Information, the Introduction of Roths,

and IRA Participation

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Abstract: This study investigates the issue of whether part of the increase in total IRA contributions from 1997 to 1998 can be attributed to increased advertising due to the introduction of Roth IRAs in 1998. In this study, the use of a tax preparer will proxy for exposure to information regarding IRAs. A preparer is expected to have *less* of an influence on IRA participation in 1998 relative to 1997. Evidence supports this prediction amongst taxpayers eligible for an IRA contribution in both 1997 and 1998. However, evidence also suggests that more information would have led to a potentially sizable increase in participation for taxpayers newly eligible for an IRA contribution in 1998.

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I.   Introduction

Social Security, employer pensions, and private savings are the legs in the often-used metaphor of the three-legged stool that represents the U.S. retirement system. Of the three, Social Security provides the bulk of support for most retirees, while pensions and private savings provide a much smaller share.[1] Individual Retirement Accounts (IRAs) have been one of the government's primary programs aimed at encouraging private savings since the early 1980s. Concern over the lack of sufficient accumulation of private savings for retirement has resulted in proposals to expand IRAs in almost every recent Federal legislative session.

Legislation passed in 1997 expanded eligibility for deductible IRAs and also created Roth IRAs. In contrast to deductible IRAs, Roth contributions consist of after-tax dollars. Eligibility for Roth contributions is based only on income, not income and pension status.[2] As a result, many taxpayers previously not eligible to make IRA contributions could now contribute to a Roth IRA. IRA participation increased from 3.3% in 1997 to 5.9% in 1998. Increased advertising and promotion of Roth IRAs may partially explain the increase in IRA contributions (deductible and Roth) from 1997 to 1998.

The difficulty in examining this claim directly is that exposure to IRA advertising is unobserved.[3] Furthermore, while more advertising is expected to have a positive effect on IRA participation, increased confusion over eligibility may have had a negative effect on IRA participation. This confusion could have been due to the eligibility expansion for deductible IRAs in 1998 or the introduction of Roth IRAs; especially since many taxpayers were eligible for both types of IRAs. The lack of a *ceteris paribus* change in IRA advertising complicates any analysis.

Using an extract from a random sample of tax returns for 1997 and 1998, this study will indirectly examine the relationship between advertising and IRA participation by studying whether more information via a tax preparer influences IRA participation. Good tax preparers inform clients of potential tax-minimizing strategies and taxpayers hiring preparers, all else equal, would contribute to IRAs more often in both 1997 and 1998. More advertising and promotion of IRAs in 1998 than in 1997, under the hypothesis, would imply that hiring a preparer has *less* of an influence on IRA participation in 1998 than in 1997.[4]

The hiring of a tax preparer is non-random and is likely to be endogenous. I instrument for tax preparer status with the number of supporting forms not related to income. These forms are related to the hiring of a preparer since they increase the complexity of a given return. They are also not related to IRA eligibility and are not expected to be directly related to decisions regarding IRAs.

I find that tax preparers had less influence on IRA participation in 1998 than in 1997 amongst taxpayers eligible for an IRA contribution in both 1997 and 1998.

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[1] See Smith (2002).

[2] Earnings are necessary to be eligible for both types of IRAs.

[3] While there is no direct evidence of increased advertising of IRAs in 1998, there is anecdotal evidence that advertising increased from 1997 to 1998.

[4] Tax preparers can only inform taxpayers about the opportunity to contribute to an IRA. It is still up to the taxpayer to actually follow-through on any recommendation.

Examining taxpayers eligible in both years is an attempt to isolate the advertising effect since confusion over IRA eligibility likely remained relatively constant for this group. However, I also find evidence suggesting that more information regarding IRAs would have led to a potentially sizable increase in participation for taxpayers newly eligible for an IRA contribution in 1998.

I also examine the relationship between tax preparers and the amount contributed to IRAs. The results are similar to those for IRA participation as I find that hiring a preparer is associated with larger contributions to an IRA in 1997, but not in 1998 for taxpayers that I observe in both years.

The results in this study will help determine whether more resources by the government or financial institutions should be devoted to informing the public about IRAs in an effort to increase IRA participation. The results may have implications for other programs, not just tax-preferred savings incentives for retirement, in helping to determine whether or not non-economic factors influence participation decisions.[5]

The paper is structured as follows. Section II contains background on deductible and Roth IRAs. A literature review can be found in section III. The data are described in section IV and the empirical results are presented in section V. Section VI concludes.

