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New Evidence on Participation in Individual Retirement Accounts

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ABSTRACT

Using longitudinal data from individual tax returns spanning different tax regimes and fixed-effects regression models that control for unobserved heterogeneity in savings tastes, we find that use of paid tax return preparers and the presence of a balance due to the IRS increase the probability of IRA participation. These results provide first-time evidence that preparers' role in the tax system extends beyond compliance issues to taxpayers' personal decisions such as savings, and reconfirm prior research results that framing bias widely impacts taxpayer decisions. We also find that segregating persistent and infrequent participants potentially explains conflicts in prior research regarding the impact of marginal tax rates on IRA participation, suggesting the importance of incorporating persistence in savings behavior in future research.

Data Availability: All data are from publicly available sources.

INTRODUCTION

Concerns over declining rates of personal savings, individuals' lack of sufficient resources to meet retirement expenses, and the inability of social security to provide adequate income protection to future generations are causing spirited debates in the United States on appropriate mechanisms for increasing savings.[1] A popular legislative response is to provide tax incentives for contributing to certain savings accounts, such as Individual Retirement Accounts (IRAs), 401(k) plans, and Keogh accounts. The tax incentives include a deferral of tax on current contributions and an ability

[1] Engen et al. (1994) report that the personal saving rate, defined as personal savings divided by personal disposable income, has declined from over 7 percent in the 1950s through the 1980s to less than 5 percent since 1990. Further, Poterba et al. (1996) report that large proportions of U.S. families reach retirement age with virtually no liquid assets. In 1991, the median level of personal financial assets, including IRAs and 401(k) accounts, was $8,300 for those 55 to 64 years of age. Excluding IRAs and 401(k) balances, the median for this age group shrunk to just $3,000.

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to earn pre-tax returns until contributions are withdrawn. Further, to encourage making these savings for the long-term, penalties are imposed for early withdrawal.

IRAs, in particular, appeal to individual taxpayers because of their widespread availability, ease of participation, and flexibility in the timing and amount of contributions. Following the liberalization of eligibility requirements under the Economic Recovery Tax Act of 1981 (ERTA), contributions to IRAs climbed rapidly during the early 1980's, reaching their peak in 1986. However, contributions fell dramatically in 1987 after the Tax Reform Act of 1986 (TRA86) restricted deductibility, and contributions have continued to decline since then (Engen et al. 1994). In an attempt to reverse this trend, Congress recently enacted several new provisions (discussed later) expanding the scope of IRAs.

Prior IRA studies focus on two main issues: (1) the determinants of IRA participation, and (2) whether contributions to IRAs (and other similar savings incentives) represent new savings or simply a shifting of wealth from nontax-favored savings accounts. Although these studies tend to emphasize the latter issue given its obvious policy implications,[2] research on the participation decision is equally important for several reasons. First, IRAs can produce substantial benefits if funds diverted to these accounts are less likely to be consumed until retirement than other savings (Thaler 1994). Restricted savings provide important guarantees for retirees by ensuring availability of adequate financial resources in retirement, thus adding to both their security and quality of life. Second, funds saved for long periods add stability to pools of capital and allow development of long-term investment programs rather than focusing on short-term profit-maximizing goals. Third, IRAs allow optimal allocation of capital because earnings are tax-exempt until withdrawn and taxed at ordinary rates at that time. Thus, there is no tax-motivated reason to hold assets in an IRA that are not earning the highest pre-tax return, and taxpayers are freed from the "lock-in effect" (Meade 1990).

The purpose of this study is to provide new evidence on the determinants of IRA participation. We focus special attention on the role of paid tax return preparers in taxpayers' decisions to participate in IRAs, and on whether the determinants of participation differ between taxpayers who persistently participate in IRAs and those who participate infrequently. In addition, we further examine the impact of taxpayers' prepayment position (either balance due or refund) on IRA participation. Examining these factors sheds light on an important institutional reality of the tax system, has implications for savings research in general, and potentially informs the policy debate on IRAs.

To conduct our analysis, we use longitudinal data spanning different tax regimes from individual tax returns in the Statistics of Income (SOI) Panel to estimate fixed-effects logit models of IRA participation. Besides informing on the persistence of participation issue, the methodology allows us to control for unobserved heterogeneity in taxpayers' tastes for savings. This approach contrasts with prior studies of IRA participation that generally used cross-sectional data or panel data without control for individual-specific effects.[3]

We find that, consistent with our hypotheses, both the use of paid preparers and the presence of a balance due to the IRS are positively associated with the probability of participating in an IRA. The preparer result provides first-time evidence that paid preparers play a role in taxpayers'

[2] Several studies attempt to provide answers to the new savings question with mixed results. Engen et al. (1994) and Gale and Scholz (1994) are two widely cited studies that suggest that the IRA tax incentives have not been instrumental in generating significant amounts of new saving, if any at all. However, in a recent study, Poterba et al. (1996) strongly conclude otherwise, based on a comprehensive review of the collective evidence to date and a re-analysis of the data used in Engen et al. (1994) and Gale and Scholz (1994).

[3] Most of the early research in the area is cross-sectional and discussed later. Some studies do use the SOI Panel data for different purposes (Feenberg and Skinner 1989; Hogan et al. 1992; Joines and Manegold 1995), but they do not estimate panel data models that control for individual-specific effects. Only Engen et al. (1994) begin to take advantage of the panel's ability to control for individual heterogeneity by using a first difference model. However, as discussed more fully later, our analysis deals with this issue more generally by estimating a fixed-effects model over a longer time period.

nontax economic decisions, such as savings. The prepayment position result reinforces previous research findings regarding the widespread influence of framing bias in various taxpayer decisions. In a broader sense, these results suggest the need to look beyond the life-cycle theory of savings, which has dominated the savings literature to date, and consider the impact of other factors on savings behavior.

Further, our results regarding persistence show that wherewithal to contribute (measured as the stock of financial assets) and the magnitude of tax incentives (represented by marginal tax rates) also significantly increase the likelihood of IRA participation, particularly for infrequent participants. This evidence of differential response for a certain segment of the taxpaying population is also a new result in the literature, and identifies another source of taxpayer heterogeneity that may be important to consider in future savings research. Moreover, such findings have potential implications for how savings incentives could be more effectively targeted in future tax policy initiatives.

In the next section, we provide a brief history of the IRA provisions and relate prior research on IRAs to our primary hypotheses, emphasizing the role of prepayment position, paid preparers and persistence in the IRA contribution decision. That is followed by a discussion of our research methods, including the empirical model, variable definitions, and the panel data estimation techniques employed in this study. Lastly, we present our results and conclude with the implications of these results for the current policy debates on IRAs.

PRIOR RESEARCH AND HYPOTHESIS DEVELOPMENT

History of the IRA Provisions

The original IRA provisions enacted in 1974 restricted participation to those not currently participating in either an employer-sponsored pension plan or a Keogh plan, and limited annual tax-deductible contributions for single taxpayers to the lesser of $1,500 or 15 percent of earned income. Thus, the maximum deduction for two-income couples filing jointly was $3,000. ERTA liberalized both the eligibility requirements and annual contribution limits. From 1982 to 1986, all wage earners were eligible to participate and make tax-deductible contributions up to the lesser of earned income or $2,000 for single workers. The presence of a nonworking spouse increased the annual limit by $250. The annual limit for two-earner couples was the lesser of earnings or $2,000 each, for a maximum of $4,000.

TRA86 restricted the deductibility, but did not change the annual dollar limits, of IRA contributions for tax years beginning after 1986. For households actively participating in another retirement plan, deductible contributions were phased out at adjusted gross income (AGI) between $25,000 and $35,000 for single taxpayers and between $40,000 and $50,000 for those married filing jointly. However, these taxpayers were allowed to make nondeductible contributions in separate IRA accounts subject to the same annual contribution ($2,000 or earned income) limits.

The funds in IRA accounts can be invested in virtually any type of financial asset. Contributions can even be financed with loans, the interest on which is tax-deductible currently as investment interest. Deductible IRA contributions are taxed when withdrawn, whereas nondeductible contributions are not. In either case, income earned on the contributions accumulates tax-free until withdrawn. Withdrawals made before the account-holder reaches age 59½ are subject to a 10 percent penalty, except in the event of a permanent disability or death.

Recently, the Taxpayer Relief Act of 1997 introduced several new provisions that gradually raise the income limits for those eligible to make tax-deductible IRA contributions to double the old limits and add penalty-free withdrawals for educational purposes and first-time home purchases. The legislation also creates a new incentive, the Roth IRA ("IRA-Plus"), in which contributions are not tax-deductible, but qualified distributions of earnings are tax free after the account has been established for five years.

Prior Research on IRA Participation

Prior research on the determinants of IRA participation generally uses cross-sectional data and focuses on the impact of marginal tax rates and income. IRA participation is found to be positively

related to marginal tax rate and income, both in studies using survey data (Hubbard 1984; Venti and Wise 1987; Collins and Wyckoff 1988), as well as some studies using tax return data (O'Neil and Thompson 1987; Long 1990). However, these results could be unreliable because it is difficult to separate the independent effects of income and tax rates in cross-sectional data.[4] Panel data, such as used in this study, can potentially overcome the problem if these data span a period of tax rate change. However, the prior panel data studies do not control for individual-specific effects in the manner we do, and leave the relation between marginal tax rates and IRA participation unresolved as they find mixed results—either a negative relation or no association with marginal tax rates (Feenberg and Skinner 1989; Joines and Manegold 1995).

Prior studies also examine the effect of taxpayer demographics (e.g., education, age, marital status and number of dependents), and other variables (e.g., wealth and prepayment position) on IRA participation. There is some consensus that IRA participation is positively related with education (e.g., Venti and Wise 1987; Collins and Wyckoff 1988) and wealth (e.g., O'Neil and Thompson 1987; Long 1990). Most studies also find that married taxpayers are more likely to participate in IRAs than single taxpayers (e.g., Venti and Wise 1987; O'Neil and Thompson 1987; Feenberg and Skinner 1989; Long 1990), although Joines and Manegold (1995) find no relation between marital status and participation. Finally, there is some preliminary evidence that IRA participation at the maximum allowable limit is positively associated with taxpayers being in a balance due position (Hogan et al. 1992).[5]

Tax Preparers and IRA Participation

Although professional tax return preparers (hereafter "paid preparers") have a widespread involvement in the tax system by preparing nearly one-half of all individual income tax returns filed annually, and an even greater proportion of complex returns, little is known about the motivations, circumstances and events affecting taxpayers' use of paid preparers. Moreover, prior empirical studies of taxpayer behavior largely ignore the role of paid preparers in the tax system. Noting this glaring omission from the extant research, the National Academy of Sciences' Panel on Taxpayer Compliance Research (Roth et al. 1989, 178) concludes:

> From a policy perspective, greater knowledge about the relationships between tax practitioners and taxpayer compliance could offer one of the most promising areas for improving compliance.

