CAHIER DE RECHERCHE #1712E
Département de science économique
Faculté des sciences sociales
Université d'Ottawa

WORKING PAPER #1712E
Department of Economics
Faculty of Social Sciences
University of Ottawa

Do 'Catch-up Limits' Raise Retirement Saving? Evidence from a Regression Discontinuity Design*

Adam M. Lavecchia†

August 2017

* Acknowledgements: I am grateful to Kory Kroft, Philip Oreopoulos and Michael Smart for their guidance throughout this project. Also, thanks to two anonymous referees, William Gentry (editor), Elliot Ash, Michael Baker, Nicolas Gendron-Carrier, Alexander Gelber, Michael Gilraine, Ashique Habib, Dominika Langenmayr, Erica Lavecchia, Robert McMillan, Derek Messacar, David Richardson and seminar participants at the Empirical Microeconomics (CEPA) seminar at the University of Toronto, CEA 2014, EconCon 2014 CPEG 2014 and NTA 2014 for helpful comments and discussions. An earlier draft of this paper circulated under the title "Does Raising Contribution Limits Lead to More Saving? Evidence from the 'Catch-up Limit? Reform'. I am grateful for support from the Social Sciences and Humanities Research Council (SSHRC) and the H. Stanely Hunnisett Fund. All remaining errors are my own.
† Department of Economics, University of Ottawa, 120 University Private, Ottawa, Ontario, Canada, K1N 6N5; e-mail; alavecch@uottawa.ca.

Abstract

This paper studies the effect of raising contribution limits on retirement saving by exploiting the 'catch-up limit' provision, a rule which allows those over the age of 50 to make higher IRA and 401(k) contributions than those under 50. Using an age-related regression discontinuity design, I find that eligibility for 'catch-up limits' leads to a large increase in total tax-deferred contributions for those without access to a 401(k) plan. This is driven by a 25 percent increase in average IRA contributions and a 21 percent increase in the likelihood of making an IRA contribution. I also find no significant effects on overall 401(k) contributions. The findings suggest that, contrary to the neoclassical life-cycle model, the response to eligibility for 'catchup limits' was not limited to constrained savers.

Key words: *Retirement saving, Tax-preferred savings accounts, Contribution limits, Regression discontinuity design.*

JEL Classification: D14, H31, J26.

1 Introduction

There is a growing concern that a significant number of households are not saving enough to smooth consumption in retirement.[1] Increasing IRA and 401(k) contribution limits is often suggested as a way to increase saving.[2] However, the effectiveness of this policy has been widely debated in academic and policy circles with no clear consensus. Opponents argue that increasing the annual IRA and 401(k) contribution limit does little to promote saving by individuals for whom the limit is not already binding (Orszag and Orszag (2001)). This view is supported by the neoclassical life-cycle model of consumption and saving which predicts that raising the contribution limit will only affect the choices of previously constrained savers.

In this paper, I question whether the savings response to higher contribution limits is always limited to constrained savers. Using exogenous policy variation to IRA and 401(k) limits, I show that the effects of raising contribution limits can be more nuanced. My analysis exploits the introduction of the 'catch-up limit' provision, a rule introduced in 2002 which allows individuals over the age of 50 to make larger tax-deferred contributions than those under the age of 50. The 'catch-up limit' provision permits an age-based regression discontinuity design (RDD) which compares the annual tax-deferred contributions of those just over the age of 50 with those just under the age of 50.

Using data from the Survey of Income and Program Participation (SIPP) for 2002, 2004 and 2005, I find that eligibility for 'catch-up limits' leads to a small and statistically significant effect on total tax-deferred (IRA plus 401(k)) contributions in the overall population. However, this finding masks significant heterogeneity, both across different types of individuals and between different retirement savings accounts. Eligibility for 'catch-up limits' leads to a 25 percent increase in average IRA contributions and a 21 percent increase in the probability of contributing to an IRA at age 50. This is driven by a 51 percent increase in the average tax-deferred contribution of individuals

[1] See Poterba (2014) for a review of the state of retirement income security in the United States. Based on his reading of the literature, Poterba suggests that approximately 25 percent of households have not accumulated enough assets to purchase an annuity that would allow them to maintain even 50 percent of their pre-retirement consumption. He notes, however, that there is significant heterogeneity across households in retirement income security. In particular, replacement rates are relatively high for many low-income households given current expected Social Security benefits.

[2] Individual Retirement Accounts (IRAs) and employer-sponsored 401(k) savings plans are the two most popular tax-preferred savings accounts. Asset balances in IRAs, more than $4.8 trillion in 2012, account for more than 25 percent of retirement wealth and 9.3 percent of household assets (Holden and Bass (2014)). 401(k) plans are the most popular employer-sponsored defined contribution plan. 401(k) balances totaled more than $4.2 trillion in 2013, almost 50 percent of private pension assets in the United States (Holden and Schrass (2014)).

that do not have access to an employer-sponsored 401(k) plan; the probability of making a contribution also increases by 31 percent for this group. Interestingly, this rise in participation rates is due to an increase in the likelihood of making a deductible contribution among existing owners, rather than higher take-up of IRA accounts. In contrast, eligibility for 'catch-up limits' leads to a small and statistically insignificant change to the tax-deferred contributions of those with access to a 401(k).[3]

The large participation response by individuals without access to a 401(k) plan is of interest because it implies that the effect of eligibility for 'catch-up limits' was not limited to constrained savers, contrary to the predictions of the neoclassical life-cycle model. Compared with those that do have access to a 401(k) plan, individuals without access earn less, have less education and are nearly three times more likely to work at a firm with fewer than 50 employees. These differences suggest that there may also be large differences in the willingness, ability and ways in which the two groups save for retirement. In turn, this may explain the observed heterogeneous responses to eligibility for 'catch-up limits'.

