Tax policy and the Growth in Mutual Funds: Evidence from Omnibus Budget Reconciliation Act of 1993

Frank Murphy

University of Arizona

francismurphy@email.arizona.edu

April 25, 2016

Abstract: Since the 1970s, U.S. tax policy has encouraged individuals to invest for retirement. The enactment of these tax incentives to save for retirement corresponds to a systematic shift in investment preferences from direct ownership of equities securities to indirect ownership of equities through mutual funds. Some prior research attributes this growth of the mutual fund industry to investors' maximizing lifetime earnings by locating these assets in tax-preferred retirement accounts that offer deferral of the associated taxable income. An inherent difficulty of examining the impact of tax policy on investment decisions is distinguishing between characteristics associated with high-earning investors from the tax incentives that benefit these investors. As a means of isolating the tax effects on investment preferences, I use Omnibus Budget Reconciliation Act of 1993 (OBRA 93), which raised tax-rates on some investors, as a quasi-natural experimental setting. By examining individual trading patterns in IRA and Keogh retirement accounts, I find evidence that increasing marginal tax rates actually *decreases* retirement investments in mutual funds. I attribute this result to a tightening of investors' budgetary constraints associated with higher taxes.

JEL Classifications: G11, H2, H31

Keywords: Mutual Funds, Portfolio Choice, Taxation

I am grateful for helpful comments from Remington Curtis, Richard Sias, Jim Stekelberg, and the Arizona Tax Reading Group. I appreciate funding from the University of Arizona Eller College of Management and the Deloitte Foundation Doctoral Fellowship. All mistakes are my own.

I. INTRODUCTION

Investing for retirement is one of the most important financial tasks many individuals face. Tax policy has been used for over forty years to encourage individuals to invest for retirement by allowing for a current deduction for some or all of the amount contributed to qualifying retirement accounts and tax deferral on investment income until funds are withdrawn during retirement. Since these tax provisions have been enacted, there has been a systematic shift in investment preferences from direct ownership of equities securities, to indirect ownership of equities through mutual funds. Some prior research attributes this growth of the mutual fund industry to tax-savvy investors maximizing lifetime earnings by placing mutual funds, which typically generate taxable dividend and capital gains income, in tax-preferred retirement accounts.

An inherent difficulty with examining the effects of tax policy on investment behavior is the endogenous relationship between tax rates and income. Specifically, investors' marginal tax rates are determined based on several non-income factors, such as marital status. However, marginal tax rates are largely a function of taxable income. Therefore, it is difficult to disentangle if it is tax policy that is encouraging mutual fund investing, or rather characteristics of higher earners, such as having a better understanding of personal finance, which is responsible for portfolio allocation decisions. I address this endogeneity by using the quasi-natural experimental setting of the Omnibus Budget Reconciliation Act of 1993 (OBRA 93) which increased the tax rates on some, but not all taxpayers, who previously faced the same marginal tax rate of 31%. This allows me to obtain identification in a difference-in-differences methodology. I use this setting to examine if tax policy is, at least in part, causing the increase in demand for indirect ownership of equities through investments in mutual funds.

A number of authors (e.g., Gruber 1996; Poterba and Samwick 1995) posit that tax incentives may have driven much of the growth of the mutual fund industry. Mutual funds are flow-through investment vehicles for which the capital gains and dividends of the fund must be reported as taxable income to owners of the fund. Relative to other types of investments, mutual fund ownership may be more elastic to tax incentives due to the significant tax savings associated with the deferral of investment income attributable to the fund. Thus, OBRA 93 may result in a changing in the overall rate of savings in tax-deferred (TD) accounts by altering the benefits for deferral of taxable income (i.e. an increase or decrease in the annual contribution to retirement savings). Alternatively, OBRA 93 may act as a catalyst for investors to rebalance their retirement savings portfolios by replacing TD assets that do not generate taxable income (e.g., municipal bonds or non-dividend paying equities) with mutual funds. Bernheim (2002) points out the limitations of trying to capture the relation between variation in tax policy and investor behavior because time-series variation in marginal tax rates is associated with "a handful of significant tax reforms." (pg. 1233). Rydqvist, Spizman, and Strebulaev (2014) (herein RSS) circumvent this issue by using panel data from eight countries, concluding that the tax benefit to deferral of investment income is driving the increased popularity in mutual fund ownership. I avoid this issue by examining variation across individual investors at one of these significant tax reform events.

While it is intuitively appealing to attribute the growth of the mutual fund industry to tax incentives, there is a multitude of other inputs that may influence investors' portfolio allocation decisions. I focus on two countervailing forces associated with changes in tax policy. The first is a tightening of budgetary constraints from having less after-tax income from a tax rate increase. That is, when investors face a reduction in capital they must reduce savings if they desire to

maintain the same level of consumption. The second is an increase in tax incentives for retirement savings due to a greater tax benefit associated with a current tax deduction, deferral of investment income, and lifetime smoothing of taxable income. I use OBRA 93 as a quasi-natural experiment to examine which of these effects dominates the retirement saving decision.

I focus on the investment decision (i.e. the amount and timing of contributions) to purchase mutual funds held in individual retirement accounts (IRAs) and Keogh plans. These plans are similar in concept to an employer-sponsored 401 (k) plan but differ in that they allow the individual to invest in a large spectrum of qualified investments. Because these two retirement accounts offer more flexibility on the timing and location of investments than 401 (k) plans, it is plausible that taxpayers responded to OBRA 93 shortly after the passage of the law, or when they first became aware of the tax law changes (Agnew, Balduzzi, and Sunden 2003). Therefore, if tax policy contributes to the increased preference for mutual fund investments, as RSS conclude, I expect taxpayers facing increased tax incentives to save for retirement to respond by placing more mutual funds (either through increasing savings or rebalancing away from other types of assets) in TD accounts after OBRA 93. Alternatively, if investors facing higher tax rates reduce overall retirement savings to avoid a reduction in consumption, then tax policy may not be the invisible hand pushing investors toward mutual funds.

To test these competing predictions, I employ a dataset from a large discount brokerage firm covering a period beginning in January 1991 and ending in December 1996.[1] This data contains the trading records and monthly holdings of 78,000 households. A key feature of this data is that it delineates between holdings in retirement (TD accounts) and non-retirement

[1] I thank Terry Odean for graciously providing me with this data.

accounts. I supplement this trading data with data from Infobase Inc. data that provides household-level attributes for a large subsample of households in this sample as of 1997.[2] These data sets have been used together in several studies such as Barber and Odean (2001) and provide a relatively symmetric time-series around OBRA 93. I use this data to place each household in its appropriate tax bracket, based on income and non-income factors, and construct household-level control variables.

To ensure that the wealthy investors do not have systemic biases against mutual fund investments and establish baseline results, I test if cross-sectional heterogeneity in marginal tax rates influences the amount of new investments in mutual funds held in retirement accounts. Following a classification system that mimics the tax code, I regress indicators for different marginal tax rates on the net yearly household investment in mutual funds located in their TD accounts. In addition to tax concerns, I control for other quantifiable factors that may alter trading behavior such as age, gender, marital status. In this specification, I include year fixed effects to control for macroeconomic conditions that may influence the decision to invest, such as trading sentiment. Consistent with theory and prior literature (Graham and Kumar 2006; Poterba and Samwick 2002) I find a positive association between individual's marginal tax rates and the amount invested in mutual funds held in TD accounts.[3]

For the main empirical specification, examining the effects of OBRA 93 on retirement portfolio allocation decisions, I utilize a difference-in-differences regression design. I split the high tax group, those facing a 31% marginal tax rate prior to OBRA 93, into those that likely did

[2] I use the terms household and individual investor interchangeably throughout this document.
[3] Despite prior literature not documenting, per se, that higher taxed investors purchase more mutual funds in their TD accounts, it could be extrapolated from the finding from other studies examining retirement portfolio decisions. However, establishing this baseline may add to the external validity of my main specifications.

not have their tax rates increased (control group) and those that had their marginal tax rate increase to 36% and 39.6% (treatment group) due to OBRA 93. This methodology improves upon the research design in prior studies by obtaining causal identification (i.e., that tax policy is causing investors to increase mutual fund investments in TD accounts) if several assumptions hold. First, these two sets of investors must have similar mutual fund investing patterns prior to OBRA 93 (i.e., parallel trends assumption). I examine the pre-trend of both groups and present evidence that the parallel trends assumption is satisfied. The second assumption is that OBRA 93, and not another confounding event in the post-OBRA 93 period, is causing differences in investing behavior. I am not aware of any macroeconomic conditions, based on S&P 500 returns and employment data, that would incrementally affect the investing behavior of those in the treatment group compared to the control group in 1994, 1995, or 1996. In addition to these identifying assumptions, I believe that OBRA 1993 was exogenous and unexpected to taxpayers. In particular, every Republican in Congress voted against the bill and it took Vice President Gore to cast the tie-breaking vote for OBRA 93 to pass the Senate. Therefore, it seems unlikely that investors became aware of this tax rate increase at differing times.

