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ABSTRACT: Congress and the media have both expressed concerns about Americans' low savings rates. We address these concerns by investigating the extent to which the form of an investment's tax preference affects individuals' willingness to choose a tax-preferred vehicle over a less restrictive, but non-tax-preferred, investment. Specifically, we tested the extent to which subjects chose a traditional savings plan versus an investment resembling either a traditional IRA, Roth IRA, or government matching program. We find that subjects are not as sensitive to the form of the tax preference as they are to restrictions on their ability to withdraw funds. This suggests that, by reconsidering the extent to which individuals are forced to trade off tax savings and liquidity restrictions, Congress might more effectively promote individuals' retirement savings.

INTRODUCTION

There is widespread concern about Americans' low savings rate, especially for retirement. Personal savings in the U.S. as a percentage of disposable income has declined from roughly 10 percent in the mid-1980s to less than two percent in recent years (Bureau of Economic Analysis 2005), and approximately one-half of U.S. households' savings are insufficient to finance their full retirement (Warshawsky and Ameriks 2001). The U.S. savings rate compares unfavorably to that of many other countries (e.g., Japanese personal savings as a percentage of disposable income has exceeded 20 percent for many years), although it has been comparable to the Canadian rate in recent years (Tal 2003).

This paucity of savings has been of concern to policy makers (U.S. Congress 1997, 2004, 2005). These concerns are based on the evolving demographics of the U.S. population (e.g., increased longevity) and related pressures on the Social Security and Medicare systems, as well as decreased rates of private savings. In an attempt to encourage taxpayers to save, Congress has allowed several forms of investment accounts to receive tax-favored treatment. These range from traditional individual retirement accounts (IRAs), employer-

provided pension plans, and 401(k) plans, which have had tax-favored treatment for decades, to Roth IRAs, section 529 plans, and retirement savings contributions credits, which are of more recent vintage. However, empirical evidence supporting the effectiveness of these investment vehicles in stimulating new savings (rather than shifting existing savings) is limited. In addition, there are differences in the form of the tax preferences among these various investment vehicles, and there is very little empirical evidence regarding the relative effectiveness of these various forms of tax preferences in stimulating taxpayer savings.

The purpose of this study is to examine the effect of the form of an investment's tax preference on individual's investment decisions. More specifically, three types of tax preferences are examined: (1) an exclusion from taxation of investment returns, similar to Roth IRAs and section 529 plans, (2) a deduction for the individual's initial investment, similar to a (deductible) traditional IRA, and (3) the provision of a partial match of the individual's initial investment, similar to the employer match that many 401(k) plans provide and similar to the retirement savings contribution credit. In this study's experiment, the three tax-favored investment forms are structured to be economically equivalent, with only their form differing.

In the first part of the experiment, the form of the tax-favored investment was varied between participants, with each one having to choose between one of the tax-favored investments (that allowed for no early withdrawals) and a non-tax-favored investment (that allowed early withdrawals without penalty). The form of the tax-favored investment was found to have no significant effect on the propensity to choose the tax-favored investment, even after controlling for several other factors that might affect this choice. In the second part of the experiment, participants were presented with all three tax-favored investment forms and asked to choose one of them. Approximately one-half, one-third, and one-fifth of the participants indicated a preference for the Roth IRA-like, the traditional IRA-like, and the 401(k)-like investment, respectively. Taken together, these results suggest that the form of an investment's tax preference has little effect on taxpayers' willingness to commit their funds for a long-term investment, even though it makes a difference when choosing among economically equivalent forms. For tax policy makers, the results suggest that the myriad forms of investment tax preferences could be reduced to a smaller number of the simpler forms without sacrificing much incentive to save in that way, although one must be careful in generalizing the results of a single experiment.

The remainder of the paper is organized as follows. The next section provides a brief description of various forms of tax-favored investments. A discussion of the theoretical background of the research and prior research results then follows. The research method is described, and results are presented. The last section draws conclusions.

DESCRIPTION OF TAX-FAVORED RETIREMENT SAVINGS

There are many ways through which individuals can save for retirement in a tax-preferenced manner. With traditional IRAs, an individual can save up to $5,000 per year and can generally deduct the amount.[1] The investment returns earned inside the IRA are not taxed as they accrue. Withdrawals are taxed as ordinary income, and they generally are also subject to a 10 percent penalty if made before the individual attains age 59½.[2] With Roth IRAs, an individual generally can save up to $5,000 per year, but the contribution is not deductible.[3] As with a traditional IRA, the investment returns earned inside the IRA are not taxed as they accrue, but withdrawals are tax-free if the individual has attained age 59½ and it has been at least five years since the individual first contributed to a Roth IRA.[4]