I explore two hypothesis for the divergent findings between the "no 401(k) available" and "401(k) available" groups. First, anecdotal evidence from trade magazines and journals for the financial services industry suggests that banks and credit unions may have directed the advertising for their IRA products towards those over the age of 50 after the introduction of 'catch-up limits'. This advertising may have raised retirement contributions and participation rates by increasing awareness about the 'catch-up limit' provision, and for retirement saving more generally. For those without access to a 401(k) plan, this advertising may have been especially helpful in the absence of other timely advice about retirement savings. Second, I explore an explanation for the small, statistically insignificant effect of eligibility for 'catch-up limits' for individuals with access to a 401(k) plan. I find suggestive evidence that 401(k) owners constrained by the contribution limit temporarily substituted to IRAs while employers amended their pension plan contracts to accommodate 'catch-up limits' (Kaplan (2002)). Specifically, I find evidence that while the effect of

[3] I also explored whether eligibility for 'catch-up limits' increases total saving (i.e. tax-deferred retirement saving plus taxable saving). Although the SIPP asks respondents about their deductible contributions to IRAs and 401(k)s, a flow measure of saving, similar questions are not asked for taxable and other non-tax deferred saving. In particular, only year-end asset balances for taxable accounts and home-equity are available (a stock measure of saving). Converting these stocks to flow variables requires differencing year-end asset balances. The resulting variables are quite noisy, leading to estimates for the effect of eligibility for 'catch-up limits' on overall saving (and crowd-out) that are very imprecisely measured. These estimates are available from the author upon request.

'catch-up limits' on IRA contributions decreases between 2002 to 2005 for 401(k) limit savers, the effect on 401(k) contributions increases between 2002 and 2005.

This paper builds on the public finance literature that studies who uses tax-deferred retirement accounts, as well as on how policy changes affect saving in these plans.[4] Some of the first estimates on the effects of raising IRA and 401(k) limits comes from counterfactual policy simulations using structural models (Venti and Wise (1990a,b), Gale and Scholz (1994)). These studies conclude that raising contribution limits leads to large a (mechanical) increase in tax-deferred contributions only for limit contributions. Using data from the Consumer Expenditure Survey and the SIPP, Venti and Wise (1990a,b) estimate that raising IRA limits leads to a large increase in annual contributions, most of which represents new saving. However, using data from the Survey of Consumer Finances and a model that allows tastes for saving to vary by IRA contributor status, Gale and Scholz (1994) estimate that only a small fraction of the increase in contributions following a limit change represents new saving. These starkly different findings may be due to differences in econometric assumptions: the estimation in Venti and Wise (1990a,b) assumes that differences in IRA saving across households is random after controlling for household characteristics, while Gale and Scholz compare IRA limit contributors, non-limit contributors and households that do not own IRAs.[5]

These mixed findings led to the development of a large literature in public finance that estimates whether IRA and 401(k) contributions displace saving in taxable assets (Feenberg and Skinner (1989), Poterba, Venti, and Wise (1995), Joines and Manegold (1995), Attanasio and DeLeire (2002), Benjamin (2003), Engelhardt and Kumar (2007), Gelber (2011)).[6] While the evidence in

[4]A large and growing literature in behavioral economics explores whether non-price mechanisms increase saving. Several papers have found that policies such as default options (Madrian and Shea (2001), Choi, Laibson, and Madrian (2004)) requiring active decisions (Carroll, Choi, Laibson, Madrian, and Metrick (2009)), salience (Duflo, Gale, Liebman, Orszag, and Saez (2006, 2007), Saez (2009), Chetty, Friedman, Leth-Petersen, Nielsen, and Olsen (2014)), the actions of agents in an advisory capacity (Duflo et al. (2007)), reminders (Karlan, McConnell, Mullainathan, and Zinman (2010)) and informational nudges (Clark, Maki, and Morrill (2014)) can be effective at increasing saving.

[5]In the Canadian setting, Milligan (2003) studies a reform that increased contribution limits for Registered Retirement Savings Plans (RRSPs), an account similar to IRAs. He finds that increases in future contribution limits lower current period contributions. Milligan (2003) reconciles these findings with a model in which savers who expect their desired retirement account contributions to be constrained in the future shift some of their savings to the current period. For these savers, increasing future contribution limits relaxes the future constraint, leading to lower contributions in the current period.

[6]In the Danish setting, Chetty et al. (2014) show that the overall savings effect of retirement accounts depends on whether individuals are active or passive in their savings allocation decisions. For those that are passive (about 85 percent of the sample), mandatory savings policies increase savings since individuals do not re-optimize by reducing saving in other accounts. Tax incentives to save in retirement accounts also have little effects on this group. For those that are active optimizers (about 15 percent of the sample), tax-incentives to save lead to reductions in other taxable saving, limiting the overall savings impact of these plans.

these papers has improved our understanding of who uses IRAs and 401(k)s, the empirical strategies used are faced with important limitations (Bernheim (2002), Friedman (2016)). These limitations are due to the fact that IRA and 401(k) contribution limits are rarely exogenous. Historically, eligibility for IRAs and 401(k)s has either been universal or correlated with potential tastes for saving such as income or workplace pension status.[7] Direct empirical evidence on the causal effect of raising contribution limits is especially scarce, in part because changes to statutory limits are infrequent. Interpreting evidence that compares IRA or 401(k) contributors before and after a limit increase is difficult if changes to unobservables that influence retirement savings are correlated with the limit increase. For example, differences in economic conditions over time make it difficult to interpret changes to savings behavior before and after a contribution limit increase as a causal effect without an unaffected control group.

The RDD used in this paper addresses and improves upon the limitations of prior work by allowing for a cleaner identification of the savings effect of raising contribution limits. This is because the validity of the RDD relies only on the assumption that all unobserved characteristics that influence savings are continuous in age at age 50. In Sections 3 and 4, I present evidence to support the plausibility of this identification assumption. In particular, using savings behavior from the years prior to the introduction of 'catch-up limits', I test whether IRA and 401(k) contributions are continuous at age 50. Reassuringly, I find no evidence that contributions or the probability of making a positive contribution are discontinuous at age 50 before the adoption of 'catch-up limits'. This implies that the tax-deferred savings behavior of those just under the age of 50 is a valid counterfactual for the choices of those just over the age of 50.