In contrast to RSS, I find that households in the treatment group, compared to those in the control group that did not have their taxes increased, *reduced* their mutual fund retirement investments after OBRA 93. These results are robust to several specifications. For example, when I limit the sample to only the self-employed, a group less likely to hold TD accounts outside of the dataset, I continue to find a negative and statistically significant treatment effect. Additionally, to reduce the influence of outliers, I confirm these results using a log-linear

specification limiting the sample to households with positive yearly mutual funds trades.[4] Lastly, I perform several alternative household fixed effect regressions and continue to document a negative and statistically significant treatment effect. Overall, I find robust, consistent evidence that OBRA 93 reduced mutual fund investments held in TD accounts by investors subject to increased tax rates. I attribute this result to these investors having less after-tax capital available to invest for their retirement due to higher marginal tax rates. This result is opposite of RSS but seems to fit with the reasoning of Barber and Odean (2004) who conclude "It does not appear that the desire to shelter fund distributions is the primary motivation for the preference for locating mutual funds in TDAs" (pg. 437).

The results of my research contribute to the finance and economics literature that examines portfolio allocation choices. For example, Poterba and Samwick (2002) find evidence that investors consider marginal tax rates when making investment decisions. I find results that investors do not appear to purchase mutual funds in their TD accounts strictly for tax minimization purposes. Therefore, it seems much is still left undocumented in understanding the channels through which personal taxation influences portfolio allocation decisions. My findings are also of importance to investors and tax policy makers because of the popularity of using mutual funds as a retirement savings vehicle. As the number of individuals who are covered by defined benefits plans decreases, it is important to understand how tax policy impacts the savings choices of investors. Individual investors held over $2.3 trillion of mutual fund assets in IRAs alone, as of 2007, according to the Investment Company Institute. TD accounts are growing in popularity, and Barber and Odean (2004) document that 37-52% of households *exclusively* hold

[4] To mitigate concerns over mis-specified tax brackets, I perform the same analysis using all households as the control group and find weaker, but directionally consistent results.

mutual funds in certain TD accounts. Given my findings that increasing tax rates, and therefore increasing the tax incentive to investment for retirement, is not causing the increased popularity of mutual funds, further evidence is needed to understand what is driving this trend in asset allocation.

The remainder of this paper is organized as follows. I describe background information on OBRA 93 and discuss relevant prior literature in Section II. In Section III I present an overview of my data and variable construction. In Section IV I detail the research design used for testing my hypothesis, followed by the empirical results in Section V. In Section VI I discuss my findings. I present limitations and conclude in Section VII.

II. Background and Literature Review

II.A. OBRA 1993

On August 10, 1993, Bill Clinton signed into law OBRA 93 which expanded the earned income tax credit for low-income households and raised tax rates for high-income households. OBRA 93 was designed to reduce the national deficit and is often referred to as the Deficit Reduction Act of 1993. The main tax increase on higher income taxpayers included an increase in the statutory tax rate from 31% to 36% on taxable income over $115,000 ($140,000 for married couples) and from 31% to 39.6% for any taxable income over $250,000.

OBRA 93 included several deficit-reducing provisions in addition to raising individual income tax rates such as increasing the top corporate income tax rate from 34% to 35% and raising national transportation fuel taxes. In addition to the changes in the statutory tax rates, OBRA 93 made permanent the phase-outs of itemized deductions and personal exemptions, which raised taxes for wealthier taxpayers. The passage of the bill was highly uncertain and

required Vice President Gore to break a tie in the Senate, therefore, it is unlikely that individual taxpayers anticipated this tax law changes. This bill passed without any bipartisan support, with every republican in Congress voting against OBRA 93. This may have signaled a structural shift away from the lower tax rates of the Regan administration, which were largely codified in the Tax Reform Act of 1986.

II.B. Tax Incentive

Contributions to a tax-deferred account (e.g., IRA, 401 (k) plan) allow the taxpayer to reduce current taxable income by the contribution, up to a limit, and defer income generated by the assets held in that account. The benefit to investing in tax deferred accounts varies based on an investor's current and expected future tax rates; generating tax clientele effects.[5] The after-tax accumulated capital for an investor in a tax-deferred account is computed with equation (1):

$$(1) \qquad Capital = \left(\frac{I}{1-\tau_0}\right)(1+r)^n(1-\tau_n)$$

Where I is the amount of the investment, r is the returns on the investment, τ_0 is the investor's current marginal tax rate, and τ_n is the investor's marginal tax rate when withdrawing during retirement n periods from now. Note that if the taxpayer faces the same tax rate today as she does upon retirement then the equation simplifies to the compounded rate of return, $I(1+r)^n$. However, if the investor's tax rate is expected to be lower in retirement, i.e., $\tau_n < \tau_0$, then the lifetime income will be strictly greater than if $\tau_n = \tau_0$. This creates an incentive for high marginal taxpayers to shift income from current periods of high taxation to future periods of lower taxation. This is generally referred to as the lifetime income smoothing benefit from tax-deferred investments. Similarly, some taxpayers focus on the current tax benefit of deductible

[5] See Scholes et al. (2015) for additional discussion.

contribution due to the uncertainty associated with future tax rates or by making investment decisions using the current tax incentives. To the extent this is the case, the benefit of the current deduction, ($I * \tau_0$), is increasing in τ_0.[6]

In addition to the lifetime income smoothing benefits (deducting contributions today and taking taxable distributions later), tax deferral of investment income creates another incentive to invest for retirement. For example, Miller (1977) speaks to the common conception that tax deferral for at least ten years is almost as good as tax exempt. While there is research that attempts to quantify the value of deferral, for purposes of this study I simply rely on the assumption that deferral is valuable and that its value is increasing in marginal tax rates. Stated differently, given the tax preferential treatment of investments in TD accounts to accumulate tax-free until retirement, investors with higher marginal tax rates will accrue greater benefits from contributions to these accounts. RSS use the following equation to measure the benefit of deferral:

$$(2) \qquad GAP = \frac{\tau_d d + \tau_g g}{(1+i)}$$

In this equation, *GAP*, measures the "gap" between taxable and tax-deferred income, with the greater the gap leads to a greater incentive to save for retirement. τ represents the marginal tax rate on dividend or capital gain income, denoted by the subscripts *d* and *g* respectively. The variables *d* and *g* capture the expected returns on dividends and capital gains and the denominator controls for expected levels of inflation (*i*). While I do not use this measure from RSS, using a difference-in-differences methodology of examining OBRA 93 holds *GAP* constant

[6] The limit on tax deductible contributions are low and taxpayers may cluster investments at this contribution limitation points.

for a control group but not the treatment group. Dividend income and short term capital gain income is taxed at an individual's marginal tax rate, thus OBRA 93 increases τ_d and the short-term portion of τ_g for the treatment group.

II.C. Related Literature

This study examines the investing preferences of individual investors based on their marginal tax rate. I briefly discuss some literature that examines: tax rates, mutual fund investing, and retirement savings. These topics are broad, and by no means mutually exclusive, therefore, I will only discuss papers that are directly related to this study for the sake of brevity.