As a result, researchers have recently begun to examine the determinants of paid preparer usage (Long and Caudill 1987; Dubin et al. 1992; Christian et al. 1993), and their influence on different facets of the tax system, such as compliance (e.g., Erard 1993; Udell 1995) and tax withholding (Christian et al. 1994). To our knowledge, however, none of the previous studies examine paid preparers' roles in taxpayers' nontax economic decisions, such as investment and saving. We begin that process by examining preparers' impact, if any, on taxpayers' IRA participation.

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[4] As explained later, we use panel data which span changes in tax rates phased in with ERTA and enacted by TRA86. Because these tax rate changes are independent of changes in income, our results potentially are more reliable.

[5] We view Hogan et al.'s (1992) evidence of a positive relation between being in a balance due position and IRA participation as preliminary because of the limited scope of their study and on methodological grounds. First, their dependent variable is whether IRA participants contribute at the maximum dollar limit. Thus, their sample consists of only those taxpayers who made an IRA contribution; non-contributors are excluded entirely. Second, although they use the SOI Panel data, their Tobit regression models are estimated cross-sectionally for the years 1979 to 1984. As discussed later in our research design, heterogeneity in savings tastes cannot be controlled in cross-sectional models and thereby severely undermines the inferences one can draw from such models. In addition, their model does not include income or preparation mode as explanatory variables. Third, their data does not cover the post-TRA86 period. Finally, their results vary by year and marital status, with the positive association being significant for married taxpayers from 1982 to 1984, and single taxpayers from 1979 to 1983. Our study's panel data approach also differs from both Feenberg and Skinner (1989) and Long (1990), who study the impact of prepayment position but whose regression models are estimated cross-sectionally.

The studies on paid preparer use contend that taxpayers are likely to have different motivations for engaging paid preparers. Survey data show that the desire to file a correct return as well as the desire to minimize tax liabilities, are two of the more important reasons (Collins et al. 1990). In addition, such data show that expenditures for paid preparers are higher among the less educated (Slemrod and Sorum 1984), with both archival and survey data indicating an association between low tax knowledge and paid preparer use (Collins et al. 1990; Dubin et al. 1992). These findings suggest that paid preparers fulfill not only a compliance function, but also play an education role. Apart from providing requisite tax knowledge, this education function likely includes informing on the current tax law, giving advice on tax minimization strategies, future tax-planning ideas, or even general financial planning. To be sure, this education function is not necessarily altruistic, but rather is consistent with a preparer's self-interest in demonstrating the benefits of his/her use. IRAs provide an excellent opportunity to examine the education role since they allow preparers to demonstrate the ability to both reduce tax liability and provide personal financial planning advice in a single recommendation.[6]

Recent research, however, also suggests that paid preparers' compliance and education roles may not be homogeneous across all types of preparers. For instance, both Erard (1993) and Udell (1995) find evidence of a significant difference in compliance across taxpayers engaging paid preparers, with the difference related to type of preparer used. This evidence is consistent with IRS estimates from the 1979 Taxpayer Compliance Measurement Program (TCMP) which find returns prepared by "tax practitioners" (public accountants or attorneys) account for a disproportionately large share of the noncompliance detected on all paid-prepared returns (Dubin et al. 1992).

Evidence also suggests that the preparer-type choice and, hence, the preparer effect on reporting decisions, may be impacted by the type of service demanded. For example, Dubin et al. (1992) find significant differences in the factors explaining the demand for paid third parties who are, and who are not, able to represent clients before the IRS, as well as between those who engage in minimal, if any, tax planning (i.e., national tax preparation services), and those who provide a full range of services (i.e., CPAs and attorneys).

This evidence argues that the paid preparer effect on IRA participation is likely to differ depending on the type of preparer utilized, with some preparers' services more planning oriented and others' services more preparation oriented. Unfortunately, the SOI Panel data does not distinguish between the type of paid preparer (CPA, attorney, national tax service, etc.) used by the taxpayer. However, many of the underlying taxpayer characteristics found to be associated with choice of preparer type are present in the data. For instance, Dubin et al. (1992) find such factors as age (those age 65 and over), the presence of self-employment income, and the number of forms filed with the return, to be associated with the type of preparer engaged. In addition, as Christian et al. (1993) suggest, it is likely that many taxpayer characteristics unobservable in SOI data, but important in the preparer choice decision (e.g., level of taxpayer education or sophistication), are correlated with included variables such as income and employment status. Therefore, in order to capture the complex preparer effect suggested by the above discussion, we interact preparation mode with certain taxpayer characteristics (e.g., income and prepayment position) available in the SOI data.

However, while these interactions allow an initial examination of whether the preparer impact on IRA participation differs across preparer types, it is difficult to predict *a priori* the directional impact of the interactions. For instance, it is likely that as taxpayers' income rises, their incentive for better understanding the tax law increases and, with it, their demand for tax planning and tax minimization strategies grow. As a result, higher income taxpayers should engage more planning-oriented preparers, suggesting a positive relation between IRA participation and the interaction between preparation mode and income. However, it may also be true that higher income (better-educated) taxpayers have a need for, and an opportunity to engage in, more advanced tax planning

[6] An anonymous reviewer pointed out that preparation mode choice is arguably endogenous in a model of IRA participation. However, we treat paid preparers as exogenous. The rationale for this treatment and the results of sensitivity tests to address this concern are discussed later.

than simply making an IRA contribution. Therefore, they may forgo a contribution in favor of more comprehensive strategies having a greater impact on tax liabilities. This reasoning would suggest a negative relation between IRA participation and the interaction between preparation mode and income. Thus, although we expect the preparation mode-income interaction to be significant, it is difficult to unambiguously predict its directional impact.

There are similar competing arguments for the interaction between preparation mode and prepayment position, again making a directional prediction difficult. For example, one might expect that preparers would arrange for the largest, penalty-free balance due, thereby increasing the taxpayers' financial resources available for investing and reducing the framing bias discussed below. However, taxpayers may "like" receiving refunds and it may even be easier for the preparer to collect fees from taxpayers receiving refunds. These arguments suggest the following hypotheses:

H1: Overall, IRA participation is positively associated with the use of paid preparers, *ceteris paribus*.

H2: IRA participation is associated with interaction effects between preparation mode and taxpayer characteristics, such as income and prepayment position, *ceteris paribus*.

Taxpayers' Prepayment Position and IRA Participation

As Thaler (1994, 188) notes, "[m]ost economics research on saving is based, either implicitly or explicitly, on the life-cycle model." The model's underlying premise is that households presumably solve a multiperiod dynamic maximization problem to optimize life-time consumption, which predicts a hump-shaped age-savings profile—the young borrow from the future to finance current consumption, the middle-aged save for retirement, and the old dissave. Support for the model is based on evidence suggesting that IRAs (and other savings incentives) minimally impact participants' overall savings levels (e.g., Engen et al. 1994; Gale and Scholz 1994).[7] It is argued that the increased contributions to tax-advantaged savings accounts do not represent new savings, but rather savings reshuffled from other sources.

However, the empirical evidence is not unequivocal. For example, Poterba et al. (1996) find a significant increase in retirement savings of IRA participants without a corresponding decrease in other financial assets, which is inconsistent with the predictions of the life-cycle model. Moreover, the model has come under attack on theoretical grounds as being misspecified (e.g., Thaler 1990, 1994). The principal argument is that the representative consumer is not very sophisticated or always rational, but rather often resorts to rules-of-thumb and is swayed by behavioral factors such as framing biases suggested by prospect theory. Under prospect theory, an individual's utility function differs depending on whether decision alternatives are framed as gains or losses in relation to a neutral reference point, and the individual is predicted to be risk-seeking (risk-averse) in loss (gain) domains (Kahneman and Tversky 1979).

Taxpayers' prepayment position offers an opportunity to test savings behavior in light of potential framing biases, and therefore offers an indirect test of the life-cycle model. Using prospect theory, researchers argue that a balance due on the tax return would be framed as a loss. Consistent with this prediction, studies demonstrate with both experimental and archival data that taxpayers in a balance due position adopt significantly riskier filing positions (e.g., Dusenberry 1994) and are less compliant (e.g., Chang and Schultz 1990). Since IRAs offer an avenue for reducing or eliminating the loss (balance due), a positive relation is expected between IRA participation and having a balance due (before considering the IRA deduction).[8] In contrast, evidence of such framing

[7] Because the life-cycle model assumes rational savings behavior over an individual's lifetime, savings incentives should have little effect on savings behavior. The model assumes that taxpayers save at required levels without external incentives. Therefore, research which finds that IRAs and other savings incentives have little impact on the overall level of savings (that is, they simply cause shifting of savings from taxable accounts to tax-favored accounts), tends to support this theory.

[8] An anonymous reviewer suggested that this expectation is also consistent with taxpayers strategically adjusting their prepayment position in anticipation of the tax savings from an IRA contribution. We attempt to examine the descriptive validity of this alternative explanation by using a continuous measure of prepayment position, instead of a dichotomous indicator of balance due or refund. The results are discussed later.

bias in the context of IRAs is inconsistent with the rational savings behavior expected under the life-cycle savings model. As mentioned before, there is preliminary evidence in support of the framing bias explanation in prior studies of IRA participation (Feenberg and Skinner 1989; Long 1990; Hogan et al. 1992). Accordingly, we examine the following research hypothesis:

H3: Based on prospect theory arguments, IRA participation is positively associated with a balance due to the IRS, *ceteris paribus.*

Persistence in IRA Participation

Despite differences in the research findings about the impact of tax incentives on savings, there is general consensus in the literature that it is important to control for heterogeneity in taxpayers' tastes for savings (e.g., Gale and Scholz 1994; Poterba et al. 1996). A distinctive phenomenon observed in IRA participation is that certain taxpayers appear to contribute to IRAs with remarkable persistence (Skinner 1992). Arguably, persistent participation is more likely a function of factors such as current placement in the "savings" phase of the life-cycle or simply an intrinsically high propensity to save, rather than tax incentives or other influences, i.e., persistent IRA participants are likely to systematically differ from infrequent participants. This argument has important policy implications because, given that the central objective of IRA legislation is to promote savings, it is in the interest of policy makers to identify taxpayer groups that can be influenced by different incentives.