In a paper that complements this research, Rutledge, Wu, and Vitagliano (2014) compare the savings of 401(k) limit contributors with the savings of non-limit contributors (between the ages of 46 and 53) before and after the adoption of 'catch-up limits'. They find that those constrained by the 401(k) limit prior to the adoption of 'catch-up limits' made larger contributions after 2002.

[7]Strategies that exploit within-person changes in IRA or 401(k) contributor status require that the time varying unobservable characteristics that influence saving evolve similarly for those whose contributor status switches and those whose does not. Significant differences in observables between these two groups may be indicative that unobservable tastes for saving also evolve differently over time. For example, in Attanasio and DeLeire (2002), new IRA contributors are younger, have lower income, lower levels of financial assets and fewer children (on average) than continuing contributors. In Gelber (2011), employees newly eligible to participate in a 401(k) are younger, have lower income, less liquid and illiquid financial assets have less debt (both secured and unsecured), on average, than employees who have always been eligible for their firm's 401(k) plan.

The main difference between this paper and Rutledge et al. (2014) is that I analyze the effect of eligibility for 'catch-up limits' on total tax-deferred (IRA plus 401(k)) contributions for all individuals, whereas the later paper focuses on the 401(k) contributions of constrained savers. This difference is important because of the large participation response and tax-deferred contribution increase I find among those without access to a 401(k) plan. By analyzing the effect of eligibility for 'catch-up limits' on all savers and for both types of plans, I am able to capture the full effect of the provision on tax-deferred retirement saving.

The remainder of the paper is organized as follows. Section 2 describes the 'catch-up limit' provision. In Section 3, I describe the data and the empirical strategy. Section 4 reports the main results for IRAs, 401(k)s and total tax-deferred saving, while Section 5 discusses the heterogeneity of the main results and several mechanisms that may underlie the empirical findings. Section 6 discusses the policy implications of the results and provides concluding comments.

2 Institutional Background

2.1 EGTRRA and the 'Catch-up Limit' Provision

This section describes the 'catch-up limit' provision, an IRA and 401(k) contribution rule introduced as part of the Economic Growth and Tax Relief Reconciliation Act (EGTRRA). In the empirical analysis below, I exploit the sharp differences to individual IRA and 401(k) limits induced by this provision to recover an estimate of the causal effect of increasing contribution limits on retirement saving. Along with Social Security benefits, IRAs and 401(k)s account for the vast majority of retirement income for most Americans.[8] Contributions to both of these accounts are tax-deductible in the year the contribution is made (up to an annual limit).[9] For 401(k)s, employee contributions are often supplemented by matching employer contributions up to a maximum per-

[8]See Poterba (2014) Poterba (2014) for one discussion of sources of retirement income for Americans. For a detailed description of Social Security Benefits, see http://www.ssa.gov.planners/about.htm.

[9]The annual nominal dollar (employee plus employer) contribution limit for 401(k)s was $45,465 in 1978, the first year this account was available. The Tax Reform Act of 1986 (TRA86) limited employee contributions to $7,000 per year. This limit has been raised periodically and is $18,000 for 2016. For IRAs, contributions were initially limited to $1,500 in 1974. The Economic Recovery Act of 1981 expanded the availability of IRAs and increased the annual contribution limit to $2,000. TRA86 limited the ability of individuals with high incomes and workplace pensions to deduct IRA contributions. For 2016 single households (tax-filers) with workplace pensions and a modified annual gross income (AGI) between $61,000 and $71,000 can partially deduct contributions. Tax-filers with a modified AGI above $71,000 may make non-deductible contributions up to the annual limit.

centage of earnings or a fixed dollar amount (Benartzi and Thaler (2007), Carroll et al. (2009)). Interest earned on assets held in IRAs and 401(k)s accumulates tax-free. With some exceptions, withdrawals are subject to a 10% penalty for savers younger than 59.5 years of age.

The EGTRRA enacted several reforms ranging from reductions in marginal income tax rates to changes in estate and gift tax regulations. It also legislated changes to retirement savings plans, including IRAs and 401(k)s. For example, the EGTRRA introduced the Saver's Credit, a non-refundable tax credit for certain low-income savers. EGTRRA also allows individuals to transfer in-kind (roll-over) assets from one workplace pension to another 401(k) or IRA. The focus of this paper, however, is on the contribution limit increases that EGTRRA legislated over the 2000s. The IRA contribution limit was increased for the first time since 1981; from $2,000 in 2001 to $3,000 in 2002-2004, $4,000 for 2005-2007 and $5,000 from 2008 onwards.[10] Similar contribution limit increases were implemented for 401(k)s, though initial contribution limits were much higher.

The EGTRRA also introduced the 'catch-up limit' provision, a rule that allows individuals over the age of 50 to make larger IRA and 401(k) contributions than those under the age of 50. Beginning in 2002, individuals who turn 50 years old (or older) by the end of the calendar year are eligible for 'catch-up limits'; eligibility is therefore a deterministic function of an individual's year of birth. 'Catch-up limits' are intended to provide a way for older workers who previously had not saved sufficiently for retirement, an opportunity to 'catch-up' (H.R. Rep. No. 107-51). For IRAs, the provision allowed eligible taxpayers to contribute an additional $500 annually from 2002 to 2005 and $1,000 annually from 2006 onwards.[11] Eligibility for 'catch-up limits' does not depend on whether a household files their tax return individually or jointly.[12] Individuals are not permitted to carry-forward unused contribution limits to future years. Importantly, 'catch-up limits' are the only provision in the EGTRRA which differentially affected individuals around age 50. This improves our confidence that any differences between the savings behavior of those just over and under the age of 50 following the adoption of 'catch-up limits' is due to this provision and not other provisions in the EGTRRA.

[10]From 2008 onwards, EGTRRA mandated that IRA contribution limits be indexed to inflation and rounded to the nearest $500 nominal dollar amount. For 2016, the contribution limit is $5,500.

[11]The *Pension Protection Act* of 2006 made 'catch-up limits' (as well as the regular contribution limit increases in the EGTRRA) permanent.