Theory predicts that taxation of investment income is a crucial consideration when making asset allocation decisions (Shoven and Sialm 2003). However, Campbell (2006) document that household financial decisions, such as how to save for retirement, may be daunting for investors who do not fully understand the complexities of our ever-changing tax environment. Barber and Odean (2004) generally find that investors could improve investment returns if they were more tax savvy. While not the main focus of their study, they conclude that the primary motivation for holding mutual funds in TD accounts is not for tax minimization purposes. Thus, they provide mixed results using retail trading data that tax policy is driving the increased popularity of indirect ownership. Shefrin and Statman (2000) suggest that investors may take a "layering" approach and hold various types of assets for different investment purposes. If this is the case, some investors may take a different approach to trading equities in their non-retirement portfolio than from mutual funds held for retirement savings. Bailey, Kumar, and Ng (2011) examine behavioral biases in mutual fund investing and find evidence that is consistent with this view, however, the authors are cautious about this interpretation. If mutual fund holdings serve a different purpose than equities, then the Barber and Odean (2004)

proxy, trading frequency of equities, might not fully capture the tax incentives to increase positions in retirement accounts and further empirical research is warranted to shed light on this area.

My study most closely resembles the work of RSS, who investigate the role tax policy has on mutual fund ownership. The authors propose that the trend in indirect ownership is related to the growth in retirement savings and use the evolution of defined contribution plans as an example. RSS use a long time series (1945-2010) of macro-level data to capture country-specific benefit to lifetime income smoothing and tax deferral. When they test their hypothesis using a pooled sample of eight countries, RSS document the theorized association that tax incentives are one of the reasons for an increased preference to hold mutual funds. However, the authors admit that there are substantial data limitations to using country-level macro data. They state: "Of course, for our purposes the major question is: What fraction of these [mutual fund investments] are actually held in tax-deferred accounts?" (pg. 73). Additionally, when the authors examine the relationship for each country separately, they find the results are primarily driven by Sweden and the United Kingdom, and not the United States. My study is incremental to the work of RSS, by studying a domestic setting and utilizing household-level trading data to examine the role tax policy plays in mutual fund investments. While RSS rely on broader country-level measures of mutual fund investments over a long time-series, I rely on the quasi-natural experimental setting of OBRA 93 to obtain causal identification in a difference-in-differences specification.

The results of RSS compliment those of Poterba and Samwick (2002) who find that taxes influence portfolio allocation preferences. Interestingly, Poterba and Samwick speculate but do not test due to data limitations that OBRA 93 should increase certain investments. They claim: "Our results suggest that a tax change like that in 1993, which increased the marginal tax rate on

households at the top of the income distribution, should increase the demand among these households for tax-exempt bonds and for investments through tax-deferred accounts" (pg. 37).

Other studies examine the effects of tax clienteles in a number of different settings including the aggregate supply of bonds (Myer 1977), corporate financing decisions (Dhaliwal, Erickson, and Krull 2007), and how individuals rebalance their portfolios around tax law changes (Dai, Maydew, Shackelford, and Zhang 2008). However, two specific studies examine how tax clientele effect may influence asset allocation decisions. The first is Graham and Kumar (2006), who explore the implications of differential taxation on dividend income vs. capital gain income. Traditionally dividends were taxed at the marginal tax rate of the investor and capital gains were taxed at a flat rate (15-28%) that was usually below the top marginal tax rate but above many of the lower marginal tax rates.[7] They find that progressive taxes on dividends induces a tax clientele demand for dividend paying equities among low-income investors. The authors acknowledge that investments in TD accounts may have a different objective for holding dividend paying securities, however, they examine demand separately for these two types of accounts.

The second is Sialm and Starks (2012) who examine if mutual fund managers alter their holding and trading strategy based on the tax clientele. Mutual funds are flow-through entities, where the owners are required to report their share of the fund's taxable dividends and capital gains. This may lead to externalities if the fund is forced to sell assets to repay investors who liquidate their positions (Dickson, Shoven, and Sialm 2000). Therefore, a mutual fund manager has significant discretion in how much tax the investors of the fund will report annually based on

[7] The Jobs and Growth Tax Relief Reconciliation Act of 2003 made these two rates equal.

her rebalancing choices as well as the choice to hold securities that generate dividend or other income. The authors find that there are tax based clienteles, in which managers of mutual funds held primarily in taxable accounts tends to employ strategies that reduce the tax liabilities of the owners.

In addition to investigating how taxes influence investment policy, the extant literature examines the nuances of saving for retirement. Analytical work from Shovel and Sialm (2003) lay a theoretical foundation for how individuals should invest for retirement. They suggest that actively managed funds should be held in TD retirement accounts to reduce the impact of investor level taxes. Empirical studies by Agnew, Balduzzi, and Sunden (2003) and Brown, Liang, Weisbenner (2007) show that individual tend to allocate their 401 (k) investments in a small number of actively managed mutual funds. Most research explicitly states that saving for retirement is one of the most difficult financial tasks many investors face, and there appears to be evidence, while not conclusive, that investors do not behave as traditional economic theory may predict. Benartzi and Thaler (2007) discuss some of these key decision-making elements involved in retirement saving such as whether to invest, how much to invest, and where to allocated the funds within the investment account. They quote the Noble Laureate Harry Markowitz who made the following comment on retirement investing: "I should have computed the historical covariance of the asset classes and drawn an efficient frontier. Instead… I split my contributions fifty-fifty between bonds and equities" (pg. 86).

III. DATA AND VARIABLE DEFINITION

III.A Data

I use two distinct proprietary data sets that allow me to observe the trading behavior of individual investors. The first dataset is from a large discount brokerage firm and covers a period

beginning in January 1991 and ending in December 1996. This data contains the trading records and monthly holdings of 78,000 households who had an open account as of 1991. Because this data covers the period around OBRA 93, it will be the primary data used to examine the trading patterns of individual investors. The key feature of this data is that it delineates between holdings in retirement and non-retirement accounts. I examine the trading patterns at the household level. Therefore, if both spouses have an active trading account and an IRA, I examine the trading patterns of the IRAs jointly. Additionally, the purpose of this study is to investigate if tax policy is driving investments of mutual funds, thus I eliminate any trades of equities, bonds, American depository receipts (ADRs), warrants, and options.[8] To compute the net annual household's investment in mutual funds, *TRADE*, I sum all mutual fund transaction (positive for buys, negative for sells) in an IRA or Keogh account, by household-year. Using trades in lieu of household level holdings has the advantage indicating an active desire to save for retirement and captures investors rebalancing decisions to shift from direct to indirect ownership of securities. I truncate the data at the 1% and 99% levels to reduce the influence of outliers. The average annual mutual fund trades in TD accounts ranged from $1,924 to $9,206.

I supplement this first dataset with demographic information collected by Infobase Inc. in June 1997. This information is collected on the primary individual on the trading account and covers a meaningful subset of households.[9] I use this information to compute variables that capture income, marital status, age, gender and use a select combination of these variables to construct tax brackets (discussed below). After eliminating observations that lack the requisite

[8] Due to the proprietary nature of this data, there is some ambiguity in the naming convention of certain investment products. While due care has been taken to properly classify investments as mutual funds, to the extend investments have been misclassified, this measurement error should make inferences harder by increasing standard errors.
[9] The trading dataset also includes self-reported information on income, wealth, etc., but the InfoBase data is assumed to be a better source and should be relatively free of measurement error.

information to construct the necessary variables, I am left with 10,626 households that have executed at least one transaction of mutual funds in their retirement account between 1991 and 1996. In table I, I report the descriptive statistics by households and also include several self-reported variables on household wealth and trading experience that was collected by the brokerage house when the account was established. The average account was opened by a 48 year-old male who is married. The mean household has an annual income $77,615 and a median self-reported net wealth of $100,000. I report full descriptive statistics in table I.