Although this participation pattern suggests another dimension of taxpayer heterogeneity, prior empirical studies do not examine whether differences exist among the factors associated with IRA participation for persistent vs. infrequent participants.[9] In fact, the entire persistence issue surprisingly receives scant attention in the literature (Thaler 1994). To provide new insights into this distinctive behavioral phenomenon related to IRAs, we examine the following research hypothesis:

H4: Factors associated with IRA participation differ between infrequent participants and persistent participants.

EMPIRICAL PROCEDURES

The former discussion suggests that a conceptual model of the decision to participate in an IRA can be expressed as follows:

IRA Participation = f (taste for, or commitment toward, savings, demographic factors, economic and other factors).

In this section we describe our methodology, choice of procedures for analysis and the empirical proxies to investigate the factors associated with taxpayers' IRA participation decision.

Data

An important aspect of our research design is the use of longitudinal data from actual tax returns. The use of such data is made possible by the Statistics of Income Panel of Individual Returns (SOI Panel), which is a part of the Ernst & Young/University of Michigan Tax Research Database. The SOI Panel is constructed from the much larger stratified sample of individual income tax returns in the SOI Model File, such that the Panel not only represents a simple random sample

[9] Joines and Manegold (1993) do examine the determinants of participation for "continuing contributors." However, their analysis is limited in terms of its implications for persistence because they only examine the characteristics of those taxpayers who participated in an IRA in the one year immediately following their initial year of IRA participation. Further, no inferences are possible regarding those taxpayers who did not contribute the following year, the group that we argue later is of greatest interest to policy makers. In contrast, we systematically classify taxpayers as persistent or infrequent participants based on actual patterns of persistence over a series of years, and then analyze the determinants of IRA participation for each group. This approach allows us to inform on determinants of IRA participation for both persistent and infrequent participants, which was not possible in the Joines and Manegold (1993) analysis.

of tax returns filed each year, but also allows following of the same taxpayers over time (i.e., the Panel can be "balanced").

The motivations for using longitudinal data in this study are three-fold. First, using such data together with a fixed-effects model potentially allows control for unobserved individual-specific differences. In particular, taxpayers' tastes for or commitment toward savings, which are unobservable in archival data, can be controlled to the extent these tastes do not vary much over time.[10] Such control is possible because, as described later, we construct balanced panels that span relatively short periods of time, making it reasonable to assume constant tastes for savings throughout the period examined. Controlling for such heterogeneity is critical in this study because of the wide recognition in the savings literature (e.g., Poterba et al. 1996) that taxpayers' propensities to save are likely correlated with observable characteristics included in the IRA participation model, such as income and taxpayer demographics. Hence, failure to exercise this control would lead to a correlated omitted variable problem and result in biased parameter estimates for the included variables. Second, using longitudinal data that span years with tax rate changes potentially enables identifying the separate effects of tax rates and income since tax rates vary independent of changes in income. Separating these effects has been difficult in prior studies because they typically use cross-sectional data and these variables do not have much independent variation in such data. Our data include the tax rate changes phased in by ERTA and in TRA86.[11] Third, examining the issue of persistence in IRA participation requires following the same taxpayer over time, which is possible only with longitudinal data.

The data are not without limitations, however. Most notably, while we assume constant tastes for savings within taxpayers, we cannot measure these tastes or explicitly control for changes in them. Thus, a change in IRA participation status that coincides with a change in a household's savings commitment remains uncontrolled. Further, certain taxpayer characteristics likely to impact savings decisions are either unavailable in the data set (e.g., education or change in family composition, say a child leaving home), or measured crudely (e.g., age—taxpayers age 65 or older can be identified, but a continuous measure of age covering the entire age-savings profile is not present in the data). Another limitation is that there is attrition in the balanced panel (Christian and Frischmann 1989), which may be systematically related to taxpayer characteristics included in the model, although the short span of our panel mitigates this problem as well.

Sample Selection

From the data currently available in the SOI panel, we select the tax years 1982–1984 and 1986–1988 because information on paid preparer use is available in the data base only in these years. Further, these years cover the transition period after ERTA and the period surrounding TRA86, thus spanning two tax regimes with different IRA provisions and exogenous tax rate changes.

To perform the panel data analysis, we pool cross-section and time-series data and construct balanced panels by including only those taxpayers for which returns are available in each year of the panel. For the main results presented later in this study, we construct three different balanced panels—the pre/post-TRA86 or the "full" panel covering all six years, and separate panels for the pre-TRA86 and post-TRA86 tax regimes.

For the full panel, the initial sample consists of 6,443 taxpayers with returns in each of the six years. We then delete 2,548 taxpayers for being ineligible to participate in a tax-deductible

[10] That is, these data allow us to assume that no changes occur in the savings life cycle of an individual taxpayer. Thus, within-taxpayer variation in the savings life cycle is assumed constant. However, cross-sectionally we expect each stage of the life cycle to be represented in our data, which allows us to draw inferences about the applicability of the life-cycle theory.

[11] Although ERTA reduced the top marginal tax rate from 70 to 50 percent effective January 1, 1982, rates in general were reduced by 10, 10 and 5 percent, respectively in 1982, 1983 and 1984. Thus, our data contain two sources of variation in tax rates independent of changes in income: those introduced by ERTA and those enacted with TRA86.

IRA in any year (1,057 for not having earned income and 1,491 for exceeding the AGI limit in 1987 or 1988).[12] We also delete a small number of taxpayers (141) for various reasons—mismatch between a return year and panel year, income earned abroad (i.e., with different IRA limits), and deducting amounts in excess of the IRA limit. The final sample size is 3,754 taxpayers with returns in each of the six years.

Although the full panel provides the advantage of following the same taxpayers over six years, it also is restrictive in terms of generalizability because taxpayers are included only if they meet the different eligibility requirements in all years. Hence, we construct separate balanced panels for the two sub-periods (pre-TRA86 and post-TRA86) following the same sample selection criteria as above, except that the first screen applies the eligibility rules in effect only in that sub-period. Thus, the pre-TRA86 panel does not impose the income screen based on AGI limits introduced by TRA86 and results in a final sample size of 6,010 taxpayers with returns in each of the four years (1982–1984 and 1986). In contrast, the post-TRA86 panel does include the AGI limits and results in a final sample size of 12,810 taxpayers with returns in each of the two years (1987 and 1988).[13]

Model and Variable Definitions

Based on the conceptual model of IRA participation, prior research, and data availability, we estimate regression models of IRA participation in which the dependent variable is an indicator coded one if a taxpayer participates in an IRA by making a tax-deductible (or partially deductible) contribution, and zero otherwise.[14] The specific explanatory variables included in the model and their precise definitions are provided below. We first present the control variables, then follow with a discussion of the hypothesis variables.

Control Variables

MTR is the marginal tax rate variable. To make it exogenous, it is computed before considering the deduction for IRA contributions. As marginal tax rate increases, the price (1–MTR) of making an IRA contribution decreases, making it more cost-effective for the taxpayer to make an IRA contribution. Hence, MTR is expected to positively impact IRA participation.

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[12] It should be noted that our income screen potentially has deleted taxpayers who might be eligible to make tax-deductible contributions to an IRA if they (or their spouse) do not participate in a qualified retirement plan. However, the data do not provide any information on retirement plan participation.

[13] Despite the additional income restriction, the larger sample size in the post-TRA86 period is simply due to larger initial samples. Specifically, the raw database in this period contains twice the number of observations than in the pre-TRA86 period. The sampling procedures utilized originally (i.e., in 1979) by the IRS to construct the individual SOI Panel year files consisted of selecting returns based on five random combinations of the last four digits of taxpayers' social security numbers. However, budget constraints apparently led the IRS to select on only one of the five combinations in 1982, 1984 and 1986, resulting in panel year files containing 9,235, 9,762 and 10,120 observations, respectively. In contrast, two of the five combinations were used for 1987 and 1988, resulting in panel year files containing 21,191 and 21,656 observations, respectively. Exact sample selection procedures are available from the authors on request.

[14] An anonymous reviewer suggested that we also analyze taxpayers making nondeductible IRA contributions in the post-TRA86 period. However, we excluded these taxpayers for both practical and conceptual reasons. First, the number of nondeductible contributors in our data set is so small (40 in 1987 and 24 in 1988) that their noninclusion should have virtually no impact given our large sample. In any case, including these taxpayers in our "participant" group, would only bias our results toward finding a stronger preparer effect than we report later because descriptive statistics indicate that this group has higher paid preparer use (75 percent in 1987, 58 percent in 1988), mean AGI (over $90,000), and wealth (about $100,000), than our sample of IRA participants. Second, conceptually it is not clear whether these taxpayers should be classified in the "participant" group or kept separate in a third group because the determinants of their participation decision could differ from those taxpayers making tax-deductible contributions. For example, nondeductible contributions are more likely to be independent of tax motivations.

TINC is the income variable in the model and represents an "ability to contribute." Because taxpayers with greater ability to make IRA contributions are more likely to participate, the sign on the coefficient of TINC is predicted to be positive. To allow it to better capture pre-tax disposable income, TINC is defined as adjusted gross income increased by the net-of-tax IRA and Keogh contributions,[15] the pre-TRA86 exclusions for capital gains and dividends and the deduction for working married couples, alternative minimum tax preference items (other than the excluded portion of capital gains), and the excluded portion of pensions, unemployment insurance, disability income and social security. This sum is then decreased by capital losses excluded (pre-TRA86). TINC is measured in 1983 constant dollars and scaled in thousands.

The variable WEALTH proxies for the stock of liquid financial assets with which the taxpayer can make an IRA contribution. As with income and marginal tax rate, the sign on the coefficient of WEALTH is predicted to be positive. It is computed as the sum of dividend income (capitalized using the dividend-price ratio) and interest income (capitalized using Moody's Aaa corporate bond rates).[16] WEALTH is scaled in thousands and measured in 1983 constant dollars. Including wealth as an explanatory variable differs in an important way from prior IRA studies using tax return data from the SOI Panel (Feenberg and Skinner 1989; Engen et al. 1994; Joines and Manegold 1995). The dependent variable in these studies was the change in wealth from period t to period t + 1 because the research objective was to examine the impact of IRAs on savings. However, Bernheim (1994) and Slemrod (1994) have criticized these studies as questionable because the wealth measure is noisy—absent information on asset balances in the data set, wealth can be inferred only indirectly by capitalizing certain investment income.

