax penalty actually raised over $1.9 billion in revenue during 1987-89.[18]

**Tax Revenue from the Tax Penalty**

| Year | Number Paid Penalty (thousand) | Collected Revenue (million) | Anticipated Revenue (million) |
|---|---|---|---|
| 1987 | 876 | $364 | $97 |
| 1988 | 1,524 | 711 | 209 |
| 1989 | 1,653 | 833 | 241 |

Source: IRS U.S. Treasury Individual Tax Model File and SOI publications (number paid penalty, collected revenue); U.S. Joint Tax Committee, p. 719 (anticipated revenue)

The number of recipients who paid the 10% LSD penalty and the collected revenue from the penalty are estimated from the U.S. Treasury Individual Tax Model and SOI publications. The IRS aggregates figures for the 10% penalty on premature IRA withdrawals with those for the 10% penalty on non-rollover of LSDs. To estimate the figures for the 10% LSD penalty, I assumed that for 1987-89 the number of taxpayers who paid the 10% IRA penalty and the revenue from the IRA penalty were the same as in 1986.[19]

Tabulations from the May 1988 CPS also suggest that the impact of the penalty on the overall group of LSD recipients has been small. The following

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[18]Figures from the May 1988 CPS are similar to those in the table. Based on the CPS data, about 926,000 LSD recipients paid an estimated $360 million in tax penalty in 1987. Figures for 1988 cannot be tabulated from the CPS, since it does not cover the entire year of 1988.

[19]How this assumption biases the figures for the 10% LSD penalty is ambiguous. If the upward trend in the revenue from the IRA penalty during 1984-86 continued during 1987-89 or if more taxpayers made premature IRA withdrawals in 1987-89 to make advantage of the lower tax rates, then my estimates of the 1987-89 revenue from the LSD penalty are too high. On the other hand, IRA participation declined dramatically after 1986 (Engen et al. 1994), such that the number of premature IRA withdrawals may have declined after 1986. This would suggest my estimates of the revenue from the LSD penalty are too low.

table shows that rollovers have increased over time; thus, the increase in rollovers after 1986 may be due to a time trend or changes in the aggregate conditions of the U.S. economy and not necessarily due to the tax penalty.

**Rollover by Year of Receipt**

| Year | Percentage of Recipients | Percentage of Amount |
|---|---|---|
| Before 1980 | 4.0% | 7.6% |
| 1980-84 | 14.9 | 29.0 |
| 1985-86 | 17.5 | 23.8 |
| 1987-88 | 20.6 | 30.7 |

Source: May 1988 CPS

A cross tabulation by year of receipt and age group is more meaningful, since only younger recipients (under 55) became subject to the tax penalty after 1986. The table below shows that rollovers increased among younger recipients after 1986 but remained fairly steady among older recipients.

**Rollover by Year of Receipt and Age Group**

| Year | Percentage of Younger Recipients | Percentage of Older Recipients |
|---|---|---|
| Before 1980 | 3.6% | 27.0% |
| 1980-84 | 13.3 | 44.7 |
| 1985-86 | 15.9 | 28.0 |
| 1987-88 | 20.3 | 27.4 |

Source: May 1988 CPS

The increase in rollovers among younger recipients after 1986 but not among older recipients suggests that the tax penalty imposed on younger recipients may have increased rollovers. Since there has been an upward trend in rollovers among younger recipients throughout the 1980s, the increase in

rollovers after 1986 cannot be attributed solely to the tax penalty. A time trend or changes in the demographic characteristics of the recipients may explain the increase in rollovers.

### *5.2 Probit Results*

A natural extension of the cross tabulations above is the difference-in-difference probit equations that include demographic variables but not the tax variables. They provide insight into whether different trends for rollovers are observed for younger and older recipients, without relying on tax variables which may be noisy (e.g., MTRs as computed from the CPS). Results from probit equations that include the tax variables are presented later in this section.

The dependent variable in the difference-in-difference equations equals 1 for recipients who rolled over at least some of their LSDs and 0 for recipients who did not roll over any of their LSDs. The independent variables of interest are as follows:

- *LESS55*: 0 for recipients 55 or older, 1 for recipients under 55;
- *POST86*: 0 for LSD receipt before 1986, 1 for after 1986; and
- (*LESS55*)*(*POST86*): an interaction term of the two variables.