[Insert Table I Around Here]

This data has two noteworthy limitations. First, I cannot confirm that it covers the entire household investment portfolio. For example, an individual may have a significant portion of their retirement savings in a company provided 401 (k) plan. For robustness, I use a sample of self-employed taxpayers to mitigate concerns that investments in other accounts are driving my results. Despite this drawback, the data has been used in numerous prior studies (e.g., Barber and Odean 2000; 2001; 2002) and I use a difference-in-differences design, which alleviates this concern as I have no reason to believe that there are systematic differences in outside investing among the treatment and control group. Moreover, this data has the advantage of allowing me to examine individual trades and track changes in holdings between taxable and TD accounts by month. Second, demographic information is only measured once at the end of the sample. While this is not an issue for certain items that do not change (e.g., gender), or can be computed throughout the sample (e.g., age), it does raise some concern for income. I suggest this data limitation does not pose significant issues due to the relatively short time series and general "stickiness" of income. Additionally, for purposes of computing tax brackets, the IRS inflation

adjusts the income schedule. Thus, an individual whose income rises with inflation will generally stay within the same marginal tax bracket.[10]

III.B Tax Bracket Computation

I use demographic data as of tax year 1997 to place each household in different marginal tax brackets. The U.S. has a progressive tax system that employs a step function to determine the appropriate marginal tax rate.[11] Income reported by Infobase Inc. is based on eight income ranges and a ninth category of all households with income over $125,000. Similar to Barber and Odean (2002, 2001), I classify income as the midpoint of these ranges and $125,000 for the top earners and report a qualitatively similar income distribution as these prior studies. The U.S. tax system uses different income schedules for determining marginal tax rate based on individual's marital status or whether the filer has children. I attempt to recreate this system by creating three distinct classifications: single, married filing jointly, and head of household. Head of household is a special designation for individuals who are single but take care of dependent children.[12] Based on this information I create an indicator variable for households that are low (15%), middle (28%) and high marginal tax rates (at least 31%). These three tax classifications existed throughout the sample period. In addition to these, I set a dummy variable to one, for all households who are in the two newly formed tax brackets after OBRA 93 (36% and 39.6%). Thus, the high tax group includes both those affected by OBRA 93 and those in the 31% tax bracket that did not experience an increase in tax rates. I present table II below, which includes

[10] Given the relatively short time-series and using income as of 1997, bracket creep as described in Saez (2003), likely is not an issue.
[11] I obtain tax bracket information from taxfoundation.org.
[12] There are other ways an individual may file as head of household but this discussion is outside the scope of this paper. Additionally, I assume that all individuals who are married file a joint tax return as there are very few circumstances where filing separately is beneficial.

the IRS tax classifications and those I estimate based on the income ranges reported by Infobase. Specifically, in the columns titled “actual”, represents the IRS income cut-off for each tax bracket as of 1997. In the columns titled “estimated” these represent the income cut-offs, based on the InfoBase data, used to classify each household. While not perfect, this matching procedure should place taxpayers in the correct rank order of marginal tax bracket.

[Insert Table II About Here]

IV. RESEARCH DESIGN

I first perform a set of tests to establish a baseline that higher taxed households invest more in mutual funds held in TD accounts. Portfolio theory predicts that individuals should place assets that generate taxable income (e.g., mutual funds) in TD accounts, and this preference should be increasing in the taxability of investment income (Rydqvist, Spizman, and Strebulaev 2014; Shoven and Sialm 2003). Poterba and Samwick (2002) document that higher marginal tax rates influence the decision on where to locate taxable investments. I predict that investors in the higher tax brackets should invest more in mutual funds held in their retirement accounts. This leads me to run the following regression:

$$(3) \quad TRADE_{it} = \alpha_{it} + \alpha_t + \beta 1\ Low\_Tax_i + \beta 2\ High\_Tax_i + \beta 3\ Male_i + \beta 4\ Single_i + \beta 5\ Retired_i + \beta 6\ Children_i + \beta 7\ Age_i + \varepsilon_{it}$$

I define *TRADE,* above in III, as the annual household investment of mutual funds held in TD accounts. I include an indicator variable for both low and high tax individuals, with the intercept capturing the effects of investors in the middle tax bracket. Note that because I define the treatment group as a subsample of the high tax group, this regression includes all observations and does not distinguish between investors who remain at 31% tax rate and those impacted by

OBRA 93. I also include several variables to control for observable traits that may influence the decision to invest for retirement. These include age and indicator variables set to one if the household reports having children, if the primary investor is male, and if the primary account holder is married. In addition to a discrete variable for age, I include an indicator variable, *Retired*, which is set to one for individuals who are at least 60 during the entire sample. I use 60 as a cut-off age because taxpayers over 59 ½ are allowed to start withdrawing funds from their tax-preferred retirement accounts without an early withdrawal penalty. I run this regression using both ordinary least squares (OLS) clustering standard errors by household, and median regression, which produces consistent estimates that are less sensitive to the influence of outliers.

While this baseline test is important to document, it is not the main empirical focus of this study. Barber and Odean (2004) are skeptical that investors are placing mutual funds in TD accounts for strictly tax minimization purposes. I use OBRA 93 as a quasi-natural experiment to test if investors respond to increased tax incentives to hold mutual funds in TD accounts (RSS) or are reducing their retirement savings due to less after-tax income available to invest. I use a traditional difference-in-differences estimator where the variable of interest is the interaction between the treatment group and post period indicator. I define the treatment group as any household whose marginal tax rate increased from 31% to either 36% or 39.6%. I define the post period as all household years after 1993. While OBRA 93 actually increased taxes effective in tax year 1993, anecdotal evidence suggests that many taxpayers are not aware of current year tax increases until they actually file their tax return the following year. This leads to my second regression model:

$$(4) \quad TRADE_{it} = \alpha_{it} + \beta 1\ Treat_i + \beta 2\ Post_i + \beta 3\ Post*Treat_i + \beta 4\ Male_i + \beta 5\ Single_i + B6\ Retired_i + \beta 7\ Children_i + \beta 8\ Age_i + \varepsilon_{it}$$

I include the same set of control variables as included above to mitigate concerns that the treatment and control group are structurally different across observable characteristics. As opposed to regression equation (3), the control group is limited to taxpayers in the highest tax bracket prior to OBRA that did not have their tax rates increase.

V. EMPIRICAL RESULTS

V.A. Main Results

Brown, Liang, Weisbenner (2007) document that the vast majority of options offered in U.S. 401(k) plans are domestic equity funds. To ensure comparability with this and similar studies, I first document the extensive use of mutual funds in retirement accounts by computing the net purchase of mutual funds held in retirement accounts by tax bracket group. Table III shows that throughout the entire sample, each tax bracket is in a net purchase position for the year. For the most part, the level of investment increases monotonically with the level of taxes.

[Insert Table III About Here]

I present the results of regression Model 3 in Table IV. The variables *Low_Tax* and *High_Tax* are indicators, therefore we can interpret the coefficient as the marginal effect of being in either of these tax categories compared to those in the middle tax bracket. The point estimates of the impact of being in the high tax bracket on mutual fund trades are 1,745 and 625 for the OLS and median regressions respectively. This indicates that the mean and median individual in the highest marginal tax brackets incrementally purchase $1,745 and $625 more mutual funds in their TD accounts per year ($p < 0.01$; $p < 0.01$). Additionally, having children, being retired, and being single all lead to less investment in mutual funds for retirement.

[Insert Table IV About Here]

I next turn my focus to the examination of OBRA 93 using a difference-in-difference methodology. I first graph the annual trades for the different tax brackets to inspect for any clear signs that the parallel trends assumption is violated. This assumption does not require that the two groups have the same level of investments, merely that one group does not alter investment patterns at a different rate than the others (i.e., the treatment group is increasing investment quadratically while the control group is increasing investments linearly or decreasing investments). I plot the annual means of all three tax brackets and the treatment group during the entire sample period in Panel A. In Panel B I focus on the 1991-1993 trends between the treatment and control group. Based on Figure 1 the parallel trends assumption appears to be satisfied.