With a qualified cash or deferred arrangement (i.e., a 401(k) plan), an employed individual can choose to direct some of his or her otherwise taxable salary or wages into the plan.[5] The individual can exclude from gross income the amount so directed,[6] and earnings within the plan are not taxed as they accrue. Distributions from the plan are taxed as ordinary income and generally are subject to a 10 percent penalty if made before the individual attains age 59½.[7] Often, employers will match some or all of their employees' contributions to their 401(k) plans, but they are not required to do so (Canan 1998). Employers' reasons for providing matching contributions vary, but one reason is to encourage non-highly compensated employees to make contributions so that the plan satisfies tax rules that require that the plan not be unduly skewed towards highly-compensated employees. Basset et al. (1998) find that, for employers who match 401(k) plan contributions, the mean match rate is 62 percent, with about one-quarter of such employers providing a 50 percent match and another quarter providing a 100 percent match.

Individuals are allowed a nonrefundable tax credit for contributions to certain types of qualified retirement plans, including traditional IRAs, Roth IRAs, and 401(k) plans.[8] A 50 percent credit is allowed in 2008 for up to $2,000 of qualified contributions if the individual's AGI is $16,000 or less ($24,000 for a

head of household and $32,000 for a married couple filing jointly), but only a 10 percent credit is allowed if AGI is between $17,251 and $26,500 (between $25,876 and $39,750 for a head of household and between $34,501 and $53,000 for a married couple filing jointly).[9] No credit is allowed for individuals with higher levels of AGI. By providing a 50 (10) percent credit, the federal government effectively matches the contribution at a 100 (11) percent rate.[10]

THEORETICAL BACKGROUND AND PRIOR RESEARCH

Mathematics of alternative investment vehicles

The after-tax returns from an investment depend in part on the manner in which they are taxed. Of relevance here, various investments' taxation can differ with respect to the timing of taxation, whether the initial investment is deductible, and whether the returns are tax-exempt.[11] To demonstrate that different investment vehicles whose taxation differs substantially can still be economically equivalent, the after-tax growth of these vehicles is modeled here.[12]

Assume that the individual will invest C after-tax dollars. The investment will earn a before-tax return of R percent each year. The investment will be made for n years, and the tax rate is t percent. If the investment is made in a vehicle that is completely tax-free (e.g., a Roth IRA for which the five-year and 59½-year requirements are met), the initial C investment will grow to the following after-tax amount at the end of the n-year investment horizon:

$$C(1 + R)^n$$

$$(1)$$

If the investment is made such that the return is taxed as it accrues (e.g., a taxable account), the initial C investment will grow to:

$$C[1 + R(1 - t)]^n$$

$$(2)$$

It can easily be shown that, if R, t, and n are all positive, expression (1) is greater than expression (2). That is, an investment will grow to a larger amount if it is tax-free than if its return is subject to annual taxation.

Consider next an investment similar to a deductible traditional IRA. Contributions to the IRA are tax-deductible and thus are made with before-tax dollars, but distributions from it are fully taxable. To determine the before-tax investment that is equivalent to a C after-tax investment, the latter must be

grossed-up by dividing by $1 - t$.[13] The initial, before-tax, investment of $C \div (1 - t)$ will grow to the following after-tax amount at the end of the n-year investment horizon:

$$\left[\frac{C}{1-t}\right](1 + R)^n - t\left[\frac{C}{1-t}\right](1 + R)^n$$

$$(3)$$

Expression (3) can be simplified to $C(1 + R)^n$, which is the same as expression (1). That is, given constant tax rates and the same after-tax investment, a Roth IRA-like investment and a deductible traditional IRA-like investment are economically equivalent.

Finally, consider an investment where the individual's initial contribution is matched at an m percent rate by a third party (e.g., the government or the individual's employer). All distributions are taxed upon withdrawal. The total initial investment (i.e., $C + Cm$) will grow to the following after-tax amount:[14]

$$C(1 + m)(1 + R)^n - tC(1 + m)(1 + R)^n$$

$$(4)$$

If m equals $t \div (1 - t)$, expression (4) simplifies to $C(1 + R)^n$, making it equal to expressions (1) and (3). That is, if the nondeductible contribution is matched at a $t \div (1 - t)$ percent, this investment is economically equivalent to the Roth IRA-like and traditional IRA-like investments. In summary, given appropriate parameter values, the three tax-preferenced investment vehicles are economically equivalent, even though the forms of their tax preferences differ substantially.