[12]Households with only one filer over the age of 50 were initially allowed to contribute an additional $500 to an IRA, whereas households with both tax-filers over the age of 50 were allowed to contribute an additional $1,000 ($500 for each spouse).

2.2 Predicting Behavioral Responses to 'Catch-up Limit' Provision

Neoclassical economic theory predicts that raising contribution limits will only affect constrained individuals, those already making the maximum allowable IRA or 401(k) contribution. This led some to be skeptical about whether the 'catch-up' provision could increase retirement saving for families with little initial savings (Orszag and Orszag (2001)). One prediction of the neoclassical theory is that the introduction of 'catch-up limits' should not increase IRA or 401(k) participation rates (the likelihood of making a contribution). Simply raising the contribution limit should not induce individuals to begin participating in a retirement savings plan if they previously were not contributing. However, this model makes a number of implicit assumption about individual savings behaviour. For example, it assumes that IRA and 401(k) contributions are viewed as perfect substitutes and that individuals are fully informed about the benefits and costs of contributing to tax-deferred plans. If these assumptions do not hold, then the savings response to 'catch-up limits' may differ significantly from the predictions of this stylized model. In the results reported below, I find that the likelihood of making a deductible IRA contribution increased for individuals at age 50 following the adoption of 'catch-up limits', suggesting that the behavioral response was not limited to constrained savers.

Whereas some analysts were skeptical that 'catch-up limits' could increase retirement saving, many in the popular media and financial planning community praised the provision as a way to help procrastinators. For example, a March 2001 Sun-Sentinel newspaper[13] article describes the 'catch-up limit' provision in the following way: "These provisions would be a boon to those Baby Boomers who just turned 50 and haven't saved diddly, to stay-at-home moms re-entering the workforce, or to working parents who finally got their kids in college and need to attend to their own needs" (Cruz and Lade (2001)). The idea that eligibility for 'catch-up limits' could increase retirement account participation rates or increase in saving for those not constrained by the initial limit offers a competing prediction for the effect of this provision on IRA and 401(k) savings behavior.

[13] The Sun-Sentinel is the main newspaper for the Broward and South Palm Beach counties in Florida.

3 Data and Empirical Strategy

3.1 Data

Estimating the effect of eligibility for 'catch-up limits' on retirement saving requires individual-level information on IRA and 401(k) contributions and year of birth. The SIPP is well-suited for this analysis because it provides detailed information on retirement account ownership, contributions and asset balances, as well as relatively large sample sizes. Individuals and households in each SIPP panel are interviewed every four months (waves) for a period of three or four years. In this paper, I pool several cross-sections (waves) from the 1996, 2001 and 2004 SIPP panels.[14] Information from the 1996 panel and waves 1 to 4 of the 2001 panel are used to analyze the savings behavior of individuals in the years prior to the EGTRRA (the 1996-1998 and 2001 calendar years). Data from waves 3 to 9 of the 2001 panel and the 2004 panel are used for the post-EGTRRA analysis.

Questions about IRA and 401(k) ownership and contributions are asked in waves 4, 7 and 10 (where available). This timing implies that respondents are asked about their tax-deductible contributions during the January to April period for the preceding calendar year. This coincides with tax-preparation season, the period when most contributions are made. For IRAs, the questions are: (i) "Do you have an Individual Retirement Account, that is, an IRA, in your own name?" (ii) "Did you make any tax-deductible contributions to IRA accounts which applied to your 200X (199X) tax return?" and (iii) "How much were your tax-deductible contributions to IRA accounts, which applied to your 200X (199X) tax return?" Similar questions are asked for 401(k)s. I use the response to question (i) to examine IRA and 401(k) ownership, while information from questions (ii) and (iii) are used to examine retirement account participation and contribution behavior. In order to explore the heterogenous responses to eligibility for 'catch-up limits', I also use information on the availability of a 401(k) plan at a respondent's current employer.

As described earlier, eligibility for 'catch-up limits' in any given year is determined by an individual's year of birth. Using the respondent's date of birth recorded in the SIPP, I construct an (end of calendar year) "age" variable for each individual-year observation. Specifically, for

[14] The 1996 SIPP panel surveys households for a period of four years from 1996 to 1999 (12 waves) while the 2001 and 2004 panels cover a period of three years (9 waves).

individual i in year t, "age" is defined as: $age_i = t - YOB_i$. Those whose "age" is 50 or greater after 2002 are eligible to make 'catch-up' contributions.[15]

Finally, I make some sample restrictions that are common in the literature. First, I restrict the analysis to individuals between the ages of 18 and 65 in any particular year.[16] Restricting the sample to working-age adults leaves 118,782 individual-year observations in the pooled post-EGTRRA sample. Next, I exclude all individuals that do not answer either the IRA or 401(k) ownership question. In Online Appendix Table A2, I confirm that non-response rates do not vary discontinuously at age 50. This ensures that individuals just over and under the age of 50 in the analysis sample are comparable. This restriction leads to a final analysis sample of 108,954 individual-year observations spanning the 2002, 2004 and 2005 calendar years.

Since some individuals in the analysis sample respond to only the IRA ownership question or only the 401(k) ownership question, an estimate of their contribution to the account they did not respond to is required. For simplicity, I assume that contributions are zero for those in the analysis sample whose contributions are unknown. Since non-response does not vary discontinuously at age 50 (see Appendix Table A2), this does not affect the estimate for the effect of eligibility for 'catch-up limits', but does decrease the precision of the coefficient estimate. As a robustness check, Online Appendix Table A8 confirms that the main results are robust to including only individuals that respond to both the IRA and 401(k) ownership questions in the analysis sample. Also, in any given year, between 6 and 10 percent of IRA contributors report tax deductible contributions that are above the annual limit; in some cases, thousands of dollars about the limit. This may be because some SIPP respondents do not distinguish between their tax-deductible contribution and rollovers into their IRA from other retirement accounts. In all such cases, I assume that the respondent's contribution is the maximum for that year.[17] Finally, I inflate all dollar amounts to 2010 dollars using the Bureau of Labor Statistics CPI Inflation Calculator.