[Insert Figure I About Here]

In Table V, I present the result of regression model (4) using several different subsamples. If the findings of this study corroborate the results of RSS I expect $\beta 3$ to be positive, however if the budgetary constraint is the dominant effect, then I expect $\beta 3$ to be negative. In columns (1), I present the results using the entire high tax sample as the treatment and control group. I find a negative and statistically significant treatment effect ($p<0.05$). Interestingly, the control group is also investing less in the post period ($\beta 2$ is negative and statistically significant). While this can be due to macroeconomic conditions, there are three full years of trades being captured by the post variable. I investigate if economic conditions could be to blame for this negative trend by examining market returns and unemployment data. From 1994 to 1996 the S&P 500 rose considerably (460 to 740) and, unemployment dropped (5.7% to 4.4%), according to the Department of Labor. Based on these statistics, I do not attribute the lower retirement investing to poor economic conditions. Overall, the results of this specification are indicative of

higher taxed households investing over $2,000 less in mutual funds after OBRA compared to the control group who did not have their taxes increase.

In columns (2) through (4) of Table V, I use two different subsamples to test if the findings are a result of having a non-representative control group or investors who may be investing in a 401 (k) plan, which is not covered by this dataset, at the expense of their IRA or Keogh plan. First, I focus on a sample that is less likely to invest in employer-sponsored 401 (k) plans, mitigating concerns that the results are a product of data limitations. In column (2), I limit the analysis to only those who are investing in a Keogh account which indicates that the investor is self-employed. I find a negative and statically significant treatment effect for this group.

I next examine if I am drawing spurious inferences between the negative relationship between tax law changes in OBRA 93 and mutual fund investments because of the aging of investors. Tax law, which mimics the lifetime consumption model, provides incentives to invest for retirement until an investor reaches a certain age when the law requires minimum withdrawal of retirement savings in tax-preferred accounts. To the extent there are older investors in the treatment group spending down their retirement accounts post-OBRA, then this shift in demographics will cause a mechanical relationship between tax incentives and mutual fund retirement savings.[13] To reduce the concern that life-cycle changes are causing the results, I limit the sample to only household years' observations when *TRADE* is greater than zero and refer to these investors as "savers".

In columns (3) and (4) of Table V, I present the effect of OBRA 93 on a sample of savers. In column (3) I present the results using OLS and in column (4) I take the natural log of

[13] The control variables for age should also mitigate this effect.

TRADE. Taking the natural log of *TRADE* should mitigate the concern that a few large trades by investors in the control or treatment group are driving the results. [14] In both columns, I find the effect is statistically significant at conventional levels ($p < 0.01$; $p < 0.10$). The results from using a sample of savers confirm, and provides additional evidence, that households respond to an increase in taxes by decreasing investments in mutual funds held in their retirement accounts. Overall, the main results of this study document that high marginal tax households invest more in mutual funds for their retirement, but reduce their mutual fund positions in response to an exogenous increase in marginal tax rates.

V.B. Robustness Check

To ensure my results are robust to alternative specifications, I use several different household fixed effects models and present the results in Table VI. In the first two columns of Table VI, I use the net monthly mutual fund trade in TD accounts as the dependent variable, *MTRADE*. Using monthly trades instead of yearly trades allows for enough observations per household to utilize household fixed effects. Additionally, this method allows me to set the post variable to monthly trades after August 1993 and reduce the possibility that investors immediately reacted to the passage of OBRA in 1993. In column (1) I use the monthly trades over the entire sample and in column (2) I limit the sample to the 12 months prior to and after the passage of OBRA. In these two specifications, I use a fixed effect estimation procedure that creates a dummy variable for each household and the interaction of the post dummy and treat dummy. This leads to the fifth regression equation:

$$(5) \qquad MTRADE_{it} = \alpha_{it} + \beta 1\ Post*Treat_i + \delta 1\ Household_i + \varepsilon_{it}$$

[14] This is only feasible when *TRADE* is strictly greater than zero.

Specifically, the coefficient $\beta 1$ represents the difference-in-differences estimator and $\delta 1$ controls for time invariant household traits. In columns (3) and (4) I average the monthly household trades over the pre- and post-OBRA 93 for the entire sample period and two-year window around August 1993, respectively. Specifically, I use the following regression equation:

$$(6) \qquad \overline{MTRADE}_{it} = \alpha_{it} + \beta 1\ Post{*}Treat_i + \varepsilon_{it}$$

This method averages out any time-invariant differences and collapses each household into two observations (one pre-, one post-OBRA 93). Similar to the first two columns, I split the samples based on the August 1993 cutoff.

The results in Table VI support my primary finding that OBRA 93 reduced the amount of mutual fund retirement investments for the treatment group. In all four columns $\beta 1$ is negative and statistically significant at a better than five-percent level. Due to the different time horizons and units of measurement, I do not compare the point estimates between these results and those documented in Table V. Instead, these test results should reduce the risk that time-invariant household-level attributes or responses to OBRA in the calendar year 1993 are primarily driving the main results.

VI. DISCUSSION AND ALTERNATE EXPLANATIONS

Overall, I find robust evidence that investors decrease their positions in mutual funds held in IRA and Keogh accounts in response to OBRA 93. This result seems to be the opposite of what is found in RSS, who document that the tax incentives are partially responsible for the rise of the mutual fund industry. In contrast, the results support the view that tax increases budgetary constraint, leading investors to save less for retirement. Despite this assertion, the results presented herein cannot completely rule out the premise that taxes are fueling the growth of the

mutual fund industry through increased contributions to TD accounts. First, while IRA and Keogh contributions appear to have a high degree of variation, prior literature documents that contributions to 401 (k) plans have a high degree of inertia (Agnew et. al 2003; Huberman and Jiang 2006). Based on these prior empirical finds, one can easily think of the anecdote in which an employee sets her 401 (k) payroll contribution once and then does not alter either the percentage contributed or the fund allocations. Thus, even if the original rationale to invest in mutual funds was tax driven, the growth of the investment is due to the disutility to effort the investor has in making any further retirement portfolio decisions.

Moreover, the U.S. tax system places a strong incentive to place income generating assets in tax deferred accounts (Shovel and Sialm 2003; Zhou 2009). However, many recent empirical studies have not focused on the penalty associated with early withdrawal of funds from retirement accounts (See İmrohoroğlu, İmrohoroğlu, and Joines (1998) for a general equilibrium framework on retirement savings). Poterba and Samwick (1995) discuss savings in retirement accounts as being "off limits" to investors who are looking for capital to increase consumption (pg. 311). I provide some very preliminary descriptive statistics on this conjecture by examining if average yearly contributions (pooled and by tax bracket) are statically different from zero. I report the results of this analysis in Table VII. Not surprisingly, the yearly contribution is statistically greater than zero at the five percent level or better in the vast majority of specifications and in no setting are investors significantly de-saving. If investors' annual savings fluctuate but accumulated contribution are ultimately not withdrawn prior to retirement, mutual fund investments housing these retirement savings are able to enjoy compound growth for years. Therefore, it may be the "stick" and not the "carrot" that is driving the growth of the mutual fund

industry as investors simply allow fund managers to continue to manage compounding amounts of capital.

[Insert Table VII About Here]

Lastly, I take that mutual funds generate passive income as given throughout this study. Sialm and Starks (2012) document that there are mutual fund clienteles based on the relative taxability of the fund owners (i.e., funds that have a large portion of taxable investors gravitate towards investment strategies that do not give rise to taxable income). The extent to which mutual fund managers respond to tax law changes and ever-shifting retirement demographics will undoubtedly alter how investors assess retirement investing.

VII. CONCLUSION AND LIMITATIONS

As fewer individuals are covered by defined benefit pension plans, investors are now forced to save for their own retirement, with many utilizing tax-preferred retirement accounts. Prior literature hypothesizes that the growth of the mutual fund industry may be due to tax policies that provide incentives to invest for retirement. RSS provides empirical evidence based on cross-country macroeconomic data that the tax incentives to save for retirement are fueling the systematic shift from direct to indirect ownership of securities. I use microdata that covered the trading patterns of 78,000 households from 1991 to 1996 to examine this issue.