II.   Background on IRAs

Deductible IRAs were first introduced in the United States in 1974 as a tax-preferred savings vehicle for those without pensions. From 1982-1986, all working taxpayers up to age 70.5 were eligible for tax-deductible contributions to an IRA. A worker could contribute up to $2,000 a year into an IRA, and a non-working spouse could contribute an additional $250. Earnings on IRA assets are allowed to accrue tax-deferred. Taxes are levied at the ordinary income rate instead of the capital gains rate when IRA assets are withdrawn at retirement. A penalty in addition to taxes is imposed if assets are withdrawn before age 59.5 and there are rules regarding required distributions from IRAs once the owner reaches age 70.5.

The Tax Reform Act of 1986 (TRA86) restricted eligibility for tax-deductible contributions for high-income taxpayers with employer-provided pensions beginning in the 1987 tax year. However, earnings were still allowed to accrue tax-deferred in all IRA accounts. All taxpayers remained eligible to make a non-deductible contribution to an IRA. Non-deductible IRA contributions will not be examined in this study. IRA participation plummeted from 1986 to 1987 and remained fairly steady thereafter. Subsequent legislation increased the limit for non-working spouses and provided for non-penalized early withdrawals under certain situations. By 1997, a non-working spouse could contribute up to $2,000 to an IRA. In 1998, eligibility for deductible contributions was expanded substantially for some taxpayers. For married couples where only one spouse is covered by a pension plan, the income limit above which a deductible contribution is not allowed for the non-covered spouse was increased from $50,000 modified Adjusted Gross Income (AGI) to $160,000 modified AGI. The top three panels

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[5] Holden (2003) cites survey data showing that 61% of U.S. households are "not at all" familiar with 529 plans, which are a tax-preferred savings incentive geared towards college education expenses.

of Table 1 summarize the eligibility requirements for a deductible IRA contribution for 1986, 1987, 1997, and 1998.

Table 1. Eligibility for Deductible/Roth IRA in 1986, 1987,1997 and 1998:
Modified AGI level above which a deductible/Roth IRA contribution is not allowed

	Covered by Pension	Spouse Covered by Pension	Not Covered by Pension (Both Spouses if MFJ)
1986 Deductible IRA			
Contribution Limit= $2,000 for a spouse with earnings; $250 for a non-working spouse			
Married Filing Jointly	No Limit	No Limit	No Limit
Single/Head of Household	No Limit	---	No Limit
1987/1997 Deductible IRA			
1987 Contribution Limit= $2,000 for a spouse with earnings; $250 for a non-working spouse			
1997 Contribution Limit= $2,000/spouse			
Married Filing Jointly	$50,000	$50,000	No Limit
Single/Head of Household	$35,000	---	No Limit
1998 Deductible IRA			
Contribution Limit= $2,000/spouse			
Married Filing Jointly	$60,000	$160,000	No Limit
Single/Head of Household	$40,000	---	No Limit
1998 Roth IRA			
Contribution Limit= $2,000/spouse			
Married Filing Jointly	$160,000	$160,000	$160,000
Single/Head of Household	$110,000	---	$110,000

See U.S. Internal Revenue Service, Publication 590 in the respective years for the proper definition of modified AGI. The definition changes as the number of adjustments to income change over time.

In 1998, Roth IRAs were available for the first time. Contributions to a Roth IRA are not deductible and eligibility is based only on income (and earnings). All taxpayers under the income limits are eligible regardless of pension status. Earnings are tax-*free* as withdrawals are not taxed. A penalty is still imposed for early withdrawal, but contributions can be made beyond age 70.5. The minimum distribution rules that apply to deductible IRAs do not apply to Roth IRAs while the owner is still alive. The bottom panel of Table 1 summarizes the eligibility requirements for a Roth IRA contribution in 1998.[6] Many taxpayers are eligible for both types of IRAs; any taxpayer without a pension with modified AGI under the limit for Roths would be eligible for both. The

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[6] Note that modified AGI is defined slightly differently for a Roth IRA. Modified AGI for Roths takes into account any income related to a conversion of deductible or non-deductible IRA assets to a Roth IRA. This type of conversion was first available in 1998.

income limits for deductible IRAs do increase over time, but the income limits for Roth IRAs do not. The most recent reform in The Economic Growth and Tax Relief Reconciliation Act of 2001 increased contribution limits for both types of IRAs beginning in 2002.

Table 2 presents IRA contribution information for 1997 and 1998.[7] Total IRA contributions (deductible plus Roth) increased substantially from 1997 to 1998. The table shows that the percent of taxpayers eligible for a deductible or Roth IRA contribution increased from 70% to 86% from 1997 to 1998. The number of returns with an IRA deduction decreased from 1997 to 1998, but the total number of IRA contributors (deductible and Roth) increased from 4.1 million in 1997 to 7.4 million in 1998. Contributions went from $8.7 billion in 1997 to over $16 billion in 1998.