Column 1 of Online Appendix Table A1 reports sample means for the pooled post-EGTRRA sample, while columns 2 and 3 show means for the sub-samples of IRA and 401(k) owners. There

[15] In a robustness check reported in Appendix Table A9, I explore the sensitivity of the results to using an individual's age in quarters as the running variable.

[16] In sensitivity analysis to the age window selected for the main results (see Figure A8) I allow the analysis to include individuals between the ages of 18 and 90.

[17] I check that the probability of reporting a contribution above the limit does not vary discontinuously at age 50. Also, all results below are robust to: (a) doing the analysis on the raw (unadjusted) data and (b) dropping the individuals that report a contribution above the limit. No individuals report a 401(k) contribution above the tax-deductible limit.

are several differences in the demographic characteristics and annual savings behaviour of these groups. For example, 22 percent of individuals own an IRA and only 25 percent own a 401(k). Moreover, the average annual level of saving in these plans is quite low, suggesting that many Americans do not accumulate large amounts of financial assets for retirement. This finding is consistent with previous research (Venti and Wise (1990a), Holden, Ireland, Leonard-Chambers, and Bogdan (2005), West (2006)).[18] IRA owners are older, more likely to be white and are more educated than both the overall population and 401(k) owners. This heterogeneity in the taste and ability to save is what has made identifying the causal effect of tax-preferred savings accounts so difficult. Consistent with previous research, the likelihood of making a deductible contribution is quite small, even among IRA owners (Holden et al. (2005), Holden and Bass (2014)). Only 26 percent of IRA owners (six percent of the full sample) make a deductible contribution in a given year.

Figure 1a shows the distribution of IRA contributions (for those making a positive contribution) separately for those under and over age 50 in the pre- and post-EGTRRA periods. In the pre-reform period, the vast majority of IRA contributors are constrained by the $2,000 limit, as demonstrated by the large spike in the distribution. Fewer contributors are constrained by the limit in the post-EGTRRA years. Interestingly, after 2002 there is still a large spike in the distribution at $2,000 for both those over and under the age of 50. This observation is consistent with the inertia in retirement savings behavior that is well documented in the literature (Madrian and Shea (2001), Choi et al. (2004), Chetty et al. (2014)).

[INSERT FIGURE 1 HERE]

3.2 Empirical Strategy

One of the challenges of identifying the causal savings effect of tax-advantaged accounts is finding exogenous variation in the eligibility of individuals to participate in these plans. Before describing the identification strategy used in this paper, it is useful to consider the "ideal experiment" to analyze the savings effect of an increase in the contribution limit. Such an experiment

[18] For example, the mean (median) IRA contribution among positive contributors is $2,684 ($2,539) in the post-EGTRRA years. These figures are nearly identical to the mean (median) of $2,700 ($2,500) for the 2004 tax year reported by Holden et al. (2005).

would either randomly assign contribution limits to a sample of individuals or increase the contribution limit for some, leaving the initial limit unchanged for others. Differences in contributions could then be interpreted as the causal effect of changing the limit.

In the United States, however, most changes to IRA and 401(k) eligibility has either been universal or correlated with potential determinants of individual tastes for saving, such as workplace pension status or AGI. In this paper, I use quasi-experimental variation in contribution limits induced by the 'catch-up limit' provision to identify the causal effect of a limit change on IRA and 401(k) saving.

I estimate the effect of eligibility for 'catch-up limits' on IRA and 401(k) contributions using a (sharp) regression discontinuity design (RDD). The RDD identifies the local (treatment) effect of eligibility for 'catch-up limits' by comparing the IRA and 401(k) contributions of individuals just above age 50 with those just below age 50. The identification assumption required by the RDD is that counterfactual retirement account contributions (i.e. the contributions in the absence of a differential change in the limit) is continuous in age at age 50. Although this assumption is not directly testable, I present evidence below that supports its plausibility.

The RDD mimics the ideal experiment by modelling retirement account contributions as a function of age and testing whether contributions increase discontinuously at age 50. If the RDD identification assumption is valid, individuals just over and under age 50 are comparable and the age-50 cutoff for 'catch-up limits' is as good as randomly assigned.[19] The RDD is also an attractive research design in this setting because it does not require panel data. In particular, if the identification assumption holds, individuals just below are 50 are a valid control group for those just over age 50, so it is not necessary to follow the same individuals over time.

The estimating equation for the RDD is

$$R_i = \alpha + \beta \,\text{over50}_i + \phi \,\text{age}_i + \theta \,\text{age}_i \cdot \text{over50}_i + Z_i^{'}\Gamma + \ \delta_t + u_i \tag{1}$$

where R_i denotes the deductible IRA (or 401(k)) contributions of individual i, $over50_i$ is a dummy variable equal to one if the individual is eligible for 'catch-up limits', age_i is the nor-

[19] See Lee and Card (2008) and Lee and Lemieux (2010) for a formal, but accessible discussion of the assumptions underlying the RDD. Dong (2015) discusses how the estimate Local Average Treatment Effect (LATE) identified by RDDs may be biased if there are rounding errors in the running variable.

malized assignment variable, Z_i' is a vector of covariates, t are year fixed effects and u_i is the residual.[20] The inclusion of covariates and year fixed effects in 1 is not required for identification but appear in some specifications to improve precision. The baseline covariates are: a set of race dummies (white, black and Hispanic (the excluded category is Asian/other)), demographic dummies (female and married), number of children under the age of 18, (individual) earnings (deflated to 2010 dollars), as well as a set of education dummies. In specifications without covariates, the parameter α is an estimate of the counterfactual level of contributions at age 50 (those just below the cutoff). The parameter β captures the casual effect of being eligible for 'catch-up' limits on contributions or participation rates. All regressions weight observations by the inverse sampling probabilities (person weights) provided in the SIPP.[21] Following Lee and Card (2008), standard errors are clustered at the birth-cohort (birth year) level.