The difference-in-difference probit equations take the following form:

$$Pr(S_i=1) = \Phi[\beta_0+\beta_1(LESS55)+\beta_2(POST86)+\beta_3(LESS55)*(POST86)+\gamma' z_i] \quad (3)$$

where $z_i$ is a vector of demographic variables and the real amount of the LSD.

The hypothesis that the tax changes affected only younger recipients after 1986 translates into a test that the coefficient $\beta_3>0$. This test is based on the assumption that there are no unobservable variables that

increased rollovers among younger recipients but not among older recipients (i.e., age-specific time trends).

The estimated coefficients for the interaction term (*LESS55*)*(*POST86*) are positive but not statistically significant (Table 5). The P-values for the one-sided test ($H_0$: $\beta_3=0$, $H_1$: $\beta_3>0$) reflect the statistical insignificance of the coefficient $\beta_3$. The P-values are 0.20 for both equations; the null hypothesis cannot be rejected at the conventional 5% level.

A measure similar to a tax elasticity can be computed from the difference-in-difference probit results as follows:

$$\frac{\Delta P^{Y}-\Delta P^{O}}{\Delta t^{Y}-\Delta t^{O}} \tag{4}$$

where $\Delta P$ denotes the change in the predicted probability of rollover between 1984-86 and 1987-88; and $\Delta t$, the change in the marginal tax price of non-rollovers. The superscripts denote the age groups: $Y$ for younger recipients and $O$ for older recipients.

Several assumptions were made to compute the predicted probabilities for the "average" younger and older recipients. The recipients were assumed to be married males with 14 years of schooling. For younger recipients, the real amount of LSD was assumed to equal $6,000; and for older recipients, $16,000. The real amount of LSD and the personal characteristics were chosen to resemble the means for the two age groups.

Based on these predicted probabilities, the estimated "tax elasticity" is 0.8 percentage point. In other words, a 1 percentage point increase in the marginal tax price of non-rollovers for younger recipients relative to older recipients raises the probability of rollover by 0.8 percentage point more among younger recipients relative to older recipients, controlling for

demographic variables. This estimate of the "tax elasticity" is similar to those from the probit equations with the tax penalty variable, which are presented below.

The estimates from the probit equations that include the tax variables are in Table 6. The dependent variable in these equations equals 1 for recipients who rolled over at least part of their LSDs into tax-deferred instruments and 0 for recipients who did not roll over any of their LSDs. Table 6 shows that MTRs do not significantly affect the probability of rollover. One explanation may be the high correlation between MTRs and family income. Multicollinearity would also explain why MTRs are significant in probit equations that do not include family income.

In contrast, the coefficient for the tax penalty is statistically significant and positive. This indicates that younger recipients who are subject to the tax penalty are more likely to roll over their LSDs. Table 7 shows that the estimated marginal effect of the tax penalty on the probability of rollover is 0.6 percentage point. In other words, increasing the tax penalty by 1 percentage point would raise the probability of rollover by 0.6 percentage point.

This implies a rough approximation that the imposition of the tax penalty (i.e., an increase in the penalty from 0 to 10%) raised the probability of rollover by 6 percentage points.[20] This is not a negligible effect, since the probability of rollover among younger recipients prior to the imposition of the tax penalty was only about 16%.

The probability of rollover also increases with the real amount of LSD,

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[20]This is a rough approximation, because the effect of the tax penalty appears to be nonlinear; its effect diminishes as the tax penalty increases.

age, and family income (Table 6).[21] These findings challenge the predictions of the standard Life-Cycle Hypothesis. The standard Life-Cycle Hypothesis predicts that taxes, the real amount of LSDs, and the age at the time of receipt should have little effect on the probability of rollover, so long as the receipt of an LSD is basically a change in the timing of income receipt.

On the other hand, the findings are consistent with an extended version of the Life-Cycle Hypothesis, in which consumption decisions are made under uncertainty about future income. Given uncertainty about future income, workers may prefer to keep some liquid assets. Since tax-deferred instruments such as IRAs are less liquid than non-tax deferred instruments,[22] as uncertainty increases workers may prefer non tax-deferred instruments. In particular, if job separations increase uncertainty about future income, then workers may prefer not to roll over their LSDs until they are more certain of their future prospects.