On August 10, 1993, OBRA 93 exogenously increased tax rates for high-income households by creating two new tax brackets (36% and 39.6%). If investors increase their holdings of mutual funds based on the tax incentive, such as deferring the taxation of dividends and capital gains, then I expect to see increased mutual fund investments for those in the new tax brackets. Alternatively, if increases in taxes create a budgetary constraint, then I expect to see a

reduction in mutual fund investing after OBRA 93. Using a difference-in-differences estimation technique I robustly document that households in the treatment group, compared to the control group, reduce mutual fund investments in IRAs and Keogh plans in the three years after the passage of OBRA 93. Thus, I contribute to the portfolio decision literature by using OBRA 93 to obtain an identification strategy that separates an income and tax rate effect on the choice to hold mutual funds in TD accounts.

The results presented in this paper are subject several important limitations. First, while I do present conjecture and provide univariate tests, I do not rigorously examine if penalties on early withdrawals may be a driving force behind the growth of mutual funds. Our current tax system uses a "carrot and stick" approach where it provides incentives to invest and disincentives to withdraw funds early. It may be that the mutual fund industry is growing due to the tax disincentive to withdraw retirement funds and many investors passively leave savings in mutual funds to accumulate. Second, my study cannot directly speak to whether 401 (k) contributions are fueling the growth of the mutual fund industry. Prior research finds that investor allocation decisions in 401 (k) plans exhibit a high degree of inertia and generally invest in only a small number of choices (Agnew, Balduzzi, and Sunden 2003; Huberman and Jiang 2006). Thus, the growth of the mutual fund industry may be due to recurring contribution from payroll deductions to 401 (k) plans that only offer mutual fund investment options. Lastly, I only have trading data from one brokerage house and cannot observe each households complete portfolio. If individuals change their asset allocation preferences to using brokerage accounts outside of the dataset used in this study, these changes may create systematic biases. This risk is mitigated by using a difference-in-differences design, which produces consistent estimates unless there are differences in brokerage account preferences between the control and treatment group after OBRA 93.

Despite these limitations, the results presented herein speak directly to the debate as to what is causing the increased preference for mutual funds.

References

Agnew, J., Balduzzi, P., & Sunden, A. (2003). Portfolio Choice and Trading in a Large 401 (k) Plan. *American Economic Review*, *93*(1), 193–215.

Bailey, W., Kumar, A., & Ng, D. (2011). Behavioral biases of mutual fund investors. *Journal of Financial Economics*, *102*(1), 1–27.

Barber, B. M., & Odean, T. (2000). Trading is Hazardous to Your Wealth: The Common Stock Investment Performance of Individual Investors. *The Journal of Finance*, *55*(2), 773–806.

_____, (2001). Boys Will be Boys: Gender, Overconfidence, and Common Stock Investment. *Quarterly Journal of Economics*, *116*(1), 261–292.

_____, (2002). Online Investors: Do the Slow Die First? *Review of Financial Studies*, *15*(2), 455–487.

_____, (2004). Are individual investors tax savvy? Evidence from retail and discount brokerage accounts. *Journal of Public Economics*, *88*(1-2), 419–442.

Benartzi, S., & Thaler, R. H. (2007). Heuristics and Biases in Retirement Savings Behavior. *The Journal of Economic Perspectives*, *21*(3), 81–104.

Brown, J. R., Liang, N., & Weisbenner, S. (2007). Individual account investment options and portfolio choice: Behavioral lessons from 401(k) plans. *Journal of Public Economics*, *91*(10), 1992–2013.

Campbell, J. Y. (2006). Household Finance. *The Journal of Finance*, *LXI*(4).

Dai, Z., Maydew, E., Shackelford, D. A., & Zhang, H. H. (2008). Capital Gains Taxes and Asset Prices : Capitalization or Lock-in ? *The Journal of Finance*, *LXIII*(2).

Dhaliwal, D., Erickson, M., & Krull, L. (2007). Incremental Financing Decisions and Time-Series Variation in Personal Taxes on Equity Income. *Journal of the American Taxation Association*, *29*(1).

Dickson, J. M., Shoven, J. B., & Sialm, C. (2000). Tax Externalities of Equity Mutual Funds. *National Tax Journal*, *53*(3), 607–628.

Graham, J. R., & Kumar, A. (2006). Do Dividend Clienteles Exist ? Evidence on Dividend Preferences of Retail Investors. *The Journal of Finance*, *61*(3), 1305–1336.

Gruber, M. J. (1996). Another Puzzle: The Growth in Actively Managed Mutual Funds. *Journal of Finance*, *51*(3), 783–810.

Huberman, G., & Jiang, W. (2006). Offering versus Choice in 401(k) Plans: Equity Exposure and Number of Funds. *The Journal of Finance*, *LXI*(2), 763–801.

İmrohoroğlu, S., İmrohoroğlu, A., & Joines, D. H. (1998). The effect of tax-favored retirement accounts on capital accumulation. *The American Economic Review*, 88(4), 749-768.

Miller, M. (1977). Debt and Taxes. *The Journal of Finance*, *XXXII*(2), 261–275.

Myers, S. (1977). Determinants of Corporate Borrowing. *Journal of Financial Economics*, *5*, 147–175.

Poterba, J. M., & Samwick, A. a. (2002). Taxation and household portfolio composition: US evidence from the 1980s and 1990s. *Journal of Public Economics*, *87*(1), 5–38.

_____ . (1995). Stock ownership patterns, stock market fluctuations, and consumption. *Brookings Papers on Economic Activity*, (2), 295–372.

Rydqvist, K., Spizman, J., & Strebulaev, I. (2014). Government policy and ownership of equity securities. *Journal of Financial Economics*, *111*(1), 70–85.

Saez, E. (2003). The effect of marginal tax rates on income: a panel study of "bracket creep." *Journal of Public Economics*, *87*(5-6), 1231–1258.

Scholes, M., Wolfson, M., Erickson, M., Hanlon, M., Maydew, E., & Shevlin, T. (2015). *Taxes and Business Strategy* (5th ed.). Pearson Education, Inc. Upper Saddle River, New Jersey.

Shefrin, H., & Statman, M. (2000). Behavioral Portfolio Theory. *The Journal of Financial and Quantitative Analysis*, *35*(2), 127.

Shoven, J. B., & Sialm, C. (2003). Asset location in tax-deferred and conventional savings accounts. *Journal of Public Economics*, *88*(1-2), 23–38.

Sialm, C., & Starks, L. (2012). Mutual Fund Tax Clienteles. *The Journal of Finance*, *LXVII*(4), 1397–1422.

Zhou, J. (2009). The asset location puzzle: Taxes matter. *Journal of Economic Dynamics and Control*, *33*(4), 955–969.

APPENDIX A

VARIABLE DESCRIPTION

High_Tax	Investors that have in marginal tax rate of 31% or greater
Middle_Tax	Investors that have a marginal tax rate of 28%
Low_Tax	Investors that have a marginal tax rate of 15%
Treat	Investors who have a marginal tax rate after OBRA 93 of 36% or 39.6%
Post	Calendar years 1994, 1995, and 1996
Children	Indicator set to one if the primary account holder indicates she had at least 1 child as of 1997.
Age	Approximate age of primary account holder based on two-year age ranges (e.g., 20-21).
Single	Indicator set to one if the primary account holder does not report being married in 1997.
Male	Indicator variable if the primary account holder is male.
Retired	Indicator variable set to one if the primary account holder is at least 67 as of 1997.
TRADE	The annual sum of all mutual fund trades in an individual retirement account or Keogh account by household.
MTRADE	The monthly sum of all mutual fund trades in an individual retirement account or Keogh account by household.

TABLE I
HOUSEHOLD LEVEL DEMOGRAPHIC STATISTICS

	(1) Whole Sample	(2) Low Tax	(3) Middle Tax	(4) High Tax
Panel A: InfoBase Data				
Number of Households	10,626	1,066	5,098	4,462
Percentage Married	67%	74%	79%	52%
Percentage with Children	33%	25%	36%	32%
Mean Age	49.0	53.7	49.0	47.9
Median Age	48	54	48	48
Mean Income ($)	77,615	24,348	64,978	104,779
Percentage with income over $125,000	12%	0	0	29%
Panel B: Self-Reported Data				
Net Wealth ($)				
Number of Households (if reported > 0)	7,205	685	3,466	3,054
10 Percentile	37,000	37,000	35,000	37,500
25 Percentile	62,500	62,500	62,000	75,000
Median	100,000	100,000	100,000	100,000
75 Percentile	250,000	180,000	200,000	250,000
90 Percentile	500,000	400,000	450,000	600,000
Investment Experience (%)				
Number of Households (if reported)	6,900	656	3,298	2,946
None	3%	4.4%	3.1%	3.7%
Little	37%	38.6%	39.4%	33.5%
Good	47%	45.3%	45.8%	47.9%
Extensive	13%	11.7%	11.7%	14.9%

InfoBase data is reported as of June 1997. Self-reported data was supplied to brokerage house when the account was opened and covers the primary account holder. Descriptive statistics are only included for the final sample of household. Income is computed as the mid-point of eight income ranges and $125,000 for those reporting income in the top range.