Prospect theory

Tversky and Kahneman (1986) wrote the seminal work on the effect of framing on decision makers' choices. They argued that, while the theory of decision making under risk that emerged from game theory could function as a normative model of an idealized decision maker, the deviations of actual behavior from this normative type model are too widespread to be dismissed as random error. Tversky and Kahneman examined the four basic assumptions of expected utility theory—cancellation, transitivity, dominance, and invariance. "Cancellation" refers to the elimination of any state of the world that yields the same outcome regardless of one's choice. The main idea of "cancellation" is that only one state will actually be realized, therefore it is reasonable to evaluate the outcomes of options separately for each state. "Transitivity" refers to an ordinal

valuation of decision outcomes such that outcome A is preferred to outcome B. "Dominance" refers to the idea that, if one option is better than another in one state and at least as good in all other states, the dominate option should be chosen. Invariance is the essential condition that claims that different representations of the same choice problem should yield the same preferences.

Tversky and Kahneman (1986) provide examples where the condition of invariance is violated in prior research. For example, Thaler (1980) found that labeling a difference between two prices as a surcharge or a discount affected purchasing decisions. Individuals found it easier to forgo a discount than to accept a surcharge. Schelling (1981) examined the framing effect in the context of tax policy. He examined the tax difference between a childless family and a two-child family. In one frame, he described the tax difference as a tax premium on the childless couple and in the second frame, an exemption for the two-child family. He found the frame of public policy can greatly alter its appeal. Tversky and Kahneman developed prospect theory to explain the effect of the frame on choice. Prospect theory describes the choice process as a two-phase process: a framing phase and an editing phase. They note that the framing phase is controlled by the manner in which the choice problem is presented as well as by norms, habits and expectations of the decision maker. In the second phase, decision makers choose between prospects by determining which dominates the other. Tversky and Kahneman find that how a decision is presented (framed) affected whether subjects behaved in "risk averse or "risk seeking" manner.

Their theory of decision making suggests that, even though saving programs are structured to provide the same payoff, decision makers may be more willing to invest in one type of program over another for reasons that can't be explained simply by payoffs.

Prior research

Numerous archival studies in the economics literature have examined the effectiveness of IRAs and 401(k) plans in stimulating new savings (versus merely substituting this type of savings for other types of savings).[15] Despite the extensive attention this research question has attracted, there is still little consensus about its answer (Benjamin 2003; Attanasio and DeLeire 2002). Madrian and Shea (2001) report results from an interesting natural experiment, where an employer that had previously had a 401(k) plan that employees could opt into changed it to a plan in which employees were automatically enrolled and could opt out. Although the two

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plans were economically equivalent, participation rates were much higher in the second plan, a result that Madrian and Shea attribute to the "power of suggestion."

Several experiments have investigated the effect on taxpayers' behavior of choices that are economically equivalent but that are different in form. In one of the earlier such studies, Jackson and Jones (1985) examine the effect of detection risk and penalty magnitude on tax reporting decisions. They manipulated these two factors such that the expected penalty (i.e., probability times amount) was constant and found that subjects were more sensitive to the magnitude of the penalty than to the risk that their noncompliance would be detected. They attribute this result to prospect theory, arguing that the amount of the penalty is more salient because individuals often fail to correctly adjust for differences in probability when those probabilities are low. Wartick et al. (1999) study the effect of decision context on reporting decisions. They argue that noncompliance in a tax context will differ from those in a non-tax, but numerically equivalent, context because subjects may import contextual information or cues, or may find the decision task more salient or motivating, in a tax context. Their subjects reported a higher percentage of their income when their decisions were made in a tax context, although this effect was concentrated among those subjects age 25 or older.

Recent experimental work by Vines and Wartick (2003) and Eckel and Grossman (2003) focused on the effects of tax subsidies versus non-tax subsidies. Vines and Wartick test the effect on reporting decisions of providing a portion, but only a portion, of subjects with an indirect (tax) subsidy versus an economically equivalent direct subsidy. They find that subjects report a higher percentage of their income when the subsidies are (unevenly) provided in the form of a direct subsidy, an outcome they attribute to goal framing. That is, when the subsidy is direct, subjects frame it as a potential gain and are risk averse (report more income); when the subsidy is indirect through a tax benefit, subjects frame it as the avoidance of a loss and are risk-seeking. Eckel and Grossman gave their subjects the opportunity to allocate funds to charity. In addition to manipulating the level of the subjects' initial endowments and the extent to which their allocations to charity would be subsidized, they manipulated the form of the subsidy. Some subjects were given a rebate of a percentage their charitable contribution while other subjects' contributions were matched in an economically equivalent manner. Eckel and Grossman found that the charitable contributions were larger when the subsidy took the form of a match, which they attributed to subjects focusing on the benefits of mutual cooperation.