The parameter β is a local intent-to-treat (ITT) estimate of the effect of eligibility for 'catch-up limits' on retirement saving (a policy effect). Regression discontinuity designs only identify causal effects in a neighborhood of the assignment cutoff. Therefore, β captures the causal effect of eligibility for a limit change for individuals at a prime savings age. This estimate should be thought of as an ITT because some individuals may have been unaware of their eligibility for 'catch-up limits' in the years immediately following the introduction of the provision.

β also incorporates the potential dynamic responses by individuals both over and under 50. For example, those under the age of 50 could delay planned contributions until they become eligible to make larger contributions, as in Milligan (2003). However, most pre-EGTRRA IRA contributors were constrained by the limit (see Figure 1), suggesting that the group of savers who might delay contributions because they were both unconstrained before the EGTRRA and expected to be constrained in the future is likely small. Moreover, the "use-it-or-lose-it" motivation described in Milligan (2003) does not predict an increase in participation rates, and delaying planned IRA or 401(k) contributions would mean foregoing the benefit from the tax-free accumulation of interest.

Alternatively, savers who planned to make retirement account contributions in their late 50s may have been induced to bring these contributions forward in response to eligibility for 'catch-

[20] Recall that age is defined as the age of an individual at the end of the calendar year. As is standard in RDD, this variable is normalized so that 0 denotes individuals that are 50 years old.

[21] OLS estimates (without weights) are available upon request. The weighted and unweighted estimates are qualitatively and quantitatively similar.

up limits'. As a result, some increases to IRA or 401(k) contributions immediately following the reform may have crowded-out future contributions. Recent research finds, however, that many individuals fail to respond to even contemporaneous changes in incentives to save in retirement accounts (Chetty et al. (2014)). Therefore, any potential dynamic responses to the reform may be small.

In RDDs it is standard to investigate whether there is manipulation of the assignment variable. In this application, such manipulation is unlikely since eligibility for 'catch-up limits' is a deterministic function of an individual's year of birth. Since deductible IRA and 401(k) contributions are claimed when filing income taxes, individuals would have to lie about their age to the IRS in order to manipulate the assignment variable. Nonetheless, Appendix Table A2 investigates this possibility by checking whether the probability of responding to the IRA or 401(k) ownership questions, and therefore being included in the analysis sample, varies discontinuously at age 50. While 91.3 percent of those just under age 50 respond to one of the two ownership questions, those just over age 50 are only 0.4 percent more likely to respond. This difference is not statistically significant. Figure A1 (appendix) tests for discontinuities in other baseline covariates.[22] Reassuringly, almost all covariates are smooth around the age 50 threshold. The one exception is the college completion dummy variable. Individuals just over the age of 50 are approximately three percentage points more likely to have a college degree than those just under the age of 50. If college completion is positively correlated with tastes for saving (perhaps due to increased financial literacy or smaller discount rates), then estimates of β may be biased upward. In the main results below, however, I show that the inclusion of this covariate does not impact the estimates of β either qualitatively or quantitatively.

4 The Effect of Eligibility for 'Catch-up Limits' on Retirement Saving

This section reports estimates of the effect of raising contribution limits on saving in retirement accounts. In subsection 4.1 I present estimates of the effect of eligibility for 'catch-up limits' on unconditional IRAs, 401(k)s, and total tax-deferred (IRA plus 401(k)) contributions. In subsection 4.2, I analyze the effect of eligibility for 'catch-up limits' on tax-deferred account ownership and

[22] Table A3 in the appendix formally tests this by estimating linear splines for the various covariates for individuals within 10 years of the cutoff.

participation rates (the likelihood of making a contribution). Subsection 4.3 concludes with a discussion of the intensive margin (effect of 'catch-up limits' conditional on contributing) results.[23]

4.1 Contributions

Figure 2 illustrates the RDD by plotting IRA contributions against age. Each circle represents the mean IRA contribution for a given age bin. A local linear regression (linear spline) is estimated on each side of the cutoff for individuals between the ages of 40 and 59. The solid lines represent the fitted values from these regressions and the dashed lines are the corresponding 95% confidence intervals. Figure 2a plots (unconditional) average IRA contributions against age for the pre-EGTRRA years, while Figure 2b plots the same relationship for the post-EGTRRA years. Appendix Figures A2-A7 plot the same relationships for 401(k) contributions and total tax-deferred (IRA plus 401(k)) contributions.

The identification assumption for the RDD requires that tastes for saving be continuous in age at age 50 in the absence of 'catch-up limits'. While there is no theoretical reason why savings would increase or decrease discontinuously at age 50, if this age is "special" for any reason, the identification assumption is violated. One way to test the plausibility of this assumption is to check whether contributions "jump" at age 50 in the years before 'catch-up limits' are introduced. Figure 2a illustrates this placebo test; there is no evidence of a discontinuity at age 50.[24] Consistent with a large response to the introduction of 'catch-up limits', average IRA contributions jump significantly, from approximately \$110 to \$145, in the post-EGTRRA years (Figure 2b).[25]

[INSERT FIGURE 2 HERE]

This relationship is estimated formally using equation 1 and the results are reported in Panel A of Table 1. A local linear regression is estimated on each side of the cutoff, allowing the effect

[23] Appendix A reports several robustness checks, including showing the sensitivity of the main results to: the chosen bandwidth, placebo tests that randomly assign the cutoff to ages other than age 50, and a difference-in-differences design. Appendix Tables A16 and A17 replicate the main results in Tables 1 and 2 using data from the Consumer Expenditure Survey (CEX).

[24] This relationship is estimated formally using equation 1 in Online Appendix Table A4. The RDD estimate is -\$5 and is not statistically significant.

[25] Online Appendix Table A10 tests whether the age profile of IRA contributions and participation rates (i.e. the slopes of Figures 2 and 3) become flatter before and after EGTRRA. For both contributions and participation rates, I find evidence that the age profile of IRA saving flattens post-EGTRRA, though statistical significance depends on the inclusion of covariates. Importantly, estimates for the effect of eligibility for 'catch-up limits' remain unchanged in these specifications.

of age on saving to vary for those over the age of 50. The local linear regressions use data from individuals between the ages of 40 and 59 (a bandwidth of 10 on each side of the age 59 cutoff).[26] In column 1, the estimate for α, the counterfactual level of IRA contributions at age 50, is $111. The estimate for β suggests that eligibility for 'catch-up limits' increases (unconditional) average IRA contributions by $34, or by about 30 percent relative to those just under the age of 50. This estimate is statistically significant at the 1 percent level and is unaffected by the inclusion of year fixed effects (column 2) and the baseline covariates (column 3), although precision improves.