Table 2. IRA Contributions 1997-1998

	1997	1998
% Returns eligible for a deductible/Roth IRA Contribution*	70.2%	85.7%
Returns with Deductible IRA ('000s)	4,069	3,868
Deductible IRA Contributions ($millions)	$8,663	$8,188
Returns with Roth IRA ('000s)*		3,500
Roth IRA Contributions ($millions)*		$8,139
Total Returns ('000s)	122,422	124,771
% Returns with Deductible IRA	3.3%	3.1%
% Returns with Roth IRA		2.8%

Source: U.S. Internal Revenue Service (various issues)
*Author's calculation from IRS data

III.   Literature Review

The expansion of eligibility for IRA contributions from 1997 to 1998 is almost the direct opposite of the restricting of eligibility for deductible IRA contributions from 1986 to 1987. As shown in Table 1, virtually all taxpayers were eligible for a deductible IRA contribution in 1986, but high-income taxpayers with pensions were prohibited from making a deductible IRA contribution beginning in 1987. In the case of IRA participation from 1986 to 1987, some researchers (Venti and Wise, 1992, Long, 1990, and Bernheim, 1997) attributed the drop-off in IRA participation following TRA86 in part to a reduction in the promotion of IRAs.[8] Taxpayer confusion over IRA eligibility therefore exacerbating the drop-off in IRA participation. Others argued that confusion

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[7] See Congressional Budget Office (2003) for a more detailed analysis of tax-preferred savings programs for 1997.

[8] Similar to the case for this study, there is no direct evidence of a drop-off in promotion and advertising of IRAs from 1986 to 1987 that is publicly available.

over the deductibility restrictions was not important in the drop-off in participation after TRA86 since participation did not rebound after 1987 (Engen et al., 1994). While a rebound might be expected for a given eligible taxpayer who does not change eligibility over time, confusion can persist in the aggregate as taxpayers change eligibility status over time due to changes in income or pension status.

More recent research has gone beyond these observations based on aggregate data and examined individual-level data. Hrung (2001) studied a panel of taxpayers using public use tax data from 1982-1988 and showed that in 1987, taxpayer confusion over IRA eligibility led some taxpayers to refrain from an IRA contribution even when they were still eligible for a deductible contribution, but other taxpayers to claim a deductible contribution when they likely were not eligible to do so. Overall, taxpayer misunderstanding was not found to have been a major factor in the steep drop-off in overall IRA contributions after TRA86. That study was hampered by the lack of age and, more importantly, pension status information in public use tax data. As a result, eligibility for a deductible IRA could not be directly observed and taxpayers could only be separated based on modified AGI.

In a related study, Duflo and Saez (2002) examine peer effects and participation in a university tax-preferred savings program. They divide their sample by department and find that higher average participation is positively correlated with own participation. Their results show that discussion and sharing of information with co-workers can increase participation in a tax-preferred savings program. The scope for such information sharing for IRAs, which are not organized around the workplace, is likely to be more limited.

IV.   Data and Empirical Strategy

The data for this study comes from a random sample of taxpayers selected from the Statistics of Income (SOI) Individual Income Tax Files. The sample for 1997 selects all returns with the same two sets of four ending-digits of the Social Security number (SSN) for the primary taxpayer. In 1998, along with the expanded eligibility rules for IRAs, five sets of SSNs were chosen (the two selected for 1997 plus three other sets) so the sample for 1998 is much larger. These randomly drawn returns from the SOI files are commonly referred to as the Continuous Work History Survey (CWHS). The dataset studied here has advantages over public use tax data in that the age and pension status of the taxpayer is available. I am therefore able to determine and select IRA-eligible taxpayers in 1997 and 1998. Variable means for the respective years are presented in Table 3.

The sample is further restricted to taxpayers between the ages of 21-69, those with earnings, and those filing single, married, or head of household, in the respective year. The earnings criterion is necessary since IRA contributions are possible only for those with earnings and the age criterion is necessary since contributions to deductible IRAs are not allowed after age 70.

As shown in the top panel of Table 3, the sample for 1997 consists of over 12,000 tax returns eligible for a deductible IRA contribution. The conditional participation rate of 5.6% (Table 3) is greater than the unconditional participation rate of

3.3% (Table 2). Not surprisingly, the participation rate for those hiring a preparer (6.7%) is larger than for those who self-prepare (4.4%).