While it is expected that the likelihood of IRA participation will increase with income and wealth, there is no evidence that the relationship is uniform across all levels of income and wealth. Because of these potential non-linearities in the relation between income, wealth and IRA participation, we attempted various transformations of both income and wealth. The square of these variables (TINCSQ and WEALTHSQ) provided the best fit and therefore are included in the model.

RENT is an indicator variable for whether the taxpayer rents or owns his own home. It is set to one if the tax return does not show a deduction for property taxes and zero otherwise.[17] Because equity in home ownership tends to be the single largest asset for most individual taxpayers, arguably it is an important control variable in any model of savings. Unfortunately, the sign on the coefficient of RENT cannot be predicted unambiguously. It could be positive if renters are more likely to seek out other avenues to shelter income and save for the future to counter the lack of savings in home equity. The coefficient sign could be negative if renters are younger (say, students and workers just entering the work force) than homeowners and age is not captured adequately in the model, or if they are saving for a down payment on a house.

To control the effect that taxpayer demographics, such as age and family size, can have on both the incentive and the wherewithal to save, we include in the model the following three demographic characteristics observable in tax return data:

[15] As was the case with marginal tax rates, using a pre-IRA contribution measure of income makes TINC exogenous of the IRA participation decision to the extent possible in archival data.

[16] Both the dividend price ratio and the corporate bond interest rates for each year of the study are obtained from the 1993 Economic Report of the President. Because information on asset balances (the ideal wealth measure) is not reported on tax returns, we used the capitalized value of dividends and interest to estimate financial (liquid) assets, following prior studies (e.g., Engen et al. 1994; Joines and Manegold 1995). However, even this measure potentially contains measurement error, particularly for high-income taxpayers whose asset portfolios contain a larger proportion of tax-exempt bonds (Feenberg and Poterba 1991).

[17] In contrast with prior research (e.g., Engen et al. 1994), we do not use the presence of a home mortgage deduction to identify home-ownership because taxpayers that might have paid off their mortgage would not have the mortgage deduction even though they own their home. Although using property tax deduction overcomes that problem, it (as is the mortgage interest deduction) is still dependent on whether the taxpayer itemizes deductions. Both measures are unable to correctly identify home-ownership of non-itemizers.

- DEP, which is the number of dependents claimed on the tax return and represents family size;
- MS, which is an indicator variable for marital status, set to one if the taxpayer's filing status is married filing jointly or separately and zero otherwise; and
- AGE, which is an indicator variable set to one if the taxpayer (in the case of joint returns, if the primary or secondary taxpayer) is age 65 or over and zero otherwise.[18]

Except for AGE, it is difficult to make directional predictions of the impact taxpayer demographics have on IRA participation. For instance, because the wherewithal to save is decreasing in family size, it is generally argued that families with more dependents are likely to save less (e.g., Engen et al. 1994). However, if family size simply captures age profiles, with savings increasing with age, the opposite might be predicted. Similarly, if family size determines savings potential, single taxpayers might be expected to save more than their married counterparts. However, if marital status again reflects age profiles, with married taxpayers expected to be older, they would be likely to save more than single taxpayers. Given these countervailing arguments, no directional prediction is made on the association of DEP and MS with IRA participation. In contrast, given that the AGE variable essentially identifies elderly taxpayers who begin disinvesting their retirement savings for consumption, AGE is expected to be negatively associated with IRA participation.

Hypothesis Variables

PREP is an indicator variable for the presence of a paid preparer. It is set to one if a paid preparer signs the tax return and zero otherwise.[19] Based on the education function of paid preparers, the overall prediction under H1 is that PREP will be positively associated with IRA participation.[20]

BALDUE is a dichotomous variable for prepayment position (refund or balance due to the IRS). It is coded one if the taxpayer owes money to the IRS before making an IRA contribution and zero otherwise.[21] Based on H3, we expect BALDUE to be positively associated with the decision to contribute to an IRA.

To capture the complex preparer effect hypothesized in H2, we interact PREP with TINC and BALDUE. The interaction with income (PREP*TINC) is chosen because income is believed to be a reasonable surrogate for the education or sophistication level of the taxpayer. As discussed earlier,

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[18] Joines and Manegold (1995) attempt a finer classification of age by placing taxpayers not claiming the age exemption (i.e., younger taxpayers) into different age groups based on the pattern of dependents claimed on the return. Although innovative, their procedure still leaves many taxpayers incorrectly classified.

[19] As pointed out in Roth et al. (1989, 173), PREP may be measured with error if taxpayers purchase professional tax services yet prepare their own returns, taxpayers use preparers only in certain years and self-prepare following their advice in subsequent years, or if preparers do not sign the return even though failure to do so is illegal.

[20] An anonymous reviewer suggested that the education role of paid preparers might be better captured by also including a lagged PREP variable, rather than a contemporaneous indicator of preparer use. We did not pursue this analysis because that required dropping the years 1982 and 1986 from the sample since, as mentioned earlier, data on preparer use is not available for 1981 or earlier and 1985. We chose to go with the longer panel as that better utilizes the benefits of the panel data estimation techniques and provides a stronger test of the persistence phenomenon.

[21] An anonymous reviewer suggested adding an indicator variable identifying taxpayers subject to the underpayment penalty. We did not include such a variable because it would simply identify a subsample of taxpayers with a balance due, i.e., it would be a derivative of BALDUE with the same expected positive sign on its coefficient. Moreover, the proportion of taxpayers subject to the penalty is very small (e.g., only 218 out of 10,120 taxpayers in the raw data for 1986 are subject to the penalty). Notwithstanding the above, a finding of a positive coefficient on BALDUE is also consistent with taxpayers making IRA contributions to avoid the underpayment penalty.

the impact of PREP is likely to differ depending on taxpayer sophistication and the existence of different types of paid preparers who likely serve different roles. Unfortunately, however, the SOI Panel data does not distinguish between the type of paid preparer (CPA, attorney, national tax service, etc.) used by the taxpayer; hence, the interaction with income. As discussed earlier, it is not possible to predict the sign on the coefficient of PREP*TINC. While demand for tax minimization strategies is likely to increase as income rises, it is also likely that more sophisticated, higher income taxpayers will forgo participation in IRAs, in favor of more comprehensive tax planning strategies having a greater impact on tax liabilities.

To examine whether preparers aid in mitigating taxpayers' framing bias suggested by prospect theory, we interact PREP with BALDUE. If the evidence is consistent with preparers having such an impact, the coefficient on PREP*BALDUE would be expected to be negative. On the other hand, if preparers recommend taxpayers with a balance due to redirect payments into an IRA that would otherwise have been partially paid to the IRS, we would expect the coefficient on the interaction to be positive.

Estimation

Because our dependent variable (participation in IRAs) is categorical, the regression models to examine the partial effects of the independent variables on this decision are estimated in a logistic framework. We estimated both simple pooled cross-section time-series and fixed-effects logit models. The latter control for time-invariant individual-specific effects by including a separate intercept for each taxpayer as follows:

$$\Pr(y_{it} = 1) = \frac{\exp(\alpha_i + \beta' x_{it})}{1 + \exp(\alpha_i + \beta' x_{it})}, \quad \begin{matrix} i = 1,...,N \\ t = 1,...,T \end{matrix} \tag{1}$$

where the subscript i indexes individual taxpayers and the subscript t indexes time, x is a (k × 1) vector of k regressors, and α and β, respectively, are the intercept and slope parameters to be estimated.

However, estimating the above model is not straightforward because the individual-specific heterogeneity cannot be swept away by taking deviations from group means as is done in a linear fixed-effects model. Chamberlain (1980) devises a special "conditional" maximum likelihood (CML) estimator that makes the estimation tractable and overcomes certain other econometric problems with the usual maximum likelihood (ML) estimator for a simple pooled logit.[22] Our fixed-effects logit models are based on Chamberlain's (1980) procedure. Note that results from the Chamberlain fixed-effects logit model are comparable to a normal logit model in that the coefficient estimates can be interpreted in the same way, except that there are no individual-specific intercepts in the normal logit model.

Although the fixed-effects model controls for heterogeneity in the individual-specific effects, it is important to test the null hypothesis of homogeneity (i.e., $\alpha_1 = \alpha_2 = ... = \alpha_n$). If the null is correct, both Chamberlain's (1980) CML estimator and the usual ML estimator for a pooled logit are consistent, but the CML estimator is inefficient because it fails to use the homogeneity restriction. However, if there is heterogeneity, the ML estimator is inconsistent while the CML estimator is both consistent and efficient. Hausman's (1978) specification test, which is distributed as Chi-square, provides a formal test of the homogeneity hypothesis. Large values of the test statistic lead to a rejection of the null and favor the fixed-effects model over the simple pooled model.

RESULTS

Descriptive Statistics

Table 1 highlights some summary statistics for trends in IRA participation over the sample period and for the variables in the empirical model. Panels A and B report these statistics for IRA participants and nonparticipants, respectively, for the different samples used in this study: (1)

[22] See Greene (1990) for a description and Christian and Gupta (1993) for an application.