We extend this research on framing in a tax setting to the area of tax-preferred retirement savings. Our null hypothesis is that the form of the savings vehicle (traditional IRA, Roth IRA, or government match) makes no difference to subject preference for tax-preferred savings.

RESEARCH DESIGN

Participants

The participants in the research were undergraduate and graduate business students at a large, urban, public university. Many of the students were not yet exposed in their coursework to various tax-favored savings vehicles. Table 1 summarizes the demographic information regarding the participants. Compared to the general U.S. population, a larger proportion of the participants are age 25-34, are female, and were born outside of the U.S.

Table 1. Demographic Characteristics of Participants and Census Data on Characteristics of the General Population [a]

Characteristic	Number [Percentage] of Participants		U.S. Census Data [b] (%)
Age:			
< 18	n/a	n/a	25
18-24	n/a	n/a	10
< 25	36	[31]	35
25-34	67	[57]	14
35-44	10	[9]	15
45-54	3	[3]	14
55-65	1	[1]	10
> 65	0	[0]	12 [c]

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Sex:

Female	68	[58]	51
Male	49	[42]	49

Family income:

Less than $15,000	19	[17]	15
$15,000 – $30,000	20	[18]	24[d]
$30,000 – $50,000	21	[18]	16[d]
$50,000 – $75,000	23	[20]	20
$75,000 – $100,000	17	[15]	11
Over $100,000	14	[12]	14

Country of birth:

United States	51	[44]	88
Other[e]	65	[56]	12

Notes:

[a] Results are based on the non-missing responses of 118 participants.

[b] Source: U.S. Census Bureau (2003).

[c] This is the percentage of the U.S. population that is age 65 or older.

[d] These percentages are based on the data available for the $15,000 to $24,999, $25,000 to $34,999, and $35,000 to $49,999 income ranges.

[e] The 65 participants who indicated that their country of birth was not the U.S. lived in the U.S. for a mean (median) of 8.51 (6) years.

Research instrument

After a brief introductory section, the first substantive part of the research instrument required the participants to choose between two investment alternatives. The participants were told that both alternatives involved a $5,000 investment and that the funds were planned to be invested for ten years. The participants were also told explicitly that the two investments differed in the amount of return they provided and the flexibility with which funds could be withdrawn. More specifically, investment B provided a higher after-tax return than investment A, but investment B did not allow for any withdrawals before the end of the 10-year investment period.[16]

Four versions of this part of the research instrument were randomly assigned to participants. In three of the versions, both investment A and investment B earned a 10 percent before-tax return. However, investment A's earnings were taxed at a 20 percent rate as they were earned, and investment B corresponded to a traditional IRA, a Roth IRA, or a tax-deferred vehicle whose initial investment is partially matched by the government.[17] In the fourth version, no reference to taxes was made (the "placebo" version). The four versions were structured such that investment A always grew from a $5,000 after-tax investment to a $10,795 after-tax amount over the 10-year investment period (an 8 percent annualized after-tax return) and investment B always grew from a $5,000 after-tax investment to a $12,969 after-tax amount (a 10 percent annualized after-tax return). The four versions were thus economically-equivalent and differed only in form. After investments A and B were described, participants indicated on a 7-point scale whether they preferred investment A or investment B and the strength of that preference. Participants were also asked to explain briefly why they answered as they did.

The participants receiving the traditional IRA version of the instrument were told that investment B was tax-deductible, that the tax savings from investing in it would also be invested in the investment, and that the entire balance of it would be taxed at the end of the investment period. The participants receiving the Roth IRA version of instrument B were told that the investment's earnings were never subject to tax. Participants receiving the matching version of the instrument were told that amounts invested in investment B were matched by the government at a 25 percent rate and that the entire balance would be taxed at the end of the investment period. Finally, participants receiving the placebo version were told that investment A provided an 8 percent guaranteed return, while investment B

provided a 10 percent guaranteed return. Table 2, panel A summarizes this part of the instrument.

The second substantive part of the research instrument required the participants to choose between the three tax-favored savings vehicles that were in the first part. That is, the participants were asked to choose between investments that corresponded to a traditional IRA, a Roth IRA, or a tax-deferred vehicle whose initial investment was partially matched by the government. Three-quarters of the participants had been presented with one of these three vehicles in the first part of the instrument; the other two were now being seen for the first time. The one-quarter of the participants who had received the placebo version of the first part were seeing all three tax-favored investment vehicles for the first time. The parameters of the investments (e.g., amount invested, rate of return) were identical to the first part of the instrument. All participants received the same version of this part. Participants were asked to indicate which of the three investments they would choose and to explain why they answered as they did. Table 2, panel B summarizes this part of the instrument.