Table 3. Variable Means for
Taxpayers eligible for a deductible contribution in 1997
and either a deductible or a Roth contribution in 1998

	Total	Preparer=1	Preparer=0
1997			
Observations	12,710	6,569	6,141
$1(IRA_{97}>0)$	0.056	0.067	0.044
$1(Preparer_{97}=1)$	0.52	1.00	0.00
Age	38.71	40.68	36.61
$1(Married=1)$	0.36	0.44	0.28
#Children	0.71	0.88	0.53
Disposable Income (current dollars)	$25,590	$29,655	$21,241
Marginal Tax Rate	0.158	0.162	0.153
#Supporting Forms	0.51	0.66	0.35

	Total	Preparer=1	Preparer=0
1998			
Observations	42,647	22,982	19,665
$1(IRA_{98}>0)$	0.067	0.070	0.064
$1(Preparer_{98}=1)$	0.54	1.00	0.00
Age	40.45	41.68	39.01
$1(Married=1)$	0.45	0.51	0.39
#Children	0.80	0.91	0.66
Disposable Income (current dollars)	$37,041	$39,797	$33,820
Marginal Tax Rate	0.180	0.181	0.179
#Supporting Forms	0.45	0.60	0.35

The bottom panel of Table 3 presents variable means for 1998; note the larger sample size. While Table 2 shows a substantial increase in the IRA participation rate from 1997 to 1998, the increase is much more modest when the sample contains only eligible taxpayers in each respective year. The participation rate in Table 3 increases

from 5.6% to 6.7% from 1997 to 1998. Comparing the participation rates for those hiring a preparer to self-preparers, there does seem to be some evidence supporting the claim that more advertising in 1998 increased IRA participation. The differential in participation rates between those hiring a preparer and self-preparers is 0.6 percentage points in 1998 whereas it is 2.3 percentage points in 1997. The smaller differential in 1998 suggests that tax preparers provided less of an information advantage with respect to IRAs in 1998 than in 1997.

Mean Marginal Tax Rates and Disposable Income for the IRA eligible population increased from 1997 to 1998, partially because more higher-income taxpayers were eligible to make an IRA contribution, particularly for Roth IRAs, in 1998. Some of this growth also represents nominal income growth since the values presented are in current dollars.

The empirical strategy for this study will follow Hrung in that the use of a tax preparer will proxy for exposure to information regarding IRAs and the relationship between the hiring of a tax preparer and IRA participation will be the focus of the regressions. Hiring a tax preparer may be endogenous with respect to an IRA contribution so I instrument for tax preparer status with the number of supporting forms not related to income.[9] This follows the strategy used by Erard (1993) in his study of preparers and tax evasion. Since a greater number of forms increases the complexity of a given return, the number of forms is expected to be related to the decision to hire a tax preparer. These forms were chosen because they do not affect the calculation of AGI or modified AGI and they are not related to IRA eligibility. And it is unlikely that the presence of these forms is directly related to decisions regarding IRAs. For example, neither the dependent care credit (Form 2441) nor the Alternative Minimum Tax (Form 6251) have any obvious direct connection to a taxpayer's retirement savings decisions. Therefore, I assume that the number of supporting forms not related to income does not directly affect IRA participation, after controlling for tax preparer status.

I will present linear and non-linear regression results. The linear estimation will occur in two steps (a standard Two-Stage Least Squares (2SLS) estimation). First, a linear probability model will be estimated to produce a predicted value for the hiring of a preparer:

$$1(Preparer_i=1) = X_i? +d*\#forms_i+?_i\ ;$$
$$E[?_i \mid X_i, \#forms_i]=0$$

Then, this predicted value will be substituted for actual Preparer status in the second stage:[10]

$$1(IRA_i>0)=X_i\ss+\ss_p*(Pred.\ Preparer_i) + e_i\ ;$$
$$E[e_i \mid X_i, Pred.\ Preparer_i]=0$$

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[9] The forms and schedules comprising this measure are Forms 1116 (Foreign Tax Credit), 2441 (Child and Dependent Care Credit), 3800 (General Business Credit), 4137 (Social Security and Medicare tax on unreported tip income), 4868 (Extension to File), 5329 (Additional Taxes on Qualified Plans), 6251 (Alternative Minimum Tax), 8396 (Mortgage Interest Credit), 8801 (Credit for Prior-Year Minimum Tax), 8812 (Additional Child Credit), 8839 (Adoption Credit), and Schedules SE (Self-Employment Tax), R (Credit for the Elderly or Disabled), H (Household Employment taxes), and EIC (Earned Income Credit).

[10] The standard errors in the second stage are appropriately adjusted for first stage estimation.

where the dependent variable will represent a deductible IRA contribution in 1997, and either a deductible or Roth IRA contribution in 1998. I will not investigate Roth and deductible contributions separately since many taxpayers were eligible to contribute to both (see Tables 5 and 6). The choice between Roth and deductible IRAs for those eligible for both will be the subject of future research. X_i contains the Marginal Tax Rate, log(Disposable Income), Age, Marital Status, and Number of Children. The Marginal Tax Rate is defined as the tax rate faced by the taxpayer prior to any deductible IRA contribution and Disposable Income is total income minus taxes assuming no deductible IRA contribution. The focus of this study is the estimate of $ß_p$.