TABLE 1
DESCRIPTIVE STATISTICS (MEANS WITH STANDARD DEVIATIONS IN PARENTHESIS) OF IRA PARTICIPANTS AND NON-PARTICIPANTS—BY YEAR AND FOR THE FULL PRE/POST-TRA86 PANEL, THE PRE-TRA86 PANEL, AND THE POST-TRA86 PANEL[a]

Panel A: Participants in IRAs

Selected Variables	1982	1983	1984	1986	1987	1988	Full Panel	Pre-TRA86 Panel	Post-TRA86 Panel
Adjusted Gross Income (1983 $ in thousands)	27.279* (16.868)	27.296* (15.866)	28.874* (13.790)	32.453* (27.391)	30.419* (11.953)	32.362* (13.039)	28.123* (12.118)	41.776* (37.511)	30.940* (12.711)
Marginal Tax Rate (percent)	28.40* (8.14)	25.35* (7.70)	24.30* (7.13)	23.33* (6.97)	18.72* (6.80)	17.80* (5.92)	21.24* (5.64)	28.48* (8.92)	18.01* (6.10)
Wealth (1983 $ in thousands)	30.487* (87.600)	33.748* (116.725)	29.973* (110.940)	38.171* (128.482)	35.039* (99.154)	29.818* (58.208)	23.776* (73.912)	36.287* (102.367)	32.772* (95.847)
Tax Return Preparation (percent using paid preparer)	57.94*	51.79*	53.05*	57.01*	51.76	51.66*	52.11*	56.50*	54.11*
Balance Due <Refund> before IRA contribution (1983 $ in thousands)	0.239* (2.318)	0.091* (3.102)	<0.149>* (2.117)	0.131* (4.639)	<0.455> (2.166)	<0.291>* (1.609)	<0.254>* (1.083)	<0.065>* (3.591)	<0.263>* (1.425)
Percent switching from Balance Due to Refund after IRA contribution	26.46	22.91	19.84	20.22	14.05	15.86	10.66	12.73	11.32
Number of Dependents	0.73* (1.01)	0.64* (0.97)	0.63* (0.95)	0.65* (0.98)	0.59* (0.97)	0.50* (0.91)	0.74* (0.95)	0.90* (1.07)	0.57* (0.93)
Marital Status (percent married filing jointly or separately)	75.49*	72.08*	71.71*	69.22*	68.15*	68.03*	69.02*	73.21*	64.63*
Age (percent age 65 or older)	4.46	5.97*	7.47*	8.93*	9.84*	9.97*	7.88*	5.79*	10.18*
No. observations (percent of total)	359 (9.56)	419 (11.16)	509 (13.56)	549 (14.62)	427 (11.37)	391 (10.42)	844 (22.48)	1,819 (30.27)	1,179 (9.20)

(*Continued on next page*)

TABLE 1 (Continued)

Panel B: Nonparticipants in IRAs

Selected Variables	1982	1983	1984	1986	1987	1988	Full Panel	Pre-TRA86 Panel	Post-TRA86 Panel
Adjusted Gross Income (1983 $ in thousands)	15.044 (10.494)	16.382 (10.668)	18.492 (11.267)	22.476 (12.652)	25.542 (13.342)	28.177 (14.569)	20.301 (10.238)	20.406 (16.022)	20.500 (14.217)
Marginal Tax Rate (percent)	18.09 (9.15)	17.06 (7.95)	17.16 (7.26)	17.68 (7.06)	15.51 (6.74)	14.97 (6.89)	16.47 (5.73)	18.32 (7.76)	13.61 (6.60)
Wealth (1983 $ in thousands)	3.379 (14.363)	3.571 (14.741)	3.574 (14.914)	5.109 (20.631)	6.480 (27.433)	6.504 (24.831)	3.568 (13.810)	5.535 (32.704)	4.718 (20.660)
Tax Return Preparation (percent using paid preparer)	38.76	40.48	41.20	46.27	46.08	42.65	42.08	41.96	39.86
Balance Due <Refund> before IRA contribution (1983 $ in thousands)	<0.415> (1.109)	<0.498> (0.904)	<0.519> (0.912)	<0.505> (1.093)	<0.614> (1.119)	<0.538> (1.021)	<0.527> (0.689)	<0.541> (2.989)	<0.504> (0.857)
Number of Dependents	0.95 (1.28)	0.98 (1.27)	1.00 (1.26)	0.98 (1.23)	0.91 (1.17)	0.83 (1.13)	0.97 (1.14)	1.00 (1.22)	0.71 (1.07)
Marital Status (percent married filing jointly or separately)	49.46	51.03	52.97	55.66	55.76	50.40	51.79	52.51	39.48
Age (percent age 65 or older)	2.18	2.46	2.68	4.40	5.35	5.67	3.39	3.72	4.06
No. observations (percent of total)	3,395 (90.44)	3,335 (88.84)	3,245 (86.44)	3,205 (85.38)	3,327 (88.63)	3,363 (89.58)	2,910 (77.52)	4,191 (69.73)	11,631 (90.80)

*Denotes that the mean for participants (panel A) is significantly different than the mean for nonparticipants (panel B) at the 0.05 level, based on two-tailed critical values.

[a]Data are obtained from the Statistics of Income Panel of Individual Returns (SOI panel), which is a part of the Ernst & Young/University of Michigan Tax Research Database. The "Full Panel" sample comprises a balanced panel of 3,754 taxpayers eligible to make a tax-deductible IRA contribution in each of the six years, 1982–1984 and 1986–1988. Similarly, the "Pre-TRA86 Panel" ("Post-TRA86 Panel") sample comprises a balanced panel of 6,010 (12,810) taxpayers eligible to make a tax-deductible IRA contribution in each of the four (two) years, 1982–1984 and 1986 (1987 and 1988). Standard deviations are reported only for continuous variables.

overall and by year for the full pre/post-TRA86 panel of 3,754 taxpayers eligible to participate in an IRA in all six years; (2) overall for the pre-TRA86 panel of 6,010 taxpayers with returns in all four years prior to TRA86; and (3) overall for the post-TRA86 panel of 12,810 taxpayers eligible to participate in an IRA in each of the two years after TRA86. The table also reports the results of univariate tests of differences between the means of the variables for the two groups.

In the full panel, consistent with other published data, IRA participation increased every year pre-TRA86 from a low of 9.6 percent in 1982 to a high of 14.6 percent in 1986, the first and last years of universal eligibility, and declined after TRA86. When viewed from a longitudinal perspective, about 22.5 percent of the taxpayers followed over the six-year period made an IRA contribution in at least one of the six years. Compared with the cross-sectional data for the individual years, the difference in the pre- and post-TRA86 participation rates is more dramatic in the panels for those periods—over 30 percent of the taxpayers in the four-year pre-TRA86 panel participated in at least one of those years, whereas less than 10 percent participated in the post-TRA86 panel in at least one of the two panel years.

Several other trends are evident from these statistics. First, in terms of the sample profile, IRA participants have significantly higher mean adjusted gross income (inflation-adjusted in 1983 dollars) and marginal tax rates than nonparticipants in each sample. However, the year-by-year statistics show that the difference in both AGI and MTR narrow markedly after 1986, which is likely due to deleting taxpayers with AGI in excess of the IRA phase-out amount after 1986 and the lower tax rates enacted in TRA86. These data also show that the MTR for both groups declined after 1986 even though income levels stayed about the same, which introduces some independent variation in the two series not typically observable in cross-sectional data. As with income, IRA participants also have significantly greater wealth in the form of liquid assets than nonparticipants.[23] The wealth differences, together with the differences in demographic characteristics, suggest that IRA participants are likely an older group with smaller families—a significantly greater proportion of participants are married, age 65 or over and have fewer dependents. The results for the AGE dummy are surprising because taxpayers in their retirement years would be expected to begin dissaving, rather than participating in IRAs.

Second, relative to nonparticipants, a significantly greater proportion of IRA participants engage a paid preparer in every year but 1987, which is consistent with preparers providing tax minimization and financial-planning advice. In addition, the year-by-year data reveal that IRA participants' use of paid preparers increased in 1982 and 1986, which were the first and last years of universal eligibility and coincided with the enactment of ERTA and TRA86. Similarly, paid preparer usage among nonparticipants is noticeably higher around the enactment of TRA86. Both trends also are consistent with the broad education role of preparers counseling taxpayers through periods of tax law change.

Finally, relative to nonparticipants, IRA participants generally have significantly smaller refunds (larger balance due) before considering the IRA deduction. In fact, in three of the six years examined, the mean prepayment position for participants reflects a balance due before consideration of the IRA contribution, while the mean prepayment position for nonparticipants reflects a refund in all six years. One possible explanation for this finding is the framing bias suggested by prospect theory, especially given that IRA contributions change the prepayment status from balance due to refund for as many as 14 percent to 26 percent of all sample participants. It also should be noted

[23] As the data in table 1 indicate, WEALTH is highly skewed; hence, the means for our sample appear quite large compared to magnitudes cited earlier (i.e., footnote 2 citing Poterba et al. 1996). However, the median wealth of our IRA participants in the full sample is $6,281, and for the nonparticipants it is $308. These numbers, while comparable with prior research, are a little lower because we screened the sample for the post-TRA86 income limit for deductibility, and our wealth measure does not capture nonincome-producing liquid wealth such as nondividend paying stocks.

that nonparticipants have larger refunds despite having about $10,000 on average lower AGI than participants have.[24]

By way of diagnostics, we also examined the pairwise correlation coefficients between the variables included in the model, and report selected coefficients in table 2. Of particular interest is the correlation between TINC and MTR, which exceeds 0.8 cross-sectionally in the pre-TRA86 period (except in 1986), but is lower in the panel. This provides another reason to believe that the chance of identifying their separate impact on IRA participation is improved in this study. We also report the correlation coefficients for PREP and BALDUE with certain taxpayer characteristics, and generally find very little correlation between these variables and the characteristics examined. For instance, PREP is most highly correlated with INCOME, but the correlation coefficients range only between .119 and .228 across the six years examined. Likewise, although BALDUE is most highly correlated with MTR, the correlations range only from .061 to .240.

In general, none of these coefficients suggest the presence of harmful multicollinearity. However, they do warrant caution in interpreting the univariate differences in the characteristics of IRA participants and nonparticipants presented in table 1. For example, the correlations imply that taxpayers who use a paid preparer or who have a balance due are both characterized with having higher income, wealth and tax rate. Further, taxpayers with BALDUE are more likely to use a paid preparer. While these correlations are consistent with expectations and prior research (e.g., see Christian et al. (1993) for characteristics of paid prepared returns), many of these same taxpayer characteristics also appear to impact IRA participation. Hence, multivariate tests presented next are necessary to help isolate the partial effect of each of these taxpayer characteristics on IRA participation.

Logit Regression Results of IRA Participation

Table 3 presents the primary regression results of the determinants of IRA participation from fixed-effects logit models estimated using Chamberlain's (1980) procedure described earlier for all three balanced panels—the full, the pre-TRA86 and the post-TRA86 panels in columns 2, 3 and 4, respectively. Coefficient estimates for each variable are presented in the first row, and the related asymptotic t-statistics in parentheses in the second row.