Within this framework, if workers desire a fixed amount of liquid assets as protection against unexpected drops in income, then they would be more likely to roll over larger LSDs; they would roll over the portion of the LSDs that exceeds the desired amount of liquid assets. If younger workers and lower-income workers face more uncertainty about their future income or are less likely to have accumulated the desired amount of liquid assets, then the probability of rollover would increase with age and family income.

The results are also consistent with two other models of saving

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[21]In the probit equations, the base age group is 35-44 and the base income group is $30,000-39,999.

[22]Engen et al. (1994) analyze how individuals may not view tax-deferred and non tax-deferred instruments as close substitutes and may want to invest in both.

behavior. The first is the model of saving under liquidity constraints. Liquidity constraints are especially relevant within the context of pre-retirement LSDs, since most recipients are younger and lower-income workers (Table 1) who are more likely to be liquidity-constrained. Liquidity constraints may thus explain the increase in the probability of rollover with the age and family income.

Liquidity constraints may also explain the positive relationship between LSD size and the probability of rollovers. Larger LSDs are more likely to exceed the desired level of consumption of liquidity-constrained recipients; liquidity-constrained recipients would roll over the amount of the LSDs that exceeds what is necessary to attain the desired level of consumption.

The second is the behavioral model of saving that emphasizes individuals' categorizing bundles of money into three different "mental accounts": (1) current income, (2) assets, and (3) future income.[23] The model assumes that individuals have the lowest marginal propensity to save bundles of money that they have categorized as current income, and the highest marginal propensity to save money categorized as future income.

This behavioral model provides an explanation for the positive effect of the amount of LSD and age on the probability of rollover. Recipients are more likely to classify larger LSDs as assets or future income than as current income; this would explain why larger LSDs are more likely to be rolled over. Similarly, older recipients may be more concerned about retirement income and more likely to classify LSDs as assets or future income than younger recipients. The behavioral model, however, does not provide a good

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[23]For a detailed discussion of behavioral models of saving behavior, see: Shefrin and Thaler (1988) and Thaler (1991).

explanation for the positive relationship between family income and the probability of rollover.

To explore further the differential effect of the tax penalty by family income, I estimated separate probit equations for lower-income and higher-income recipients. Lower-income recipients are defined as those with less than $40,000 in family income in 1987. Higher-income recipients are defined as those with 1987 family income greater than $30,000.

Table 7 presents the estimated marginal effect of the tax penalty for the two income groups. The marginal effect of the tax penalty is larger for higher-income recipients than for lower-income recipients. An increase of 1 percentage point in the tax penalty raises the probability of rollover among the higher-income group by 1.1 percentage point. In contrast, the marginal effect for the lower-income group is 0.4 percentage point. This contrast is noteworthy, since the tax penalty raised the marginal tax price of non-rollovers more for lower-income recipients than for higher-income recipients.

The results cast doubt on the idea of including one tax price variable that equals the sum of MTRs and the tax penalty. The results show that the MTRs do not have a statistically effect on the probability of rollover. In contrast, the coefficient for the tax penalty is significantly positive. Nonetheless, I have done likelihood ratio tests to determine if the coefficients on the MTRs and the tax penalty are equal (i.e., the MTRs and the tax penalty can be summed into one variable).

The results from the likelihood ratio tests indicate that for the whole group of LSD recipients and for the lower-income group, the null hypothesis that the coefficients are equal cannot be rejected at the conventional 5% level. Since most LSD recipients are in the lower-income group, it is not

surprising that the results from the likelihood ratio tests for the whole group and for the lower-income group lead to the same conclusion. On the other hand, the null hypothesis is rejected at the 1% level for the higher-income group. The MTRs and the tax penalty cannot be summed for the higher-income group.

The results from the likelihood ratio tests are consistent with the discussion in Section 4.1. The 10% penalty is the major source of variation in the marginal tax price of non-rollovers for higher-income recipients. In contrast, for lower-income recipients, both the MTRs and the penalty generate variations in the marginal tax price of non-rollovers. Thus, the effect of the tax penalty differs from the effect of the MTRs more among the higher-income group than among the lower-income group.

The presence of a self-selection bias, as discussed in Section 4.3, would imply that the estimates in Tables 6 and 7 underestimate the true effect of the tax penalty on the entire group of workers who had the LSD option. While more precise estimates may be possible in the future with better data, the policy interest in the rollover decisions of LSD recipients warrants the present endeavor to estimate the effect of the tax penalty.