The last part of the research instrument included various demographic questions, as well as items regarding participants' familiarity with tax-favored investment vehicles, investment decision philosophy, and the quality of the instrument. Table 1 summarizes the responses to the demographic questions, while table 3 summarizes the responses to the other items.

Table 2. Summary of Research Instrument

Panel A: First part of research instrument

Imagine that you have $5,000 to invest in one of two investments. Both investments provide a guaranteed 10% annual return, and you are planning to invest the funds for 10 years. The two investments differ in their tax treatment and the flexibility to withdraw your investment early.[a]

Investment A: This investment's earnings are taxed at a 20% rate when they are earned. You can withdraw your investment without penalty at any time. After 10 years, you will have $10,795 after paying all taxes (if you do not withdraw your investment early).[b]

Investment B [Roth IRA version]: This investment's earnings are never subject to tax. You cannot withdraw your investment until the end of the 10-year period.

After 10 years, you will have $12,969.

Investment B [traditional IRA version]: This investment is tax-deductible. The $1,250 of taxes saved from making this investment will be reinvested, so that the total investment will be $6,250. The earnings on this investment are not taxed until the end of the 10-year period, when they will be taxed at a 20% rate. The $5,000 that you invested and the reinvested $1,250 of tax savings will be taxed at a 20% rate at the end of the 10-year period. You cannot withdraw your investment until the end of the 10-year period. After 10 years, you will have $12,969 after paying all taxes.

Investment B [matching contribution version]: This investment is matched by the government at a 25% rate (that is, $1,250), so that the total investment will be $6,250. The earnings on this investment are not taxed until the end of the 10-year period, when they will be taxed at a 20% rate. The $5,000 that you invested and the $1,250 from the government will also be taxed at a 20% rate at the end of the 10-year period. You cannot withdraw your investment until the end of the 10-year period. After 10 years, you will have $12,969 after paying all taxes.

Investment B [placebo version]: This investment provides a guaranteed 10% annual return. You cannot withdraw your investment until the end of the 10-year period. After 10 years, you will have $12,969.

Panel B: Second part of research instrument

Imagine that you have $5,000 to invest in one of three investments. All three investments provide a guaranteed 10% annual return, and all three require you to keep the funds invested for 10 years. For each investment, you will have $12,969 after 10 years and paying all taxes (if any). The three investments differ in their tax treatment.

Investment A: [same as the first investment B in panel A, except the last sentence was omitted]

Investment B: [same as the second investment B in panel A, except the last sentence was omitted]

Investment C: [same as the third investment B in panel A, except the last sentence was omitted]

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Notes:

[a] In the placebo version, participants were told that both investments provide a guaranteed annual return and that the investments differed in their guaranteed returns and the flexibility to withdraw the investment. There was no mention of taxes.

[b] In the traditional IRA version, investment A's description also indicated that it could not be deducted for tax purposes. In the matching contribution version, investment A's description also indicated that it would not be matched. In the placebo version, investment A's description also indicated that it provided a guaranteed 8 percent annual return, and there was no mention of taxes.

Table 3. Participants' Responses to Various Questions on Their Background[a]

	Mean	Std. dev.	Median
Familiarity with various tax-favored savings vehicles: [b]			
401(k) plan	4.43	1.70	4
Traditional (tax-deductible) IRA	4.14	1.70	4
Roth IRA	3.47	1.99	4
Employer provided pension plan	3.81	1.87	4
Agreement with statements regarding investment decisions: [c]			
Like having money available for withdrawal	5.31	1.49	6
Like risky investments that provide higher return	4.32	1.50	5
Like investments that help save taxes	5.10	1.33	5
Like when gov't. provides match of money invested	5.00	1.41	5
Prefer investments that save taxes now not later	4.44	1.57	4

Importance of saving for retirement [d]	6.26	1.10	7
Have you begun saving for retirement? [e]	0.52	0.50	1
Agreement with statements regarding research instrument: [f]			
Written instructions clear and unambiguous	5.49	1.16	6
Procedures described in instrctns. actually followed	5.57	1.02	6
Questionnaire too complicated for me to understand	2.82	1.38	2
Questionnaire was boring	3.42	1.33	4

Notes: [a] Results are based on the non-missing responses of 118 participants.

[b] 1=not familiar; 4=somewhat familiar; 7=very familiar.

[c] 1=strongly disagree; 4= neutral; 7=strongly agree.

[d] 1=not important; 4=somewhat important; 7=very important

[e] 1=yes; 0=no.

[f] 1=strongly disagree; 4=neutral; 7=strongly agree.