Although we estimated both pooled cross-section time-series ("simple pooled") and fixed-effects models for each panel, the Hausman (1978) statistic is significant at the 0.01 level in all but the post-TRA86 model (where it is significant at the 0.16 level), which rejects the null hypothesis of a common intercept for all taxpayers and indicates that the fixed-effects model results are preferable. Nevertheless, for comparison, we present the results of the simple pooled logit model for the entire sample in the first column of table 3 and note that these results differ in many

[24] Based on these statistics, an anonymous reviewer suggested that it might be inappropriate to include the lowest income taxpayers in our samples because these taxpayers, although technically eligible to participate, potentially are unable to participate for financial reasons, and they could be driving our results. However, we include them for the following reasons. First, deciding on an income cut-off is arbitrary and problematic because, at a minimum, the cut-offs are likely to vary with taxpayer characteristics, such as filing status and family size (e.g., single taxpayers potentially require less income to have sufficient resources to contribute than a married couple). Second, one could argue that the data already contain a natural income cut-off point, i.e., the minimum income requirements for filing a tax return. Third, omitting them would reduce the information provided by the descriptive statistics, since these taxpayers are indeed part of the population. Lastly, the Chamberlain (1980) logit procedure itself controls for taxpayers whose income levels are so low that they have no means to participate. The Chamberlain conditional logit model's estimation process uses information from all observations to perform the Hausman (1978) test of the null hypothesis of homogeneity of intercepts, i.e., whether the fixed-effects model is preferred to the simple pooled model; if the null is rejected, the fixed-effects model produces consistent parameter estimates, whereas the simple pooled model does not. However, observations that do not change their status (i.e., in our study the taxpayers who either participate in an IRA in all six years or do not participate in any of the years) do not impact the fixed-effects parameter estimates (Greene 1990, 686–689).

TABLE 2

PEARSON PAIRWISE CORRELATION COEFFICIENTS BETWEEN CERTAIN VARIABLES, BY YEAR AND FOR THE BALANCED PANEL[a]

Variable	1982	1983	1984	1986	1987	1988	Full Panel	Pre-TRA86 Panel	Post-TRA86 Panel
Correlation of TINC with:									
MTR	0.827	0.817	0.812	0.718	0.571	0.570	0.702	0.725	0.606
WEALTH	0.299	0.305	0.179	0.268	0.036	0.059	0.203	0.433	0.056
Correlation of PREP with:									
TINC	0.228	0.217	0.200	0.151	0.151	0.119	0.183	0.186	0.188
MTR	0.154	0.127	0.096	0.063	0.030*	0.014*	0.079	0.140	0.067
WEALTH	0.104	0.079	0.070	0.067	0.089	0.110	0.084	0.102	0.094
BALDUE	0.147	0.113	0.107	0.132	0.101	0.076	0.113	0.128	0.119
Correlation of BALDUE with:									
TINC	0.240	0.172	0.136	0.171	0.061	0.082	0.148	0.206	0.089
MTR	0.251	0.180	0.166	0.188	0.091	0.105	0.167	0.266	0.143
WEALTH	0.216	0.161	0.136	0.155	0.126	0.076	0.113	0.155	0.130

[a]All correlation coefficients are significant at the 0.05 level based on two-tailed critical values, unless indicated with (*).

TABLE 3
LOGIT REGRESSION RESULTS OF IRA PARTICIPATION
(Asymptotic t-statistics in parentheses)

Dependent Variable: Log Odds of the Probability of IRA Participation

	Simple Pooled	Fixed-Effects		
Independent Variables	**Full Panel (1982–84, 1986–88)**	**Full Panel (1982–84, 1986–88)**	**Pre-TRA86 (1982–84, 1986)**	**Post-TRA86 (1987–88)**
Control Variables				
MTR (+)	0.0386††	0.0112	−0.0196††	0.0431††
	(7.58)	(1.26)	(−1.83)	(2.00)
TINC (+)	0.0718††	0.1335††	0.1421††	0.3189††
	(11.41)	(9.90)	(11.17)	(3.98)
TINCSQ (?)	−0.16E-03**	−0.27E-03**	−0.27E-03**	−0.0050**
	(−5.60)	(−4.40)	(−6.40)	(−2.97)
WEALTH (+)	0.0170††	0.0038	0.0080††	0.0230†
	(19.11)	(1.08)	(2.70)	(1.57)
WEALTHSQ (?)	−0.66E-05**	−0.85E-05	−0.14E-04**	−0.68E-04
	(−15.46)	(−1.35)	(−3.01)	(−1.63)
RENT (?)	−0.3447**	−0.0203	0.2984**	−0.2145
	(−6.23)	(−0.16)	(2.08)	(−0.82)
DEP (?)	−0.3740**	−0.0350	−0.4113**	0.0344
	(−14.30)	(−0.46)	(−4.72)	(0.12)
MS (?)	0.0410	0.2621	0.0866	0.9954
	(0.059)	(1.01)	(0.35)	(1.14)
AGE (−)	−0.1210	−0.9274††	−0.6915††	−0.3266
	(−1.13)	(−3.06)	(−2.01)	(−0.64)
Hypothesis Variables				
PREP (+)	0.6555††	0.5518††	0.8806††	1.1383†
	(5.29)	(2.07)	(3.42)	(1.50)
BALDUE (+)	1.0371††	0.6404††	0.6920††	0.6999††
	(14.133)	(4.62)	(4.88)	(2.47)
PREP*TINC (?)	−0.0239**	−0.0264**	−0.0204**	−0.0589**
	(−4.86)	(−2.50)	(−2.51)	(−1.76)
PREP*BALDUE (?)	−0.3302**	0.1111	−0.1022	−0.4660
	(−3.36)	(0.59)	(−0.56)	(−1.30)
Hausman χ^2 statistic	NA	179.6**	174.1**	18.12
Log-likelihood	−6521.42	−1476.59	−1485.62	−290.58
No. of observations	22,524	3,754	6,010	12,810

**(*)Denotes significance at the 0.05 (0.10) level, based on two-tailed critical values.
††(†)Denotes significance at the 0.05 (0.10) level, based on one-tailed critical values.

respects from their counterpart fixed-effects results in the second column. Specifically, MTR, WEALTH, RENT and DEP are significantly associated with IRA participation in the simple pooled model, but not in the fixed-effects model, while the opposite pattern is observed for AGE. Caution is warranted in interpreting the results from the simple pooled model, however, as well as the results of prior cross-sectional and panel studies which failed to control for individual-specific

effects, as they may suffer from omitted variables bias we find in our data and yield inconsistent parameter estimates. Hence, the remainder of the discussion is based on the fixed-effects results.

Of primary interest in this study is the role of paid preparers in IRA participation. The table 3 results show that, even after controlling for various taxpayer characteristics, paid preparer use is significantly associated with an increased probability of IRA participation in all models. Specifically, the results from the fixed-effects model on the full panel (column 2) suggest that engaging a paid preparer increases the probability of participating in an IRA by approximately 6 percent.[25] These results are consistent with H1 and further reinforce the descriptive data, which reveal that preparers indeed appear to play a role in taxpayers' savings decisions.

Table 3 also shows that the coefficients on the PREP*TINC interaction are significant and negative for each of the three panels. Combined with the positive coefficient on PREP, this indicates that the positive influence of paid preparers on IRA participation decreases as income increases. These results are consistent with the general expectations of H2, and suggest that more sophisticated, higher income taxpayers are less likely to be influenced by preparers into participating in an IRA. One possible explanation for this finding is that these taxpayers have the opportunity to benefit from a variety of tax minimization strategies besides simply relying on IRAs, and thus seek out paid preparers who are able to advise regarding more sophisticated strategies. However, a possible limiting factor in this explanation is our deletion of any return with AGI exceeding $50,000 in all but our pre-TRA86 sample because of the IRA eligibility criteria in the post-TRA86 period. This criterion potentially makes it less likely that our higher income taxpayers have sufficient income to demand more sophisticated planning techniques. Alternatively, it may be that this "high income" group is actually constituted by middle income taxpayers who use a preparation service simply to file a correct return or to save time, but not for planning advice.

A potential concern with the table 3 results is the fact that taxpayers are not randomly assigned to preparation mode, but instead choose to either use a preparer or self-prepare their return based on certain characteristics. This self-selection of preparation mode could bias our results if there are variables that impact both preparation mode choice and IRA participation, but are not included in our IRA model. Similarly, a self-selection bias could exist if there are any omitted unobservable variables common to both decisions that remain uncontrolled by our fixed-effects procedure.

One solution for this problem is to use an instrumental variable approach that involves identifying a variable highly correlated with PREP, but uncorrelated with the error term. Using $PREP_{t-1}$ as an instrument for $PREP_t$, we re-estimated the IRA model on the full panel. The results (not reported) are similar in sign, magnitude and significance to the results reported in table 3, except that marginal tax rate is now significant at the 0.05 level, suggesting that the self-selection bias, if any, is minimal in our data. We chose $PREP_{t-1}$ as an instrument for $PREP_t$ because the correlation between the two variables is high ($r = 0.74$), and $PREP_{t-1}$ is less likely than $PREP_t$ to be correlated with omitted explanatory variables.[26,27]

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[25] The marginal effect for the kth explanatory variable is calculated as $[p(1 - p)\hat{\beta}_k]$, where p is the proportion of taxpayers participating in an IRA in the sample. For the full panel, p is equal to 0.11783. Therefore, the 5.7 percent increase in the probability of IRA participation associated with the use of a paid-preparer is obtained as follows: [0.11783(1−0.11783)]*0.5518.

[26] Based on prior research on the determinants of preparer choice (e.g., Long and Caudill 1987; Christian et al. 1993; Christian et al. 1994), we do not believe that there are any observable variables relevant to both decisions that are omitted from our IRA model. However, to the extent such variables exist *and* they are correlated with $PREP_{t-1}$ (perhaps due to the persistence of preparation mode over time), the suitability of $PREP_{t-1}$ as an instrumental variable may be weakened.

[27] An anonymous reviewer suggested that PREP is likely endogenous in a model of IRA participation, i.e., a taxpayer's choice of preparation mode is partly driven by whether the taxpayer chooses to participate in an IRA. We did not pursue this potential problem for two reasons. First, theoretically we do not believe that causality flows from IRA participation to preparation mode choice. This position is supported by previous studies of preparation mode choice (e.g., Long and Caudill 1987; Christian et al. 1993), which do not include

(*Continued on next page*)

The third phenomenon of interest is the effect of prepayment position on IRA contributions. The table 3 results indicate that, regardless of the tax regime, taxpayers' prepayment position has a strong impact on their probability of making an IRA contribution. In terms of magnitude, the full panel results imply an increase in the probability of IRA participation of approximately 7 percent when taxpayers are in a balance due position compared with those in a refund position, which is consistent with H3 and the prospect theory explanation of a framing bias. However, the use of paid preparers does not appear to mitigate this framing effect as the PREP*BALDUE interaction is generally insignificant.