## 6. Conclusion

Congress has often attempted to raise personal saving with tax penalties on consumption. They imposed a 10% tax penalty on early withdrawals from IRAs since 1982, when IRAs became available to all workers (Ozanne 1992). In 1986, Congress imposed a 10% tax penalty on the amount of lump-sum distributions (LSDs) not rolled over into tax-deferred instruments.

This paper presents the first estimates of the effect of the 10% tax penalty and federal income taxes on individuals' use of LSDs. Aggregate data

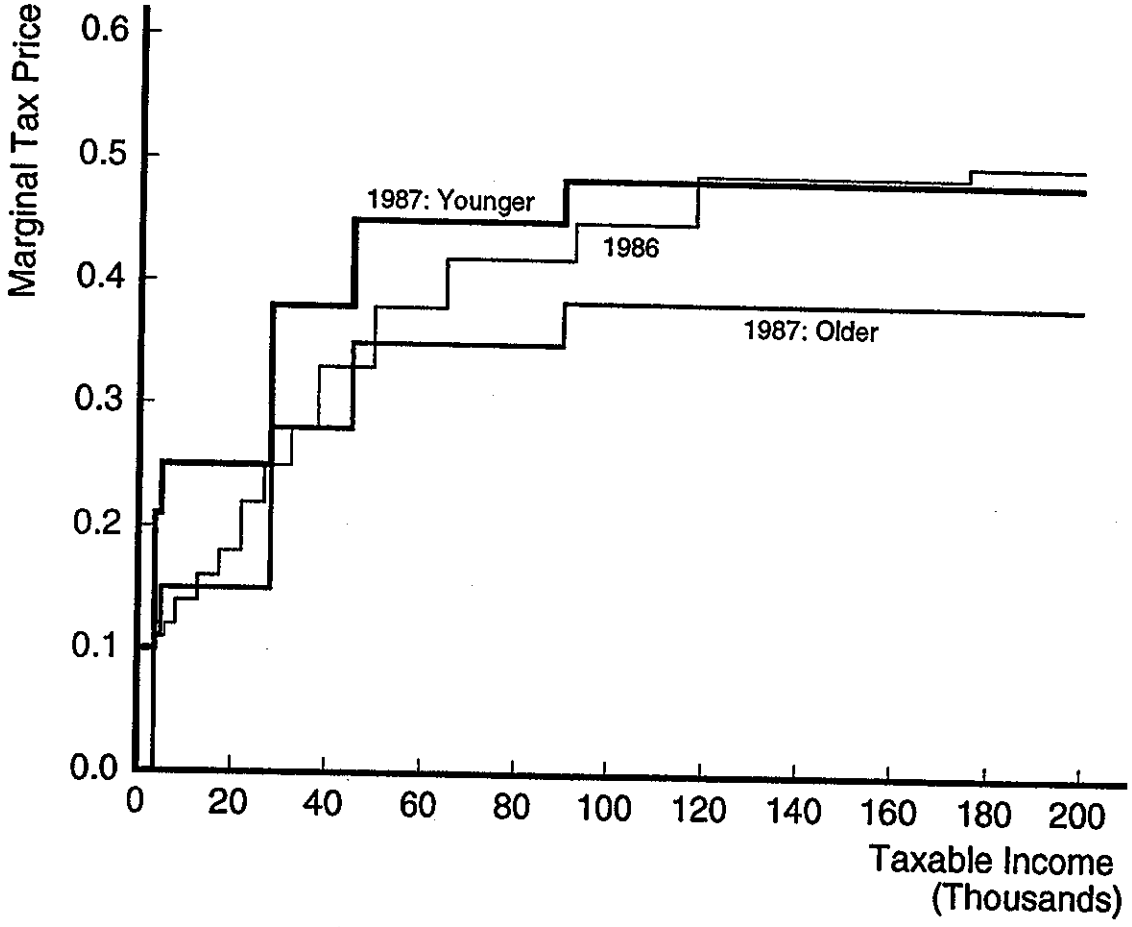
show that rollovers increased after the tax penalty went into effect but not to the degree expected by Congress. Consequently, the penalty has raised more tax revenue than Congress anticipated.

An analysis of individual-level data from the May 1988 CPS indicates that the tax penalty significantly increases the probability of rollover among higher-income recipients (i.e., recipients with income above $30,000). A 1 percentage point increase in the tax penalty produces a 1.1 percentage point increase in the probability of rollover among higher-income recipients. In contrast, the tax penalty does not significantly affect the rollover decisions of lower-income recipients.