RESULTS

Table 4 presents results pertaining to the first part of the research instrument, where participants chose between a non-tax-favored investment from which funds could be withdrawn at any time without penalty (investment A) and a tax-favored investment from which funds could not be withdrawn until the end of the 10-year period (investment B). Panel A reports univariate results. Overall, the participants chose investments A and B in roughly equal proportions, indicating that there was sufficient tension in this part of the research instrument (i.e., participants truly faced a trade-off when choosing between the two investments). Participants for whom investment B was a traditional IRA or a Roth IRA were slightly more likely to choose investment B than investment A (and participants for whom investment B was a government match or the placebo were slightly less likely), but a χ^2 test of the independence of the randomly assigned treatment and the choice of investment was insignificant ($\alpha=0.7377$). The panel A results thus

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suggest that, given economic equivalence, the form of an investment's ta
preference makes little difference in taxpayers' propensity to choose to invest in it

Table 4. Results of Part 1

Panel A: Univariate results

Treatment	Number of participants	Chose tax-favored investment	
		Number	Percentage
Traditional IRA	30	17	56.7
Roth IRA	30	16	53.3
Government match	29	14	48.3
Placebo	<u>29</u>	<u>12.5 [a]</u>	<u>43.1</u>
	118	59.5	50.4

Panel B: Logistic regression of choice of investment A versus B

Variable	Coefficient estimate	χ^2 statistic [b]	p-value
Intercept	1.9200	1.7631	0.1842
Treatment indicator variables: [c]			
Roth IRA	0.4465	0.5067	0.4766
Traditional IRA	0.4808	0.5402	0.4623
Government match	0.5426	0.7120	0.3988
Familiarity w/ tax-favored invstmnt plans	0.1664	1.0244	0.3115
Like having money avail. for withdrawal	-.6842	12.0565 [***]	0.0005
Like risky investments with higher return	-.1203	0.5639	0.4527

Like investments that help save taxes	-.1124	0.3586	0.5493
Like if gov't. matches money invested	0.6215	9.1985***	0.0024
Prefer saving taxes now rather than later	-.2791	3.2914*	0.0696

Model χ^2 = 34.3739 (α < 0.0001)

Panel C: OLS regression of strength of preference for investment A v. B

	Coefficient		
Variable	estimate	t-statistic[b]	p-value
Intercept	5.4565	4.07***	<0.0001
Treatment indicator variables:[c]			
Roth IRA	0.3262	0.56	0.5754
Traditional IRA	0.5983	1.01	0.3139
Government match	0.6010	1.03	0.3061
Familiarity w/ tax-favored invstmnt plans	0.1325	0.89	0.3750
Like having money avail. for withdrawal	-.4909	-3.49***	0.0007
Like risky investments with higher return	-.0561	-0.40	0.6928
Like investments that help save taxes	-.1262	-0.76	0.4507
Like if gov't. matches money invested	0.4712	2.87***	0.0049
Prefer saving taxes now rather than later	-.2636	-1.97*	0.0514

Adjusted R^2 = 0.1723; model F-statistic = 3.64 (α = 0.0006)

Notes:

[a] One participant indicated no preference for investment A or investment B.

[b] ***, **, and * indicate significance at less than the 0.01, 0.05, and 0.10 level.

[c] The placebo group is the comparison group for each of these three treatment groups (i.e., all three indicator variables are zero).

The panel A results are based on an analysis that does not control for any other factors that might affect participants' investment choice. Panel B reports the results of a logistic regression of participants' investment choice on various regressors, including the form of investment B with which they were presented. The three indicator variables that operationalize the four treatment conditions are all insignificantly associated with investment choice, indicating that the irrelevance of the form of an investment's tax preference persists even after controlling for several other factors. Several of these other factors are significantly associated with the participants' investment choices and in the directions that would be expected. Participants' agreement (on a seven-point scale) with the statement that they like having their money available for withdrawal whenever needed is negatively associated with their preference for investment B, which has less withdrawal flexibility than investment A. In addition, the extent to which participants like when the government provides a match of the money they invest is positively associated with their preference for investment B, while their preference for investments that save taxes currently rather than the future is negatively associated.[18] Participants' familiarity with tax-favored investment plans was not significantly associated with their investment choice.[19] Participants' preferences for risky investments with higher returns and for investments that help save taxes were also not significantly associated with their investment choices.[20]

Panel C of Table 4 reports the results of an OLS regression of the strength of the participants' preferences for investment B, relative to investment A, on various regressors, including the form of investment B with which they were presented. The panel C analysis differs from the panel B analysis in the specification of the dependent variable. The OLS results are similar to the logistic regression results, with the form of investment B having no significant effect on participants' preferences. In addition, similar to the logistic regression results, participants have a stronger preference for investment B when they are less concerned about having their money in the investment available for withdrawal, when they like it when the government matches their investment, and when they are less concerned with saving taxes now rather than later.