In contrast to the results for IRA contributions, the coefficient estimates in Panel B of Table 1 suggest that average unconditional 401(k) contributions do not increase significantly at age 50. I estimate that eligibility for 'catch-up limits' reduces 401(k) contributions at age 50 by a statistically insignificant $15 (column 1). The standard error for this coefficient estimate is large ($105), suggesting that estimates much larger or smaller than -$15 cannot be ruled out. As is the case with IRA contributions, the inclusion of year fixed effects (column 2) and covariates (column 3) does not affect the baseline estimate, although the standard errors do decrease somewhat.

In Panel C of Table 1 I explore whether eligibility for 'catch-up limits' increases total tax-deferred (IRA plus 401(k)) contributions. Across all specifications, the coefficient estimate for β is small in magnitude and statistically insignificant. For example, in column 1, the average total tax-deferred contribution for those just under age 50 is $1,008. Eligibility for 'catch-up limits' increases retirement account contributions by a statistically insignificant $19. Overall, the evidence from Table 1 indicates that eligibility for 'catch-up limits' has no statistically significant effect on total tax-deferred contributions. However, given that IRA contributions do increase significantly at age 50, it may be the case that total tax-deferred contributions do increase for some sub-samples of the population. I investigate this possibility in Section 5 below.

[INSERT TABLE 1 HERE]

4.2 Ownership and Participation Rates (Extensive Margin)

I also investigate whether eligibility for 'catch-up limits' affects the likelihood of owning an IRA or 401(k) and the likelihood of making a tax-deductible contribution. Panel A of Table 2

[26] Figure A8 in the Appendix shows that the main results do not vary with the choice of bandwidth, for both IRA and 401(k) contributions. Consequently, all the results in the main text use an age bandwidth of 10.

reports estimates of the effect of eligibility for 'catch-up limits' on account ownership. In column 1, the dependent variable is an indicator variable equal to one if the respondent owns an IRA and zero otherwise. Eligibility for 'catch-up limits' does not have a statistically significant effect on IRA ownership rates; the coefficient estimate for β is 0.001 (s.e. 0.009). However, the likelihood of owning a 401(k) plan decreases by 2.3 percentage points or 6.5 percent (column 2). Eligibility for 'catch-up limits' does not affect the likelihood of owning any retirement account (column 3) or the likelihood of owning both accounts (column 4).[27]

Figure 3 plots the fraction of individuals making a deductible IRA contribution against age. The dependent variable is equal to one if the respondent reports making a deductible IRA contribution and is equal to zero otherwise. Figure 3a illustrates the placebo test for whether IRA participation rates "jump" at age 50 before 'catch-up limits' are introduced. As is the case with contributions, I cannot reject the null hypothesis that the IRA participation rate is continuous in age at age 50 in the pre-EGTRRA years (statistically insignificant point estimate of -0.005 for β (s.e. 0.005)). During the post-EGTRRA years, however, the likelihood of making a deductible IRA contribution increases by about one and a half percentage points from approximately 6.5 to 8.0 percent at age 50.

[INSERT FIGURE 3 HERE]

The estimate for β in Panel B of Table 2 (column 1) implies eligibility for 'catch-up limits' increases the likelihood of making an IRA contribution by 1.4 percentage points (21 percent relative to the control mean of 6.7 percent), an estimate that is statistically significant at the one percent level. Similar to the findings for ownership rates, eligibility for 'catch-up limits' leads to a small decline in 401(k) participation rates (column 2), but has no statistically significant on overall retirement account participation rates.

The neoclassical consumption and savings model predicts that only those constrained by pre-EGTRRA contribution limits should be affected by the introduction of 'catch-up limits'. Interestingly, the increase in IRA participation rates suggests that the response to eligibility for 'catch-up limits' was not limited to constrained IRA savers. In Section 5, I explore potential explanations for the IRA participation response and the small decline in 401(k) participation rates.

[27] Figure A3 in the appendix visually displays the result for 401(k) ownership rates and Figure A6 displays this result for IRA or 401(k) ownership rates.

[INSERT TABLE 2 HERE]

4.3 Intensive Margin

In the years leading up to the EGTRRA, 70 percent of positive IRA contributors were constrained by the annual contribution limit, while only 9 percent of 401(k) contributors were constrained (Figure 1). Panel A of Table 3 reports estimates of equation 1 on: the sub-samples of positive IRA contributors (column 1), positive 401(k) contributors (column 2), those with a positive IRA or 401(k) contribution (column 3), positive IRA and 401(k) contributors (column 4). I estimate that eligibility for 'catch-up limits' increases deductible IRA contributions by a statistically insignificant $95 (standard error of $73) for positive contributors. Similarly, eligibility for 'catch-up limits' increases deductible 401(k) contributions among positive contributors by $123; however, this estimate is also not statistically significant (standard error $141).

Taken at face value, the estimates in Panel A suggest that the large expansion in IRA and 401(k) contribution limits did not have a significant impact on the contributions of positive savers. However, the estimates in Panel A may be biased because of the participation response to 'catch-up limits', especially for IRAs. The positive participation response implies that positive IRA or 401(k) contributors just over and under the age of 50 may not be comparable, even if the two groups are comparable in the overall population. For example, if those induced to begin making IRA contributions (participating) have lower tastes for saving, on average, than those that would have contributed in the absence of 'catch-up limits', then conditioning on any positive level of saving would lead to estimates that are biased downwards.