I will also present Non-linear Instrumental Variables (IV) results where the "second stage" is a probit model instead of a linear probability model.[11] Separate cross-sectional regressions will be estimated for 1997 and 1998, and the sample will only include taxpayers eligible for a deductible IRA contribution in 1997, or taxpayers eligible for a deductible or Roth IRA contribution in 1998.[12]

In separate cross-sectional analyses, it is theoretically ambiguous whether the Preparer coefficient, $ß_p$, should be greater in 1997 or 1998. If the only relevant change for IRAs from 1997 to 1998 was increased advertising of IRAs, then the Preparer coefficient would be expected to be smaller in 1998 than in 1997. This is because more taxpayers would have been aware of IRAs in 1998 due to increased advertising and taxpayers with a preparer would have little informational advantage over self-preparers with respect to IRAs. That is, a preparer would have less influence in 1998 on the decision to contribute to an IRA.

However, Roth IRAs were introduced in 1998 and they expanded eligibility for an IRA contribution based only on income and not pension status. In addition, the income limits for deductible IRAs were also expanded. The different rules may have confused taxpayers as to their eligibility, particularly those newly eligible. Therefore, a preparer may have a greater influence in 1998 on the decision to contribute to an IRA (deductible or Roth) than in 1997.

Since the two CWHS-endings for SSNs that were chosen for 1997 were also among the five selected for 1998, I am able to create a panel. However, with only two years of data, I am unable to use non-linear panel data techniques to control for unobserved heterogeneity. The fixed-effects logit model (Chamberlain, 1984) is inappropriate because it constrains coefficients to be equal across time and relies on variation in the dependent variable to control for the unobserved fixed effect. Unfortunately, only 4.4% of the returns eligible for an IRA contribution in both years contributed to an IRA in only one year.

The correlated random effects model (Chamberlain, 1982, 1984) allows coefficients to vary over time. For this model, the number of degrees of freedom depends on the number of years in the panel, not the number of observations. With only two years of data being studied, there are insufficient degrees of freedom for the specification

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[11] See Davidson and MacKinnon (1993) for why it is incorrect to think of Non-linear IV estimation as occurring in two steps (p. 224-5).

[12] I do not consider non-deductible IRA contributions since all taxpayers were eligible to make a non-deductible IRA contribution after 1987 and participation rates for non-deductible IRAs are very low. In 1998, less than 1 million taxpayers contributed to a non-deductible IRA.

required for this study. The Appendix provides a more detailed explanation. Instead, the panel aspect of the data will be exploited to create sub-samples based on eligibility across 1997 and 1998. The analysis will remain cross-sectional and instrumental variables will continue to be used to control for the endogeneity of hiring a tax preparer.

As there were two changes relevant to this study from 1997 to 1998, the increase in IRA advertising and the expansion in IRA eligibility, splitting the data into sub-samples is an attempt to isolate the advertising effect. By examining taxpayers eligible to contribute to an IRA in both years, any difference in the Preparer coefficient from 1997 to 1998 can likely be attributed to advertising and not the expansion in IRA eligibility. For these taxpayers, increased advertising in 1998 should lead to a smaller Preparer coefficient in 1998. It is more difficult to speculate for newly eligible taxpayers in 1998. Increased advertising and increased confusion due to IRA eligibility expansion run counter to each other in terms of an expected Preparer coefficient.

I focus primarily on the IRA participation decision since I find that most contributors contribute at least $2,000 to their IRAs. For example, in 1998, for returns with a deductible or Roth IRA contribution, around three-fourths contributed at least $2,000. Also, the different contribution limits for married and non-married taxpayers, as well as taxpayers facing a phase-out of their contribution limit complicates any analysis of contribution amounts. Nevertheless, I will also present 2SLS results where the dependent variable is the amount contributed to an IRA, conditional on a positive contribution. These results will give a sense of the dollar magnitude of the relationship between preparers and IRAs.

V. Results

The first set of results in Table 4 are for the 1997 cross-section by itself with no linking to the 1998 data. In column (1), I present the first-stage results where preparer status is regressed against the other independent variables and the number of supporting forms. The second column presents the second-stage results. They suggest that hiring a preparer leads to a 9.2 ± 4 percentage point increase in the probability of contributing to an IRA in 1997. The Preparer coefficient is significant at the 95% confidence level. The Marginal Tax Rate and Disposable Income both have a positive influence on IRA participation, while the Number of Children negatively influences IRA participation.