Table 5 presents results pertaining to the second part of the research instrument, where participants chose between the three tax-favored savings vehicles. These three choices were economically equivalent but differed in the form of their tax preferences. Panel A reports univariate results. Nearly half of the participants indicated a preference for the Roth IRA over the traditional IRA and government match, approximately one-third preferred the traditional IRA, and the remaining one-fifth of participants opted for the government match. A χ^2 test for equal proportions was significantly different from zero (α=0.0027). Panel B reports the results of a multinomial logistic regression of participants' investment choice on various regressors.[21] Although a few of the coefficients' p-values are less than conventional significance levels, the model χ^2 statistic is not ($\alpha = 0.3911$), indicating a lack of significance for the model as a whole. The results thus show a significant difference among the three tax-favored investments but provide no significant evidence of the explanation for that difference.[22]

Table 5. Results of Part 2

Panel A: Univariate results

Treatment	Number of participants[a]	Percentage of participants
Traditional IRA	37	32
Roth IRA	54	47
Government match	24	21
	115	100

Panel B: Multivariate results – multinomial logistic regression of choice of traditional IRA, Roth IRA, or government match

	Roth IRA v. 401(k)			Trad. IRA v. 401(k)		
Variable	Estim.	χ^2 stat.[b]	p-value	Estim.	χ^2 stat.[b]	p-value
Intercept	3.880	4.98**	0.0256	1.840	0.97	0.3238
Familiarity w/401(k)s	-0.253	0.85	0.3573	-0.224	0.62	0.4324

Famil. w/ trad. IRAs	0.543	2.54	0.1112	0.193	0.28	0.5968
Famil. with Roth IRAs	-0.277	1.29	0.2565	0.038	0.02	0.8862
Famil. w/ pens. plans	0.064	0.10	0.7529	0.086	0.17	0.6840
Like inv. that save taxes	-0.020	0.01	0.9222	0.498	3.89 **	0.0486
Like gov't. matches	-0.668	6.91 ***	0.0086	-0.886	10.42 ***	0.0012
Prefer tax savings now	0.049	0.08	0.7745	0.093	0.27	0.6050

Model $\chi^2 = 208.96$ ($\alpha = 0.3911$)

Notes: [a] Three participants did not answer this part of the research instrument.

[b] ***, **, and * indicate significance at less than the 0.01, 0.05, and 0.10 level, respectively

CONCLUSION

Congress and the media have both expressed concerns about Americans' low savings rates. We address these concerns by investigating the extent to which the form of an investment's tax preference affects individuals' willingness to choose a tax-preferred vehicle over a less restrictive form of investment. Specifically, we tested the extent to which subjects chose either a traditional IRA, Roth IRA, or investment matching program to a traditional savings plan. We find that subjects are not as sensitive to the form of the tax preference as they are to restrictions on their ability to withdraw funds. This suggests that, by reconsidering the extent to which individuals are forced to trade off tax savings and liquidity restrictions, Congress might more effectively promote individuals' retirement savings.

NOTES

1. The deductibility of a traditional IRA contribution for an individual who is an active participant in an employer-provided retirement plan is phased out in 2008 as adjusted gross income (AGI) increases from $53,000 to $63,000 ($85,000 to $105,000 for a married couple filing jointly). The deductibility of a traditional IRA contribution for an individual who is not an active

participant in an employer-provided retirement plan but whose spouse is such a participant is phased out as AGI increases from $159,000 to $169,000. Additional "catch-up" contributions of $1,000 per year are allowed for individuals age 50 or older. Contributions to a traditional IRA cannot exceed the individual's taxable compensation.

2. The 10 percent penalty, but not the ordinary income taxation, is waived in certain circumstances, such as the individual's death or disability.

3. More precisely, the amount that can be contributed is limited to $5,000 (or taxable compensation, if less) minus the amount contributed to a traditional IRA. As with traditional IRAs, "catch-up" contributions are allowed. The individual's eligibility to contribute to a Roth IRA is phased-out as AGI increases from $101,000 to $116,000 ($159,000 to $169,000 for married couples filing jointly).

4. Nonqualifying distributions from Roth IRAs may be subject to ordinary income taxation (to the extent they exceed any unrecovered basis in the IRA) and a 10 percent penalty. The details regarding these tax rules are beyond the scope of the discussion here.

5. In 2007, the maximum amount that can be so directed is $15,500.

6. This exclusion is equivalent to taxing the employee on this portion of his or her compensation and allowing the amount to be deducted to arrive at AGI.