An alternative explanation for the BALDUE result is that taxpayers may be strategically adjusting their tax prepayments (withholding) in anticipation of the tax savings from the IRA contribution. Because there is no *a priori* reason to expect such strategic behavior to occur only when a taxpayer has a balance due, the appropriate test of this explanation is to use a continuous measure of prepayment status (the amount owed or refund due before IRA contribution), rather than a dichotomous variable. In these regressions (not shown), the coefficient on BALDUE was positive, but weakly significant, indicating that it is the notion of balance due or refund that drives the result, not the dollar amount.[28]

Of the control variables in the model, the coefficients on TINC are always positive and highly significant, the coefficients on WEALTH are positive (but not always significant), and the coefficients on TINCSQ and WEALTHSQ are negative and generally significant. These results suggest that the probability of IRA participation increases with income and wealth, but at a decreasing rate. With the exception of the pre-TRA86 period, there is little evidence that renters are more or less likely to participate. Among the demographic characteristics, family size and marital status do not appear to systematically impact the probability of participation. However, the expectation that older people will dissave is generally upheld in the data. This result is particularly interesting given the findings in the descriptive statistics that the proportion of IRA participants age 65 or older is much greater than that of nonparticipants. Thus, there appears to be another variable or other variables in the analysis, highly correlated with AGE, which when controlled, allows the true relation between AGE and IRA participation to emerge.

Footnote 27 (Continued)

IRA participation as an explanatory variable in the preparer choice model. Second, empirically accounting for the endogeneity would require simultaneously estimating two equations—one for IRA, which includes PREP as an independent variable, and another for PREP, which includes IRA participation as an independent variable. From a practical standpoint, estimating such a model that has both limited dependent variables with panel data introduces significant econometric problems for which, to our knowledge, known solutions do not exist. While we understand that the technology does exist to estimate a simultaneous equations probit model in a cross-sectional framework, switching to a cross-sectional analysis would unfortunately require making a trade-off between controlling for omitted variables (hence, fixed-effects) and controlling for endogeneity of preparer mode. We think that the former is much more important in the context of IRA participation, as borne out by the numerous studies on savings research that underscore the importance of controlling for individual heterogeneity in savings tastes (accomplished by our fixed-effects procedure).

[28] In order to further examine the importance of the demographic variables, economic variables, PREP, BALDUE, PREP*TINC, and PREP*BALDUE, we estimated the model without these variables with the full panel, then re-estimated the model with these variables added incrementally to the model. A likelihood ratio test was performed after each variable was added in order to examine its incremental explanatory power. In addition, we compared coefficients of the remaining variables before and after the new variable was added. For each of the variables except for PREP alone and the PREP*BALDUE interaction, the likelihood ratio test indicated that the added variable explained a significant incremental portion of the variation in IRA participation. Further, the coefficients of the remaining variables showed a high degree of stability as the new variables were added, indicating that the added variables did not provide a needed adjustment to the variables already present in the model.

Results of Persistence in IRA Participation

The final purpose of this study is to examine whether the determinants of IRA participation differ between persistent and infrequent participants. For this purpose, we use the full panel of returns for all six years because the most meaningful analysis of persistence is likely to emerge from data spanning the longest possible time period. The results are reported in tables 4 and 5.

Consistent with Skinner's (1992) earlier findings, the data in panel A of table 4 show that the taxpayers in our sample exhibit a high degree of persistence in IRA participation. Approximately

TABLE 4
DESCRIPTIVE STATISTICS ON PERSISTENCE IN IRA PARTICIPATION

Panel A: Participation Rates for One or More Additional Years, Given Participation in Any Year

Year of Participation	Percent Participating At Least One Additional Year	Percent Participating At Least Two Additional Years	Percent Participating At Least Three Additional Years	Percent Participating At Least Four Additional Years	Percent Participating All Five Additional Years
1982	89.69	79.67	68.52	50.42	36.77
1983	94.03	83.29	68.97	51.55	31.50
1984	90.18	79.96	64.64	42.83	25.93
1986	90.35	80.33	60.11	39.53	24.04
1987	93.44	84.07	65.81	50.12	30.91
1988	92.58	83.38	65.22	50.13	33.76

Panel B: Descriptive Statistics by Persistence of Participation (means with standard deviations in parentheses)

Selected Variables	Years Participating in IRAs: None	1	2	3	4	5	6
Adjusted Gross Income (1983 $ in thousands)	18.768 (9.536)	25.007 (10.054)	25.708 (10.607)	26.304 (10.904)	27.864 (11.860)	31.943 (14.133)	29.705 (12.381)
Marginal Tax Rate (percent)	16.47 (5.73)	19.63 (5.29)	20.12 (5.60)	21.00 (5.29)	21.67 (6.10)	23.31 (5.61)	23.52 (5.01)
Wealth (1983 $ in thousands)	3.568 (13.810)	8.841 (21.911)	12.685 (32.179)	15.144 (28.492)	25.290 (40.481)	46.680 (76.881)	52.513 (158.437)
Tax Return Preparation (percent using paid preparer)	42.08	51.58	51.39	47.72	46.86	56.48	60.48
Balance Due <Refund> before IRA contribution (1983 $ in thousands)	<0.527> (0.689)	<0.387> (0.911)	<0.452> (0.646)	<0.374> (1.087)	<0.337> (0.947)	<0.021> (1.424)	0.219 (1.366)
Number of Dependents	0.97 (1.14)	1.02 (1.01)	0.85 (0.96)	0.78 (1.05)	0.60 (0.84)	0.50 (0.79)	0.40 (0.67)
Marital Status (percent married and filing jointly or separately)	51.79	71.47	62.88	65.07	69.54	76.30	69.95
Age (percent age 65 or older)	3.39	5.56	6.70	9.70	6.42	14.44	7.83
No. Of Observations (percent of total)	2,910 (77.52)	222 (5.91)	132 (3.52)	146 (3.89)	122 (3.25)	90 (2.39)	132 (3.52)

TABLE 5
FIXED-EFFECTS LOGIT REGRESSION RESULTS OF IRA PARTICIPATION BY PERSISTENCE OF PARTICIPATION
(Asymptotic t-statistics in parentheses)

Dependent Variable: Log Odds of the Probability of IRA Participation

Independent Variables	3-Year Participants as Persistent Savers		3-Year Participants as Infrequent Savers	
	Infrequent Participants (0–2 Years)	Persistent Participants (3–6 Years)	Infrequent Participants (0–3 Years)	Persistent Participants (4–6 Years)
Control Variables:				
MTR (+)	0.0366††	−0.0092	0.0175†	−0.0066
	(2.67)	(−0.77)	(1.63)	(−0.39)
TINC (+)	0.0937††	0.1872††	0.1319††	0.1722††
	(2.97)	(9.45)	(6.12)	(6.11)
TINCSQ (?)	−0.48E-03	−0.32E-03**	−0.45E-03	−0.35E-03**
	(−0.90)	(−4.93)	(−1.43)	(−2.35)
WEALTH (+)	0.0167††	0.9516E-04	0.0173††	−0.0130††
	(2.65)	(0.02)	(3.74)	(−2.19)
WEALTHSQ (?)	−0.21E-04*	−0.16E-04	−0.25E-04**	0.89E-05
	(−2.09)	(−1.18)	(−3.26)	(0.63)
RENT (?)	0.0691	−0.0772	0.1235	−0.3936
	(0.35)	(−0.45)	(0.82)	(−1.59)
DEP (?)	0.0714	−0.1450	−0.0179	−0.0566
	(0.67)	(−1.29)	(−0.21)	(−0.32)
MS (?)	0.4141	0.0027	0.2186	0.5447
	(1.10)	(0.01)	(0.73)	(1.02)
AGE (−)	−2.2320††	−0.6418††	−1.1380††	−0.8658††
	(−2.71)	(−1.90)	(−2.73)	(−1.90)
Hypothesis Variables:				
PREP (+)	−0.2172	1.4396††	0.5226†	0.7980
	(−0.58)	(3.82)	(1.62)	(1.27)
BALDUE (+)	0.5809††	0.6611††	0.6841††	0.6289††
	(2.81)	(3.42)	(4.18)	(2.37)
PREP*TINC (?)	0.31E-03	−0.0612**	−0.0309**	−0.0249
	(0.02)	(−4.17)	(−2.36)	(−1.03)
PREP*BALDUE (?)	0.4767*	−0.1371	0.3352	−0.4384
	(1.74)	(−0.52)	(1.52)	(−1.24)
Hausman χ^2 statistic	34.87**	97.87**	48.88**	63.80**
Log-likelihood	−661.63	−793.88	−1,042.29	−412.15
No. of observations	3,264	490	3,410	344

**(*)Denotes significance at the .05 (.10) level, based on two-tailed critical values.
††(†)Denotes significance at the .05 (.10) level, based on one-tailed critical values.

90 percent of the IRA participants in any one of the six years participate at least one additional year, over 60 percent participate in at least three additional years, and approximately 30 percent participate in all five additional years. This compares to a 10 percent to 15 percent participation rate for the sample as a whole in any individual year. Thus, while the proportion of participants exhibiting persistent behavior drops as the number of years increases, a participant in any one of

the years is two to three times more likely to participate in all six years than a randomly chosen taxpayer is to participate in a single year.

Descriptive statistics by persistence of participation are shown in panel B of table 4. As in table 1, these data show that participants' adjusted gross income, MTR and wealth are all higher than those of nonparticipants and almost monotonically increasing with persistence of participation. In contrast, the mean refund due and the number of dependents claimed decline with persistence of participation. Other taxpayer characteristics, such as age, marital status, and use of a paid preparer do not display any obvious trend with regards to IRA participation persistence.

Table 5 presents fixed-effects logit regression results for subgroups of taxpayers classified by frequency of IRA participation.[29] Given that taxpayers in our data fall into seven different participation levels (as taxpayers could contribute from zero to six years), several classification schemes for persistence were feasible. Our approach was to achieve simplicity in both estimation and interpretation of the results while retaining the full sample for analysis. Hence, we first chose to combine the seven levels into two groups—infrequent and persistent.[30] Next, to mitigate arbitrariness over who to include in the two groups, we classified taxpayers in the lower half of participation persistence (zero, one and two years) as infrequent, and those in the upper half (four, five and six years) as persistent. That still left us with the three-year participants, who could logically be included in either group. We resolved that issue by estimating the regression models both ways—with three-year participants first classified as persistent (columns 1 and 2 of table 5), and then as infrequent (columns 3 and 4). Another possibility was to simply leave out the three-year participants. That comparison is also possible from columns one and four of table 5.