Probit IV results are presented in column (3) of Table 4. In general, the marginal effects are smaller than the 2SLS coefficients. The difference is not surprising since as a rough rule of thumb, a linear probability model gives similar results to a probit model only when the mean of the dependent variable is close to 0.5. Here, the mean of the dependent variable is only 0.056, so the Probit IV results are preferred and I will focus mainly on the Probit IV results.[13] These results suggest that hiring a preparer increases the probability of contributing to an IRA by 4.3 ± 4 percentage points and the Preparer coefficient is statistically significant. So despite the fact that IRA eligibility rules remained basically constant from 1987 to 1997, I still find that hiring a preparer increases the probability of contributing to an IRA in 1997. This may not be surprising considering that younger taxpayers may not be fully aware of IRAs as they enter the taxpaying

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[13] The main criticism of the linear probability model is that predicted values of the dependent variable can lie outside the (0,1) interval.

population and that taxpayers may change eligibility status over time due to changes in income or pension status.[14] A simple calculation suggests that IRA participation would have increased by around 2 percentage points for the sample if all taxpayers had hired a tax preparer.

Table 4. Regression Results (standard errors in parentheses)
Marginal Effects Presented, Dependent Variable: 1(IRA>0) in Respective Year

	1997			1998		
	First-Stage	2SLS	Probit IV	First-Stage	2SLS	Probit IV
1(Preparer=1)	----	0.092	0.043	----	0.110	0.092
	----	(0.02)	(0.02)	----	(0.01)	(0.02)
Marginal Tax Rate	-0.219	0.08	0.05	-0.292	0.05	0.02
	(0.06)	(0.03)	(0.03)	(0.03)	(0.02)	(0.02)
1(Married=1)	0.05	-0.0014	-0.003	0.04	0.008	0.002
	(0.01)	(0.01)	(0.004)	(0.01)	(0.003)	(0.003)
Age	-0.0713	-0.017	0.019	-0.0827	-0.0066	0.0023
	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Age Squared	0.014	0.0036	-0.001	0.0146	0.0014	0.0002
	(0.003)	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)
# Children	0.3680	-0.20	-0.13	0.0191	-0.02	-0.02
	(0.05)	(0.03)	(0.03)	(0.003)	(0.002)	(0.002)
log(Disposable Income)	0.06	0.040	0.04	0.06	0.033	0.04
	(0.01)	(0.003)	(0.004)	(0.004)	(0.002)	(0.003)
# Supporting Forms	0.167			0.148		
	(0.01)			(0.004)		
obs.		12,710			42,647	
Mean of Dependent Variable		5.6%			6.7%	
% Roth					3.3%	
% Deductible					3.4%	

Columns (4) - (6) present the corresponding results for 1998. The Probit IV results suggest that hiring a preparer increases the probability of contributing to an IRA by 9.2 ± 4 percentage points. The estimated Preparer coefficient in 1998 is larger than in 1997, in absolute value and relative to the mean of the dependent variable. While this result is not consistent with the hypothesis that increased advertising of IRAs increased participation in 1998 relative to 1997, examining different sub-samples will provide a cleaner test of the hypothesis.

As noted above, the panel aspect of the data is exploited to examine sub-samples of the data and I continue to control for the endogeneity of preparer status through instrumental variables. The total sample size of returns that I observe in both 1997 and 1998 is 14,712. This sample contains returns eligible for a Roth or deductible IRA contribution in 1998 and returns which may or may not have been eligible for a deductible IRA contribution in 1997.[15]

I first examine taxpayers who were eligible to contribute to an IRA in both 1997 and 1998. Confusion over IRA eligibility should be relatively constant for these taxpayers so examining this group should provide a cleaner test of the hypothesis that increased advertising led to increased IRA participation in 1998. The sample here is

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[14] I find that 12% of returns eligible for a deductible IRA contribution in 1997 would not have been eligible for a deductible IRA contribution in 1998 based on 1997 rules.

[15] Hence the larger sample size than in Tables 3 and 4 for only returns eligible for a 1997 deductible IRA contribution.

slightly smaller than the cross-sectional sample for 1997 primarily due to the restriction that marital status remain constant from 1997 to 1998. Table 5 shows that IRA participation for this group did increase from 5.7% in 1997 to 6.9% in 1998. This is consistent with some eligible non-contributors in 1997 beginning contributions in 1998 due to increased promotion and advertising of IRAs in 1998.

Table 5. Regression Results (standard errors in parentheses)
Marginal Effects Presented, Dependent Variable: 1(IRA>0) in Respective Year

	1997		1998	
ELIGIBLE IN 1997 AND 1998	2SLS	Probit IV	2SLS	Probit IV
1(Preparer=1)	0.074	0.062	0.071	0.046
	(0.024)	(0.03)	(0.027)	(0.03)
obs.	10,400		10,400	
Mean of Dependent Variable	5.7%		6.9%	
% Roth			2.2%	
% Deductible			4.7%	
% eligible only for Roth IRA			23.1%	
% eligible only for Deductible IRA			0.6%	
% eligible for Both			76.3%	