One explanation for the differential impact of the tax penalty by income is that the lower-income recipients are more likely to be liquidity-constrained; therefore, their rollover decisions are less sensitive to tax concerns. The importance of liquidity constraints in the rollover decisions of LSD recipients cannot be examined with the currently available datasets. Once adequate data become available, an examination of the importance of liquidity constraints in the rollover decision may provide important insights into the tax sensitivity of rollovers.

As the trend continues toward defined contribution pension plans, more workers will receive LSDs. Most of the recipients are young, lower-income workers who use their LSDs to finance current consumption. Thus, for most recipients, the receipt of LSDs is associated with a reduction in their accumulated retirement savings. The combination of increasing prevalence of LSDs, the spending of most LSDs, and the insignificant effect of the tax penalty on the rollover decisions of lower-income recipients suggests that the non-rollover of LSDs will continue to be a policy concern in the near future.

Figure 1. Marginal Tax Price of Non-Rollovers: Younger and Older Married Recipients




Source: Coopers & Lybrand (1986)[p.2,166], ACIR (1986)[p.22], ACIR (1987)[p.20].

Table 1. Distribution of Recipiency of Lump-Sum Distributions

| Characteristics | Recipient-Weighted | | Dollar-Weighted | |
|---|---|---|---|---|
| | thousands | percentage | billions | percentage |
| Total | 8,478 | 100% | $42.0 | 100% |
| Age at time of receipt: | | | | |
| Under 35 | 5,201 | 61.4 | 15.7 | 37.4 |
| 35-44 | 2,042 | 24.1 | 15.3 | 36.4 |
| 45-54 | 850 | 10.0 | 6.5 | 15.5 |
| 55+ | 385 | 4.5 | 4.5 | 10.7 |
| 1987 Family Income: | | | | |
| Less than $10,000 | 344 | 4.2 | 1.8 | 4.3 |
| $10,000-19,999 | 1,610 | 19.6 | 6.6 | 15.7 |
| $20,000-29,999 | 1,710 | 20.8 | 6.6 | 15.7 |
| $30,000-39,999 | 2,042 | 24.9 | 9.9 | 23.6 |
| $40,000-49,999 | 1,002 | 12.2 | 4.9 | 11.7 |
| $50,000-74,999 | 682 | 8.3 | 3.8 | 9.0 |
| $75,000+ | 818 | 10.0 | 7.6 | 18.1 |

All figures have been computed using weights provided in the May 1988 CPS supplement. The sample consists of 2,162 workers who reported receiving at least one pre-retirement lump-sum distribution from a prior job.

Table 2. Distribution of Size of Lump-Sum Distributions

| Characteristics | Amount of Lump-Sum Distribution | | | | | | |
|---|---|---|---|---|---|---|---|
| | Average | $1-999 | $1,000-2,999 | $3,000-4,999 | $5,000-9,999 | $10,000-19,999 | $20,000+ |
| Age at time of receipt: | | | | | | | |
| Under 35 | $3,673 | 46.4% | 25.4% | 10.7% | 10.4% | 5.2% | 1.9% |
| 35-44 | 8,546 | 29.6 | 19.1 | 11.7 | 17.0 | 13.5 | 9.1 |
| 45-54 | 9,789 | 35.3 | 16.1 | 11.4 | 18.8 | 8.8 | 9.5 |
| 55+ | 15,449 | 30.6 | 14.1 | 10.5 | 13.3 | 12.9 | 18.6 |
| 1987 Family Income: | | | | | | | |
| Less than $10,000 | $6,543 | 45.0% | 21.7% | 8.2% | 10.2% | 8.7% | 6.2% |
| $10,000-19,999 | 4,836 | 44.5 | 22.9 | 12.7 | 8.5 | 2.4 | 4.0 |
| $20,000-29,999 | 4,751 | 43.5 | 24.9 | 9.3 | 12.4 | 6.5 | 3.5 |
| $30,000-39,999 | 5,534 | 38.5 | 24.9 | 12.2 | 12.9 | 7.8 | 3.9 |
| $40,000-49,999 | 6,059 | 37.8 | 19.5 | 9.5 | 17.3 | 12.2 | 3.7 |
| $50,000-74,999 | 6,786 | 32.9 | 19.6 | 16.5 | 18.0 | 6.2 | 6.9 |
| $75,000+ | 11,739 | 32.2 | 19.0 | 8.5 | 16.7 | 8.8 | 14.8 |
| Recipient-Weighted | $5,989[a] | 40.5% | 22.4% | 11.0% | 13.0% | 7.9% | 5.2% |
| Dollar-Weighted | 2,451[b] | 2.2 | 8.3 | 8.6 | 10.9 | 21.7 | 40.6 |