TABLE II

TAX BRACKET COMPUTATION

		Married		**Single**		**Head of Household**	
Classification	*Tax Rate*	*Actual*	*Estimate*	*Actual*	*Estimate*	*Actual*	*Estimate*
Low-Tax	15.0%	< $41,200	< $40,000	< $24,650	< $20,000	< $33,050	$30,000
Middle-tax	28.0%	$41,200-99,600	$40,000-100,000	$24,650-59,750	$20,000-50,000	$33,050-85,350	$30,000-75,000
High-Tax	31.0%	$99,600-151,750	>$100,000	$59,750-124,650	> $50,000	$85,350-138,200	> $75,000
Treat	36.0%	$151,750-271,050	>$125,000	$124,650-271,050	>$125,000	$138,200-271,050	>$125,000
Treat	39.6%	>$271,050	>$125,000	>$271,050	>$125,000	>$271,050	>$125,000

Tax schedule information is based on nominal income levels provided by taxfoundation.org. Income is computed as the mid-point of eight income ranges and $125,000 for those reporting income in the top range. For the purposes of this study I assume that all income is taxable income. Married filing status is based on the tax rate schedule for married couples filing a joint tax return. I classify taxpayers as head of house if they are single and report having one or more children as of June 1997.

TABLE III
ANNUAL MUTUAL FUND TRADES BY GROUP

	Low Tax		Middle Tax		High Tax		Treat	
	Mean	Median	Mean	Median	Mean	Median	Mean	Median
1991	7,758.4	2,485.5	8,786.1	3,504.6	10,084.9	4,107.3	11,765.8	4,926.1
1992	7,136.8	2,616.0	6,701.9	2,912.5	7,593.9	3,524.0	8,363.8	3,594.4
1993	6,028.6	2,986.0	6,356.6	3,000.0	7,724.6	3,723.0	9,010.5	4,000.0
1994	1,261.3	1,882.1	1,579.6	1,950.0	2,482.2	2,250.0	1,742.2	2,141.5
1995	18.0	986.7	3,214.7	1,937.9	3,964.9	2,000.0	4,358.1	2,001.7
1996	2,600.3	2,011.0	2,973.3	2,000.0	6,362.4	2,515.2	5,543.7	2,500.0

Tax classification is based on the estimated marginal tax rate presented in Table II. All years are computed on a calendar basis (January 1-Decemeber 31) to align with most taxpayers filing period. Treat is a subsample of High Tax, thus the trades from the treatment group are being presented as part of high tax and on their own. Annual trades are the net annual mutual fund investment by household.

TABLE IV
MARGINAL TAX RATES AND MUTUAL FUND INVESTMENTS

VARIABLES	(1) OLS	(2) Median Regression
Low_Tax	-807.44*	-137.94
	(-1.77)	(-1.12)
High_Tax	1,745.15***	625.00***
	(5.55)	(7.40)
Male	775.10**	-94.33
	(2.15)	(-0.84)
Single	-1,154.39***	-562.00***
	(-3.62)	(-6.65)
Retired	-1,712.22**	-769.35***
	(-2.25)	(-3.93)
Age	20.61	-8.33**
	(1.23)	(-2.04)
Children	-1,078.1***	-208.33**
	(-3.58)	(-2.41)
Constant	7,739.78***	4,331.33***
	(7.86)	(15.90)
Observations	26,589	26,589
R-squared	0.012	N/A
Year FE	Yes	Yes
Cluster	Household	N/A

This table presents the regression results for equation (3). Column (1) use OLS with year fixed effects and robust standard errors clustered at the household level. Column (2) quantile regression examining the conditional median of *TRADE*. The dependent variable for all columns is *TRADE*. The symbols *, ** and *** denote statistical significance at the 10%, 5% and 1% levels, respectively.

TABLE V
EFFECT OF OBRA 93 ON MUTUAL FUND INVESTMENTS IN TD ACCOUNTS

VARIABLES	(1) High Tax Control	(2) Self Employed	(3) Savers	(4) Log-Linear
Treat	1,249.0	12,780.0*	3,138.5***	0.15***
	(1.34)	(1.86)	(2.65)	(2.68)
Post	-3,202.2***	-2,497.8	1,153.5*	-0.05
	(-5.51)	(-0.77)	(1.86)	(-1.26)
Treat * Post	**-2,263.3****	**-17,300.6****	**-3,958.6*****	**-0.12***
	(-1.97)	**(-2.19)**	**(-3.23)**	**(-1.80)**
Male	647.1	4,061.9*	1,934.6**	0.11*
	(1.13)	(1.74)	(2.07)	(1.77)
Single	-1,298.0**	-1,432.0	-1,429.7**	-0.13***
	(-2.52)	(-0.47)	(-1.98)	(-3.04)
Retired	-1,861.9	-1,838.9	1,806.6	0.03
	(-1.11)	(-0.20)	(0.69)	(0.26)
Age	69.9**	71.5	244.2***	0.01***
	(2.22)	(0.38)	(5.36)	(3.97)
Children	-333.0	1,135.4	-688.4	-0.02
	(-0.61)	(0.33)	(-0.92)	(-0.35)
Constant	4,707.3***	4,339.3	-189.2	8.16***
	(2.98)	(0.48)	(-0.08)	(63.89)
Observations	10,952	500	7,724	7,724
R-squared	0.007	0.030	0.018	0.012
Year FE	No	No	No	No
Cluster	Household	Household	Household	Household

This table presents the regression results for equation (4). All columns use OLS with robust standard errors clustered at the household level. In column (1) *TRADE* is the dependent variable defined in the appendix. In column (2) *TRADE* is limited to the sum of trades held in a Keogh account. Column (3) *TRADE* is limited to only positive values and in column (4) *TRADE* is the natural log of positive values. The symbols *, ** and *** denote statistical significance at the 10%, 5% and 1% levels, respectively.

TABLE VI
EFFECT OF OBRA 93 ON MUTUAL FUND INVESTMENT: FIXED EFFECTS

VARIABLES	(1) Monthly Trades Full Period	(2) Monthly Trades Two Years	(3) Average Full Period	(4) Average Two Years
*Treat * Post*	-3,364.49***	-3,416.62***	-433.19***	-466.66**
	(-6.69)	(-4.23)	(-2.59)	(-2.27)
Constant	3,389.90***	3,722.48***	2,228.87***	2,321.04***
	(35.09)	(28.60)	(33.70)	(25.61)
Controls	None	None	None	None
Observations	22,439	8,444	6,347	4,006
R-squared	0.188	0.311	0.001	0.001
Household FE	LSDV	LSDV	Within Estimation	Within Estimation
Cluster	Household	Household	Household	Household

This table presents the regression results for household fixed effects using regression equations (5) and (6). Columns (1) and (3), examines the net monthly trade for the entire sample. Columns (2) and (4) examines the net monthly trades for the 12 months before and after August 1993. In columns (3) and (4), I average the net monthly trades by household over the pre- and post-OBRA 93 periods. All specifications use OLS with robust standard errors clustered at the household level. The symbols *, ** and *** denote statistical significance at the 10%, 5% and 1% levels, respectively.