Other coefficients not presented to conserve space

In Table 5, the Probit IV results show that for taxpayers eligible for an IRA contribution in both 1997 and 1998, hiring a preparer increases the probability of contributing to an IRA by 6.2 ± 6 percentage points in 1997. In 1998, more than three-quarters of this sample was eligible for both a deductible and a Roth IRA while around a quarter of the sample was eligible only for a Roth IRA. For 1998, two-thirds of IRA participants contributed to a deductible IRA instead of a Roth IRA. The Probit IV results show that hiring a preparer in 1998 increases the probability of contributing to an IRA by 4.6 ± 6 percentage points. For this sub-sample, the influence of a preparer is smaller in 1998 than in 1997 in both magnitude and statistical significance. So when taxpayers eligible for an IRA contribution in both years are examined, the results are consistent with the expectation that a preparer would have less of an influence on IRA participation in 1998 because increased advertising had already made taxpayers more aware of IRAs.

Without a more direct measure of advertising, it is difficult to rule out other possible interpretations of these results. For example, for this sub-sample of taxpayers eligible for an IRA contribution in both years, a preparer may have less influence in 1998 because of the natural accumulation of information regarding IRAs over time, rather than because of any increase in advertising of IRAs.[16] A finding that more advertising did not increase IRA participation in 1998 for this group would support this alternative interpretation.

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[16] As noted earlier, a smaller influence of preparers on IRA participation over time is not expected for separate cross-sections or in the aggregate due to younger taxpayers and taxpayers changing IRA eligibility status over time.

Table 6. Regression Results (standard errors in parentheses)
Marginal Effects Presented, Dependent Variable: 1(IRA>0) in 1998

ELIGIBLE only in 1998	2SLS	Probit IV
1(Preparer$_{98}$=1)	0.165	0.245
	(0.06)	(0.30)
obs.	4,312	
Mean of Dependent Variable	9.1%	
% Roth	6.8%	
% Deductible	2.2%	
% eligible only for Roth IRA	50.6%	
% eligible only for Deductible IRA	0.9%	
% eligible for Both	48.5%	

ELIGIBLE IN 1998	2SLS	Probit IV
(regardless of 1997 status)		
1(Preparer$_{98}$=1)	0.092	0.084
	(0.02)	(0.032)
obs.	14,712	
Mean of Dependent Variable	7.6%	
% Roth	3.6%	
% Deductible	4.0%	

Other coefficients not presented to conserve space

The first panel in Table 6 presents results for taxpayers who were newly eligible to contribute to an IRA in 1998. Here, more than half of the sample was eligible only for a Roth IRA while less than half of the sample was eligible for both types of IRAs. The participation rate of 9.1% for this sub-sample is larger than the participation rate of 6.9% in 1998 for taxpayers who were also eligible to make an IRA contribution in 1997. For these newly eligible taxpayers, more than two-thirds of IRA contributors contributed to a Roth IRA instead of a deductible IRA. For the newly eligible sample, I find that hiring a preparer increases the estimated probability of contributing to an IRA by 24.5 ± 60 percentage points. This is consistent with these taxpayers being confused by the new eligibility rules and therefore, hiring a preparer increases the probability of contributing to an IRA quite substantially. However, the Preparer coefficient is not significant at any reasonable confidence level. The larger cross-sectional Preparer coefficient for 1998

relative to 1997, which was reported in Table 4, is likely driven by this sub-sample. This is also shown in the last panel of Table 6 where the sample contains returns eligible for a Roth or deductible IRA in 1998 regardless of eligibility in 1997.

Table 7. 2SLS Regression Results (standard errors in parentheses)
Dependent Variable: IRA Contribution Amount in Respective Year,
Inclusion in Sample is Conditional on IRA Participation

| | ELIGIBLE IN 1997 AND 1998 | | ELIGIBLE only in 1998 |
	1997	1998	1998
1(Preparer=1)	1,905.8	427.3	9,674.1
	(653.04)	(398.53)	(39,171)
obs.	590	720	391
Mean of Dependent Variable	$2,145	$2,128	$2,473

Other coefficients not presented to conserve space

Table 7 presents 2SLS results where the dependent variable is the amount contributed to an IRA. Since I condition on positive IRA contributions, the sample size differs in 1997 and 1998 even for the sample that is eligible for a contribution in both years. The results in Table 7 are similar to those found in Tables 5 and 6 in that the Preparer coefficient is positive and statistically significant in 1997, but not in 1998 for either sample.[17] The magnitude of the Preparer coefficient in 1998 for those newly eligible in 1998 is quite large, but the coefficient is not significant at any reasonable level.

VI.   Conclusion

This paper has sought to study the claim that the increase in total IRA contributions from 1997 to 1998 can be at least partially attributed to increased advertising and promotion due to the introduction of Roth IRAs in 1998. I use the hiring of a tax preparer to proxy for exposure to information regarding IRAs. If increased advertising of IRAs led to increased IRA participation in 1998, the impact of hiring a preparer should be smaller in 1998 than in 1997. Complicating the analysis is the fact that eligibility rules for deductible IRAs were also expanded in 1998 and Roth IRAs were introduced, which likely led to increased confusion regarding IRA eligibility.