The results show that there are many similarities in the factors affecting IRA participation of persistent and infrequent participants. For instance, income and prepayment position have a strong positive impact on the probability of IRA participation and age has a significant negative impact for both infrequent and persistent participants, while the number of dependents, home ownership and marital status are not related to IRA participation for either group. However, while preparer use is still generally positively related to IRA participation and the PREP*TINC interaction negatively impacts IRA participation, the results are much weaker than in the full panel, and these results appear to be sensitive to the classification of the three-year participants. Finally, the result for the PREP*BALDUE interaction, while also weak, indicates another differential response between frequent and infrequent participants: it is positive for infrequent participants and insignificant (or perhaps negative) for frequent participants, suggesting that preparers appear to recommend taxpayers who are not habitual savers but have a balance due to redirect payments to an IRA.

However, two variables (marginal tax rate and wealth) appear to impact IRA participation differently for the two groups, regardless of the classification scheme. MTR positively impacts IRA participation of the infrequent participants, but appears to have no impact on the persistent participants. This result indicates that the price of contributions matters only for the infrequent participants and may explain why previous studies that do not control for persistence of participation obtain mixed results for the impact of MTR on IRA participation. Similarly, WEALTH positively impacts IRA participation of the infrequent group, while it either does not or negatively impacts the persistent group. This result suggests that infrequent participants rely on existing financial assets to fund IRAs, thereby simply reshuffling their assets rather than creating new savings. Thus, lack of control for persistence may again account for the conflicting findings of prior research focused on the savings impact of IRAs.

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[29] As before, the Hausman (1978) statistic is significant in each case at the 0.01 level, rejecting the null hypothesis of a common intercept for all taxpayers. Consequently, we present in table 5 results from only the fixed-effects models, which produce consistent and efficient parameter estimates.

[30] We believe combining the different participation levels is desirable for several reasons. First, the number of observations in each level is small, which is not desirable for maximum likelihood estimation that relies on asymptotic properties. Second, more than two levels would require estimating a multinomial logit model, which adds additional dimensions of complexity in a fixed-effects framework. Finally, there is no *a priori* reason to expect that the determinants of IRA participation are different for each level of persistence.

The analysis of persistence in IRA participation also could be pursued from at least two other perspectives.[31] For example, it might be interesting to examine the factors that explain persistence in participation, for which the dependent variable would be the grouping variable. Further, our analysis of persistence is static. To examine the dynamics of this issue would require including a lagged dependent variable (i.e., a dummy for IRA participation in the immediately previous year) as an explanatory variable. Given our results, both ideas offer promising avenues for future research, but would likely require different data and research design choices, such as a longer panel, different model specification, and estimation procedures.

CONCLUSIONS

Concerns about the low overall level of personal savings, and especially the precipitous decline in IRA contributions, recently galvanized bipartisan support in Congress and led to expanding the scope of the IRA tax benefit. Hence, the question of who participates in an IRA and what factors are associated with that decision are of topical interest. Using longitudinal data that span two tax regimes and estimation procedures that control for unobserved heterogeneity in taxpayers' tastes for savings, we provide evidence on the impact of paid tax return preparers and taxpayers' prepayment position on IRA participation, and whether the determinants of participation differ among those who participate frequently (i.e., persistent savers) and those who do not.

Specifically, we find that the use of paid preparers increases the probability of IRA participation, but that this effect is decreasing in taxpayer income and, for infrequent participants, this effect is increasing in taxpayers' balance due. The overall result provides first time evidence that the paid preparers' role within the tax system extends beyond taxpayer compliance issues documented in prior studies to critical personal decisions such as savings. Moreover, the interactions with income and prepayment position shed light on the complex nature of this role and suggest that taxpayers may engage different preparer types depending on their own need and sophistication level, and preparers in turn appear to provide recommendations commensurate with the nature of services demanded. Together these results contribute to the recent emphasis on obtaining a greater understanding about the motivations, circumstances and events relating to the taxpayers' use of paid preparers, whose widespread involvement makes them an important institutional reality of the tax system.

With regard to prepayment position, we find that the presence of a balance due increases the probability of IRA participation, a result consistent with the framing bias phenomenon observed in prior IRA studies and in many other studies of taxpayer behavior. In a broader sense, we infer from both the paid preparer and prepayment position results the greater need to consider factors beyond simply those suggested by the life-cycle theory of savings, which relies heavily on utility maximization and which has dominated the savings literature to date.

The results based on the persistence of IRA participation reveal that increases in wealth and marginal tax rates are associated with an increased likelihood of IRA participation, but only among infrequent participants. The wealth results are consistent with shuffling of asset holdings among less frequent participants (and perhaps less frequent savers), but not among persistent participants (savers), and could potentially explain the conflicting findings in previous studies about the impact of IRAs on overall savings. Our finding that marginal tax rates primarily influence infrequent participants suggests that a potential explanation for the mixed findings for tax rates in prior IRA studies could be the lack of differentiation between frequent and infrequent participants. From a policy perspective, these results imply that the new "back-loaded" IRAs that do not provide a current tax benefit are unlikely to be the savings vehicle of choice for infrequent participants. At a minimum, the persistence results shed new light on a potentially important source of taxpayer heterogeneity, which should be considered in future savings research.

[31] We thank the editor and an anonymous reviewer for suggesting these ideas.

REFERENCES

Bernheim, B. 1994. Comments on: Do savings incentives work? *Brookings Papers on Economic Activity* 1: 152–166.

Chamberlain, G. 1980. Analysis of covariance with qualitative data. *Review of Economic Studies* 47: 225–38.

Chang, O., and J. Schultz. 1990. The income tax withholding phenomenon: Evidence from TCMP data. *The Journal of the American Taxation Association* 12 (Spring): 88–93.

Christian, C., and P. Frischmann. 1989. Attrition in the statistics of income panel of individual returns. *National Tax Journal* 42 (December): 495–501.

———, and S. Gupta. 1993. New evidence on "secondary evasion." *The Journal of the American Taxation Association* 15 (Spring): 72–93.

———, ———, and S. Lin. 1993. Determinants of tax preparer usage: Evidence from panel data. *National Tax Journal* 46 (December): 487–504.

———, ———, G. Weber, and E. Willis. 1994. The relation between the use of tax preparers and taxpayers' prepayment position. *The Journal of the American Taxation Association* 16 (Spring): 17–40.

Collins, J., and J. Wyckoff. 1988. Estimates of tax-deferred retirement savings behavior. *National Tax Journal* 41 (December): 561–572.

———, V. Milliron, and D. R. Toy. 1990. Factors associated with household demand for tax preparers. *The Journal of American Taxation Association* 12 (Fall): 9–25.

Dubin, J., M. Graetz, M. Udell, and L. Wilde. 1992. The demand for tax return preparation services. *The Review of Economics and Statistics* 74: 75–82.

Dusenberry, R. 1994. The effect of prepayment position on individual taxpayers' preferences for risky tax-filing options. *The Journal of the American Taxation Association* 16 (Spring): 1–16.

Engen, E., W. Gale, and J. Scholz. 1994. Do savings incentives work? *Brookings Papers on Economic Activity* 1: 85–151.

Erard, B. 1993. Taxation with representation: An analysis of the role of tax practitioners in tax compliance. *Journal of Public Economics* 52: 163–197.

Feenberg, D., and J. Skinner. 1989. Sources of IRA saving. In *Tax Policy and the Economy*, edited by L. Summers. Cambridge, MA: MIT Press.

———, and J. Poterba. 1991. Which households own municipal bonds? Evidence from tax returns. *National Tax Journal* 44 (December): 93–103.

Gale, W., and J. Scholz. 1994. IRAs and household saving. *American Economic Review* 84 (December): 1233–1260.

Greene, W. 1990. *Econometric Analysis*. New York, NY: Macmillan.

Hausman, J. 1978. Specification tests in econometrics. *Econometrica* 46: 1251–1271.

Hogan, T., C. O'Neil, and G. Thompson. 1992. Tax rates, taxes due, and IRA contributions. *Tax Notes* (August): 643–650.

Hubbard, R. 1984. Do IRAs and Keoghs increase saving? *National Tax Journal* 37 (March): 43–54.

Joines, D., and J. Manegold. 1995. IRAs and saving: Evidence from a panel of taxpayers. Working paper, University of Southern California.

Kahneman, D., and A. Tversky. 1979. Prospect theory: An analysis of decision under risk. *Econometrica* 47: 263–291.

Long, J. 1990. Marginal rates and IRA contributions. *National Tax Journal* 43 (June): 143–153.

———, and S. Caudill. 1987. The usage and benefits of paid tax return preparation. *National Tax Journal* 40 (1): 35–46.

Meade, J. 1990. The impact of different capital gains tax regimes on the lock-in effect and new risky investment decisions. *The Accounting Review* 65 (April): 406–431.

O'Neil, C., and G. Thompson. 1987. Participation in individual retirement accounts: An empirical investigation. *National Tax Journal* 40 (December): 617–624.

Poterba, J., S. Venti, and D. Wise. 1996. Personal retirement savings programs and asset accumulations: Reconciling the evidence. Working paper, MIT, Dartmouth, Harvard and National Bureau of Economic Research.

Roth, J., J. Scholz, and A. Witte, eds. 1989. *Taxpayer Compliance, Volume 1: An Agenda for Research*. Philadelphia, PA: University of Pennsylvania Press.

Skinner, J. 1992. Do IRAs promote saving? A review of the evidence. *Tax Notes* (January 13): 201–211.

Slemrod, J. 1994. Comments on: Do savings incentives work? *Brookings Papers on Economic Activity* 1: 166–180.

———, and N. Sorum. 1984. The compliance cost of the U.S. individual income tax system. *National Tax Journal* 37 (4): 461–474.

Thaler, R. 1990. Saving, fungibility, and mental accounts. *Journal of Economic Perspectives* 4 (Winter): 193–205.

———. 1994. Psychology and savings policies. *The American Economic Review* 84 (May): 186–192.

Udell, M. 1995. Tax return preparers and tax evasion. Working paper, Joint Committee on Taxation, U.S. Congress, Washington, D.C.

Venti, S., and D. Wise. 1987. The determinants of IRA contributions and the effects of limit changes. In *Pensions in the U. S. Economy*, edited by Z. Bodie, J. B. Shoven, and D. A. Wise. Chicago, IL: University of Chicago Press and NBER.