TABLE VII
AVERAGE YEARLY INVESTMENT IN MUTUAL FUNDS HELD IN TD ACCOUNTS

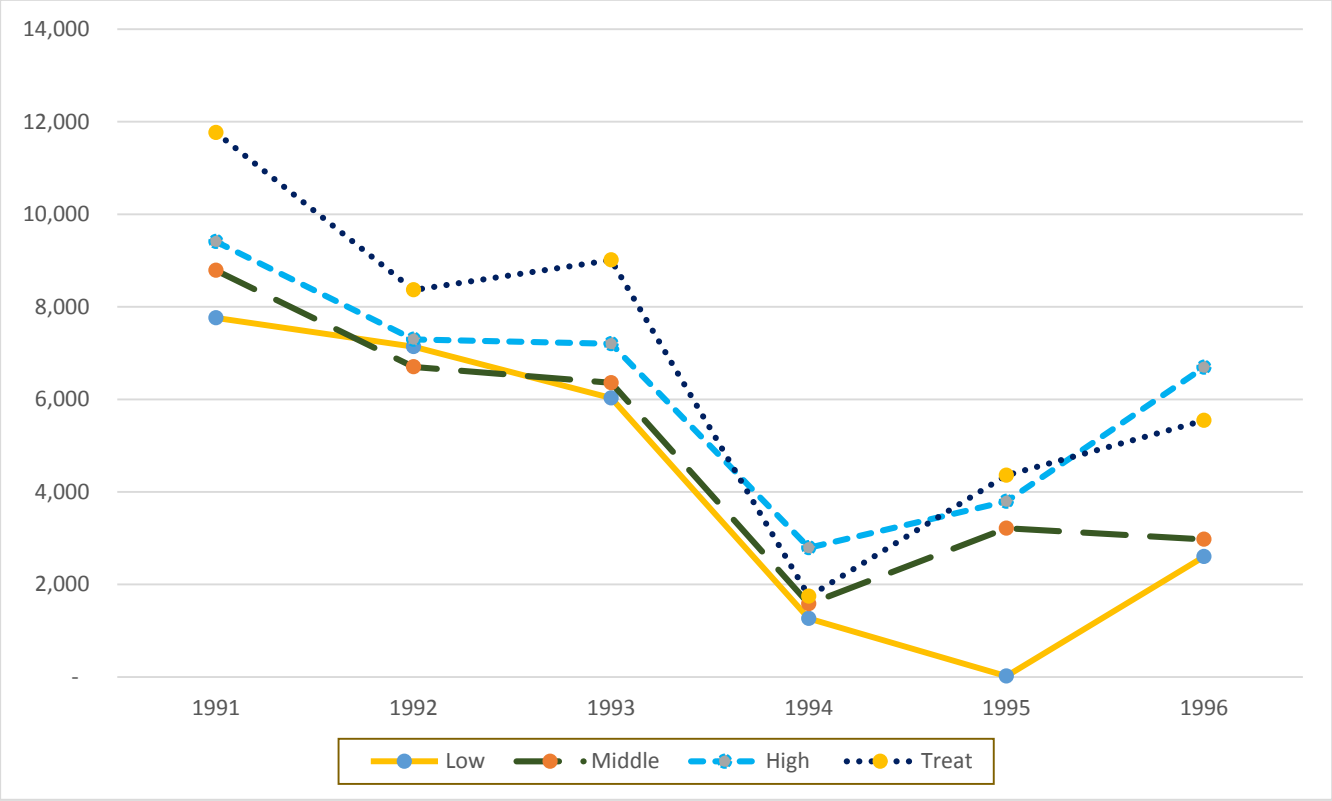
	Pooled		Low Tax		Middle Tax		High Tax		Treat[a]	
	Mean	*t-stat*	Mean	*t-stat*	Mean	*t-stat*	Mean	*t-stat*	Mean	*t-stat*
1991	9,206***	*19.93*	7,758***	*5.69*	8,786***	*13.42*	10,085***	*13.63*	11,766***	*7.37*
1992	7,107***	*18.02*	7,137***	*5.52*	6,702***	*12.61*	7,594***	*11.69*	8,364***	*6.23*
1993	6,875***	*22.30*	6,029***	*6.53*	6,357***	*15.63*	7,725***	*14.65*	9,010***	*7.02*
1994	1,924***	*5.45*	1,261	*1.04*	1,580***	*3.09*	2,482***	*4.67*	1,742**	*1.84*
1995	3,210***	*9.09*	18	*0.02*	3,215***	*6.46*	3,965***	*6.85*	4,358***	*4.02*
1996	4,355***	*12.55*	2,600***	*3.05*	2,973***	*6.70*	6,362***	*10.28*	5,544***	*5.35*

Tax classification is based on the estimated marginal tax rate presented in Table II. All years are computed on a calendar basis (January 1-Decemeber 31) to align with most taxpayers filing period. Annual trades are the net annual mutual fund investment by household. T-statistics are based on single sample t-test. The symbols *, ** and *** denote statistical significance at the 10%, 5% and 1% levels, respectively.

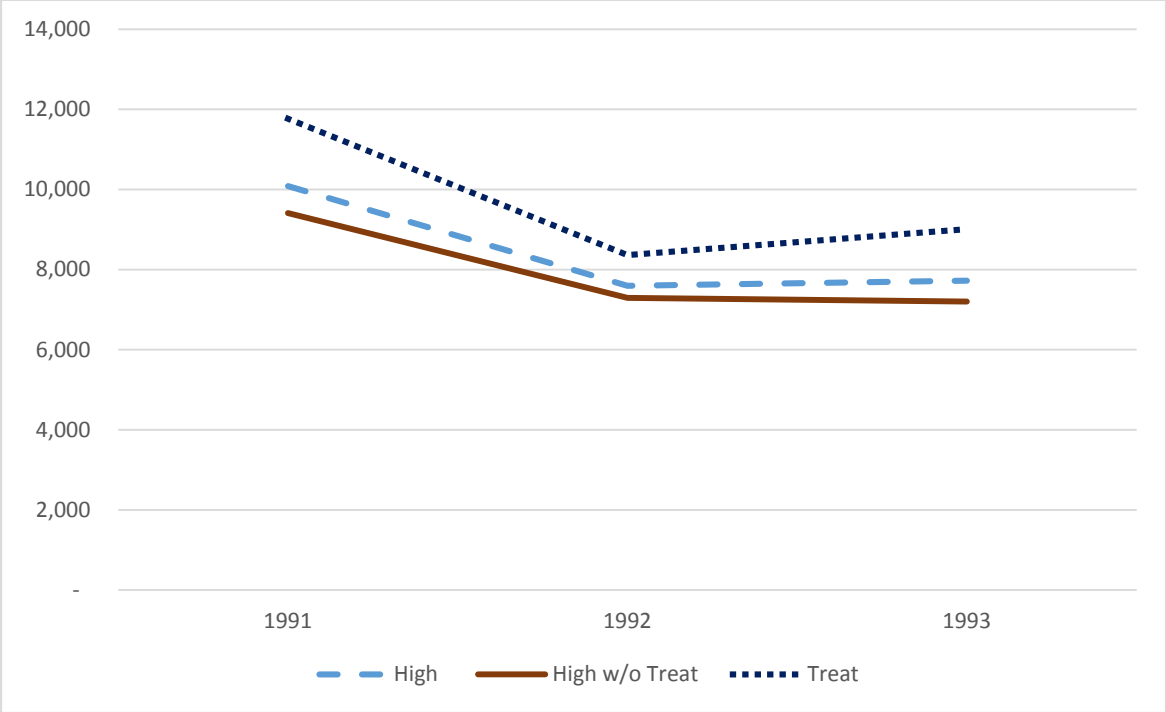
[a]Treat is a subsample of High Tax, thus the trades from the treatment group are being presented as part of high tax and on their own.

FIGURE I: PARALLEL TRENDS ASSUMPTION

PANEL A: TAX RATE TRENDS BY TAX GROUP



PANEL B: PRE-OBRA 93 TRENDS



Tax classification is based on the estimated marginal tax rate presented in Table II. All years are computed on a calendar basis (January 1-Decemeber 31) to align with most taxpayers filing period. In Panel A High Tax does not include the trades from the treatment group. In Panel B the "High" line is the pooled sample and "High w/o Treat" excluded the treatment group. The y-axis represents the yearly average of *TRADE* by tax group.