[a]Mean amount of lump-sum distributions received

[b]Median amount of lump-sum distributions received

Table 3. Uses of Lump-Sum Distributions

| Uses | Recipient-Weighted | | Dollar-Weighted | |
|---|---|---|---|---|
| | thousands | percentage | billions | percentage |
| Tax-deferred instruments: | 1,142 | 13.5% | $9.4 | 22.3% |
| Retirement programs | 944 | 11.1 | 7.7 | 18.4 |
| Insurance annuities | 198 | 2.3 | 1.7 | 4.1 |
| Savings accounts | 1,478 | 17.4 | 5.1 | 12.0 |
| Other financial instruments | 532 | 6.3 | 4.5 | 10.6 |
| Start or buy a business | 233 | 2.7 | 2.5 | 5.9 |
| Buy a house | 756 | 8.9 | 4.8 | 11.5 |
| Buy a car | 310 | 3.7 | 1.4 | 3.4 |
| Pay off debt | 1,843 | 21.7 | 4.9 | 11.7 |
| Pay educational expenses | 355 | 4.2 | 1.6 | 3.7 |
| Pay expenses during unemployment | 552 | 6.5 | 1.8 | 4.3 |
| Other | 2,250 | 26.5 | 7.7 | 18.4 |

All figures have been computed using weights provided in the May 1988 CPS supplement. The sample consists of 2,162 workers who reported having received at least one pre-retirement lump-sum distribution from a prior job.

The May 1988 CPS supplement does not provide the exact amount of lump-sum distributions allocated to various uses; therefore, only a range of the amount allocated to each use can be inferred. If a recipient reported more than one use, then he/she was assumed to have allocated a minimum of $1 and a maximum of the entire amount of the lump-sum distribution to each reported use. Summing across these minimum and maximum figures across recipients yields a range of total amount allocated to each use. The figures in the fourth and fifth columns are the median values of these ranges.

Table 4. Means: By Age Group and Time Period

| Variables | Younger Recipients | | Older Recipients | |
|---|---|---|---|---|
| | 1984-86 | 1987-88 | 1984-86 | 1987-88 |
| % rolled over any of lump-sum distribution (LSD) | 16.0<br>[36.7] | 19.2<br>[39.5] | 35.7<br>[48.5] | 27.3<br>[45.6] |
| % rolled over all of LSD | 12.8<br>[33.4] | 15.6<br>[36.3] | 28.6<br>[45.7] | 13.6<br>[35.1] |
| Amount of LSD in 1988 dollars | 5,916<br>[10,301] | 5,792<br>[11,542] | 16,373<br>[20,669] | 11,785<br>[11,910] |
| Marginal tax price of non-rollovers | 0.30<br>[0.10] | 0.34<br>[0.09] | 0.29<br>[0.12] | 0.27<br>[0.10] |
| Age at time of LSD receipt | 34.8<br>[8.3] | 34.5<br>[7.9] | 59.2<br>[3.3] | 60.1<br>[4.4] |
| Family income in 1987 | 35,396<br>[20,350] | 30,609<br>[17,649] | 28,748<br>[18,176] | 31,350<br>[20,507] |
| Years of schooling completed | 14.2<br>[2.4] | 14.2<br>[2.3] | 13.2<br>[3.2] | 13.4<br>[3.1] |
| % female | 46.9<br>[50.0] | 47.0<br>[50.0] | 23.8<br>[43.1] | 45.5<br>[51.0] |
| % married | 79.2<br>[40.6] | 67.3<br>[47.0] | 88.1<br>[32.8] | 68.2<br>[47.7] |
| % owned home in 1987 | 73.1<br>[44.4] | 66.2<br>[47.4] | 90.5<br>[29.7] | 81.8<br>[39.5] |
| % contributed to IRA in 1987 | 17.6<br>[38.1] | 19.7<br>[39.9] | 35.7<br>[48.5] | 27.3<br>[45.6] |
| Number of observations | 501 | 385 | 42 | 22 |

The figures above are unweighted. The standard deviations are listed in brackets. The marginal tax price of non-rollovers incorporates the 10% penalty that was imposed on younger recipients after 1986. The sample consists of 950 workers who received pre-retirement lump-sum distributions between 1984-88.