First, I find that hiring a preparer would have increased IRA participation in 1997 despite the fact that the eligibility rules for deductible IRAs remained basically unchanged from 1987 to 1997. Secondly, I find that for taxpayers who were eligible to make an IRA contribution in both 1997 and 1998, hiring a tax preparer had more of an impact in 1997 than in 1998. This includes the IRA participation decision as well as the decision of how much to contribute. This is consistent with the notion that increased advertising surrounding the introduction of Roth IRAs in 1998 reduced the informational advantage regarding IRAs for those hiring a preparer relative to 1997. However, I also

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[17] The contribution limit for married taxpayers is double that of non-married taxpayers. When the 1997 sample is split into married and non-married sub-samples, the preparer coefficient (standard error/sample size) takes on the values $2,671 (1,331/268) and $830 (446/322), respectively.

find that, for taxpayers newly eligible for an IRA contribution in 1998, despite the increased advertising of IRAs in 1998, there remained potential opportunities to increase participation and contributions through increased awareness of IRAs. For future work, a more refined analysis will require more direct measures of exposure to advertising and measures of taxpayer confusion over IRA eligibility.

APPENDIX

Correlated Random Effects

A method that allows for correlation between an unobserved individual effect and the explanatory variables is the correlated random effects (CRE) model (Chamberlain, 1982, 1984). The unobserved individual component is treated as random, but it is still allowed to be correlated with the regressors. While the probit case is slightly more complicated, a linear probability example will be sufficient to illustrate why the CRE model would not be appropriate for this study.

The CRE model is estimated in two steps. First the dependent variable in each year is regressed on all leads and lags of the explanatory variables. Then, restrictions are imposed on the matrix of coefficients; these restrictions can be tested.

Consider the following simple relationship between contributing to an IRA and hiring a tax preparer for person i in year t:

$$IRA_{it} = \gamma_t a_i + \beta_t Preparer_{it} + e_{it} \tag{1}$$

where IRA_{it} is a dummy variable taking on the value of 1 if taxpayer i made an IRA contribution in year t and zero otherwise, $Preparer_{it}$ is a dummy variable taking on the value of 1 if a preparer was hired by taxpayer i in year t and zero otherwise, α_i is an unobserved individual effect which may be correlated with $Preparer_{it}$, and ε_{it} is a random error term.

Note that the model in equation (1) is very general in that there are coefficients for the individual effects which vary over time (γ_t) and the coefficients for the Preparer variable are allowed to vary through time (β_t).[18]

If the individual effects are correlated with the Preparer variable at a point in time, they are likely to be correlated with the Preparer variable at all points in time. So for T time periods,

$$a_i = \gamma_1 Preparer_{i1} + \ldots + \gamma_T\ Preparer_{iT} + u_i = \gamma'Preparer_i + u_i \tag{2}$$

where u is uncorrelated with the Preparer variable. Substituting the above expression into equation (1), the following is obtained:

$$IRA_{it} = \beta_t Preparer_{it} + \gamma_t \gamma'Preparer_i + (\gamma_t u_i + e_{it}) \tag{3}$$

Therefore the first step of the CRE model would regress the IRA dummy variable in each year on all values of the Preparer variable. The unrestricted model against which the restrictions will be imposed in the second step is typically expressed as follows:

$$IRA_i = \gamma\ Preparer_i + e_i \tag{4}$$

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[18] In a typical application of the standard individual effects model, the γ_ts are assumed to all equal 1, and the β_ts do not vary over time.

where IRA$_i$ is the vector of the IRA dummy for person *i* over the sample period. The Π matrix will have the following form for the sample in this study where T=2:

$$\Pi = \begin{bmatrix} b_1 + g_1 l_1 & g_1 l_2 \\ g_2 l_1 & b_2 + g_2 l_2 \end{bmatrix}$$

Once the unrestricted Π matrix is estimated, the various restrictions on the parameters are imposed via a minimum distance estimator using the variance/covariance matrix for the Π coefficients as the optimal weighting matrix. A test of the over-identifying restrictions will tell whether or not a particular specification can be rejected at standard confidence levels.

The specific issue for this study is that with only two time periods, there are only 4 (2 x 2) coefficients/degrees of freedom upon which to impose restrictions on six parameters (two ßs/two ?s/two γs). The degrees of freedom for the second stage only depend on the size of the Π matrix, not the total number of observations. So if the Preparer coefficients are allowed to vary across the two years, there remain two degrees of freedom and four remaining parameters (two ?s and two γs), and only a very restrictive model is possible (e.g., all ?s and γs assumed/restricted to be a constant).

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