7. As with IRAs, the 10 percent penalty is waived in certain circumstances, such as the employee's death or disability.

8. Certain not-for-profit employers can offer so-called 403(b) plans and 457 plans, which are very similar, from the employee's perspective, to a 401(k) plan. Elective contributions under these types of plans also qualify for this credit.

9. For the narrow range of AGI from $16,001 to $17,250 ($24,001 to $25,875 for a head of household and $32,001 to $34,500 for a married couple filing jointly), a 20 percent credit is allowed.

10. For example, consider a single individual with $20,000 of AGI who makes a $2,000 qualifying contribution. A $200 credit would be allowed ($2,000 × .10), making the cost of the contribution, net of the credit allowed, only $1,800 ($2,000 − $200). Effectively then, the individual has invested $1,800, while the government has invested $200. This is equivalent to the government matching the individual's contribution at an 11 percent rate ($200 ÷ $1,800).

11. Of course, there are many other ways that various investments' taxation can differ. For example, some investment returns (e.g., long-term capital gains and qualified dividends) are subject to a reduced, but nonzero, tax rate.

12. The models of after-tax growth presented here are largely based on similar models in Scholes et al. (2002).

13. That is, the individual invests $C \div (1 - t)$, and the tax savings from deducting this amount are $t[C \div (1 - t)]$. The net after-tax investment is

$\{[C \div (1-t)] - t[C \div (1-t)]\}$, which equals C. The research here ignores the $5,000 (in 2008) limitation on annual IRA contributions; see Seida and Stern (1998) for an analysis that takes into account this limitation. The research here also ignores the embedded option to rollover a traditional IRA to a Roth IRA (Hulse 2003).

14. We model this as a nondeductible contribution. If it were instead modeled as a deductible contribution (similar to a 401(k) plan), a zero percent match rate would be needed to attain economic equivalence with the Roth IRA-like and traditional IRA-like investments, which would eliminate our ability to use an investment with a matching contribution as an economically equivalent form of investment. In addition, the research instrument (discussed later) does not frame this investment as a deductible contribution in order to avoid making the description of it more complicated.

15. Although approximately a decade old, Hubbard and Skinner (1996), Poterba et al. (1996), and Engen et al. (1996) provide a literature review of many of these studies as of that time. The Tax Policy Center (2005) recently reported results of a randomized field experiment that suggests that higher match rates for IRA contributions leads to higher IRA participation rates and contribution rates.

16. The research instrument did not allow funds to be withdrawn from investment B before the end of the investment period in order to add some "tension" to the investment choice. That is, since investment B had a tax advantage, there needed to be a disadvantage to it. Restricting withdrawals was a relatively uncomplicated way to introduce a disadvantage, and it bears some resemblance to the restrictions that exist for various tax-favored investment vehicles (e.g., the 59½-year rule for IRAs and 401(k) plans).

17. The intent of this third version was to approximate 401(k) plans and the retirement saver's tax credit. It was designed as a government match here so that, in all three versions of the instrument that pertained to tax-favored savings vehicles, the benefits of the vehicle all pertained to the government (i.e., preferential tax treatment and match).

18. One might suspect that this significance is attributable to particular forms of the tax-favored investments (e.g., liking when the government matches invested money is positively associated with choosing the tax-favored investment only for participants presented with the 401(k)-like form of investment B). In results not tabulated here, an interaction term between each of these factors and the form of investment B was not significant.

19. Participants were asked about their familiarity with 401(k) plans, traditional IRAs, Roth IRAs, and employer-provided pension plans. Since the responses to these four items were positively correlated, we combined them into one metric, taking the average of each participant's four responses.

20. We also examined the effect on the results of adding each of the other demographic and background variables to the logistic regression. The only one that is significantly associated with the investment choice at less than the 0.15 level is the agreement with the statement that the questionnaire was boring (α=0.0979), which was negatively associated with the choice of investment B. The results for the variables reported in panel B were qualitatively similar in these other logistic regressions.

21. A multinomial logistic regression is appropriate when the dependent variable is categorical, has more than two levels, and its levels do not have an inherent ordering. The estimation produces k-1 sets of coefficients, where k is the number of categories for the dependent variable. In the present case, two sets of logistic regression coefficients are generated: the Roth IRA-like and traditional IRA-like investments, each with respect to the 401(k)-like investment. The choice of the latter investment as the reference group for the other two is arbitrary; one could use the Roth IRA-like or traditional IRA-like investment as the reference group without changing the inferences. For a more detailed discussion of multinomial logistic regressions, see Agresti (1996).

22. We also examined the effect on the results of adding each of the other demographic and background variables, as well as the form of investment B with which the participant was presented in the first part of the experiment and the participant's investment choice in the first part, to the multinomial logistic regression,. None of these models' χ^2 statistics were significant at less than the 0.30 level.

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