Table 5. Difference-in-Difference Probit Results

| Explanatory Variables | Coefficients | |
|---|---|---|
| Real amount of LSD | $1.7 \times 10^{-5}$** | $1.6 \times 10^{-5}$** |
| | ($4.0 \times 10^{-6}$) | ($4.0 \times 10^{-6}$) |
| If less than 55 years of age: LESS55 | -0.46** | -0.53** |
| | (0.24) | (0.24) |
| If received LSD after 1986: POST86 | -0.18 | -0.17 |
| | (0.38) | (0.38) |
| ($\beta_3$)(LESS55)*(POST86) | 0.34 | 0.33 |
| | (0.40) | (0.40) |
| Years of schooling | --- | 0.05** |
| | | (0.02) |
| If female | --- | 0.02 |
| | | (0.10) |
| If married | --- | 0.04 |
| | | (0.12) |
| Constant | -0.67** | -1.37** |
| | (0.23) | (0.39) |
| -Log likelihood | 391.45 | 388.51 |
| Test: $\beta_3>0$ | 0.34 | 0.33 |
| [p values] | [0.20] | [0.20] |

* Statistically significant at the 10% level
** Statistically significant at the 5% level

The dependent variable is binary and represents whether a recipient rolled over any of his/her lump-sum distribution (LSD) into tax-deferred instruments. Standard errors are in parentheses. The sample size is 855.

Table 6. Probit Results

| Explanatory Variables | | Coefficients |
|---|---|---|
| Real amount of LSD | | $9.5 \times 10^{-6}$* |
| | | ($4.9 \times 10^{-6}$) |
| Federal income tax rates (MTRs) | | 0.77 |
| | | (0.89) |
| Tax penalty | | 2.34* |
| | | (1.25) |
| Age when received LSD: | Under 35 | -0.23* |
| | | (0.12) |
| | 45-54 | 0.34** |
| | | (0.16) |
| | 55+ | 0.51** |
| | | (0.22) |
| Family income in 1987: | Less than $10,000 | -0.14 |
| | | (0.32) |
| | $10,000-19,999 | -0.37** |
| | | (0.17) |
| | $20,000-29,999 | -0.11 |
| | | (0.15) |
| | $40,000-49,999 | 0.05 |
| | | (0.19) |
| | $50,000-74,999 | 0.03 |
| | | (0.24) |
| | $75,000+ | 0.20 |
| | | (0.22) |
| Years of schooling | | 0.03 |
| | | (0.02) |
| If female | | 0.02 |
| | | (0.11) |
| If married | | -0.04 |
| | | (0.14) |
| Constant | | -1.60** |
| | | (0.49) |
| -Log likelihood | | 373.48 |

* Statistically significant at the 10% level
** Statistically significant at the 5% level

The dependent variable denotes whether a recipient rolled over any of his/her LSD. Standard errors are in parentheses. The sample size is 855.

Table 7. Marginal Effect of the Tax Penalty on Non-Rollovers: By Income Group

| Sample | Estimates |
|---|---|
| Full Sample: | |
| coefficient for tax penalty | 2.34* (1.25) |
| $\Delta(prob)/\Delta(p)$ | 0.6% |
| Lower Income:[a] | |
| coefficient for tax penalty | 1.74 (1.67) |
| $\Delta(prob)/\Delta(p)$ | 0.4% |
| Higher Income:[a] | |
| coefficient for tax penalty | 3.74** (1.61) |
| $\Delta(prob)/\Delta(p)$ | 1.1% |

* Statistically significant at the 10% level
** Statistically significant at the 5% level

[a] The base family income bracket is $30,000-39,999. Recipients in this bracket are in both income groups.

This table summarizes estimates from three probit equations. The standard errors are in parentheses. The MTRs in these probits are the federal income tax rates. The probit equations also include the following variables: real amount of LSD, family income brackets, marital status, years of schooling completed, gender, and age brackets. The estimates for $\Delta(prob)/\Delta(p)$ represent the change in the probability of rollover per 1 percentage point change tax penalty.