I address this concern by estimating lower and upper bounds on the effect of eligibility for 'catch-up limits' for positive savers using the procedure developed by Lee (2009). Intuitively, this procedure ranks all contributors and calculates an upper (lower) bound on the effect of 'catch-up limits' by assuming that all new contributors are the lowest (highest) savers among all positive contributors. Using this procedure, the upper bounds for the intensive margin effect of eligibility for 'catch-up limits' for IRA and 401(k) contributions are $493 and $1,105, respectively. The latter estimate is near the top end of the range of the estimates for constrained 401(k) savers found by Rutledge et al. (2014). In reality, it is likely that not all new savers have the lowest (highest) taste for saving. In this case, the true intensive margin effect of eligibility for 'catch-up limits' lies between the estimates in Panel A and Panel B.[28]

[INSERT TABLE 3 HERE]

5 Heterogeneity and Discussion of Possible Mechanisms

5.1 Heterogeneity in the Savings Response to 'Catch-up Limits'

The estimates in Table 1 suggest that eligibility for 'catch-up limits' did not significantly increase overall tax-deferred retirement contributions. However, the provision did lead to large increases in unconditional IRA contributions and participation rates. This suggests that the small overall effects of 'catch-up limits' may mask heterogeneous responses across different groups of savers.[29] To examine this possibility, I explore how eligibility for 'catch-up limits' affects individuals with and without access to an employer-sponsored 401(k) plan. By definition, contributions to IRAs represent the only tax-deferred saving for the latter group. Note that the validity of the RDD in this case does not depend on whether savers whose employer offers a 401(k) plan are comparable to those whose employer does not. Rather, the identification assumption is that among individuals with access to a 401(k) (or who do not have access to a 401(k)), those just above 50 are comparable to those just below age 50.[30]

SIPP respondents are only asked about whether their employer offers a tax-deferred 401(k) plan, as well as whether they are eligible to participate, in wave 7 of the SIPP. This means that I only have information on the availability of a 401(k) plan for the 2002 and 2005 post-EGTRRA years. In contrast, the results throughout this paper are for the 2002, 2004 and 2005 years. Columns 1 and 2 of Table 4 confirm that the baseline results for total tax-deferred contributions and partic-

[28] Assuming that the intensive margin effect for IRAs is $250 – the midpoint of the range of the $100 estimate in Panel A, Table 3 and the upper bound of $490 in Panel B, Table 3 – the fraction of the total increase in IRA contributions coming from existing limit contributors is 250(0.067)/28 = 60 percent.

[29] Another possibility is that 401(k) limits were not binding because only 9 percent of contributors saved close to the statutory limit prior to EGTRRA. As a result, the RDD may not be well-suited to pick up increases in saving from those at the extreme right tail of the 401(k) distribution. Moreover, since 401(k) contributions are, on average, much larger than IRA contributions, increases in the latter may be too small to pick up when looking at overall saving.

[30] Online Appendix Table A11 confirms that the fraction of individuals with access to a 401(k) plan does not vary discontinuously at age 50, supporting the validity of the RDD. I also explore whether the effect of eligibility for 'catch-up limits' varies between those with access to *any* pension plan versus those without access to any plan. The results are similar to the results reported in Table 4.

ipation rates are similar for the subset of years for which 401(k) plan availability is observed. Column 1 of Panel A replicates the result from column 3, Panel C of Table 1 for total tax-deferred contributions. Column 2 reports the results from estimating 1 for the 2002 and 2005 years only. In both cases, eligibility for 'catch-up limits' has a small, statistically insignificant effect on average overall tax-deferred contributions. The same is true for participation rates in Panel B.

In the post-EGTRRA years, 58 percent of individuals do not have access to a 401(k) plan. Of this group, only 4.9 percent of those just under age 50 make a tax-deferred contribution (to an IRA) and the unconditional average contribution is $78.[31] Eligibility for 'catch-up limits' increases tax-deferred contributions by a statistically significant $40 or 51 percent (Panel A, column 3). Moreover, the likelihood of making a tax-deferred contribution increases by 1.5 percentage points or 31 percent (Panel B, column 3). Of individuals who do have access to a 401(k) plan, 42 percent of those just under age 50 make a tax-deferred contribution (to an IRA, 401(k), or both). The average contribution among those just under 50 in this group is $1,916. Eligibility for 'catch-up limits' decreases retirement contributions by a statistically insignificant $83 (standard error $77) or 4 percent. The likelihood of making a tax-deductible contribution among those in this group decreases by 3.4 percentage points or 8 percent.[32]

[INSERT TABLE 4 HERE]

The estimates in Table 4 indicate that eligibility for 'catch-up limits' led to a large and statistically significant increase in the tax-deferred contributions and participation rates of those without access to an employer-sponsored 401(k). This contrasts with the small, statistically insignificant effect on retirement saving for those with access to a 401(k). In order to better understand this result, it is important to note that there are significant differences between the two groups. Individuals with access to a 401(k) plan are, on average, more likely to have a job, are nearly three

[31]The -$70 estimate reported in column 3, Panel A of Table 4 is a regression-adjusted constant that includes the effect of covariates and year fixed effects. The unconditional mean for those just under 50 is $78. The average contribution by those with a positive contribution is $78/0.049 = $1,592.

[32]I explored potential explanations for the decline in the likelihood of making a tax-deductible contribution among those with access to a 401(k) plan. One possible explanation is that confusion about how the introduction of 'catch-up limits' affected the taxation of employer pension plans discouraged take-up by some individuals over the age of 50. The IRS did not clarify the final rules for 'catch-up limits' until August 2003; in particular, catch-up contributions are not subject to nondiscrimination tests. As a result, many firms did not offer catch-up limits in their 401(k) plan until 2004 (Kaplan (2002); Holden and VanDerhei, 2005). 62 percent of individuals with access to a 401(k) plan actually owned a 401(k) in the post-EGTRRA years, consistent with prior research that finds that the take-up of these plans is not universal.

times more likely to work for an employer with more than 50 workers (a 'large employer'), earn more and are more educated than individuals without access to a 401(k) plan (see Appendix Table A12).[33] These differences may help explain why these two groups respond so differently to the introduction of 'catch-up limits'.

Tables 5 and 6 further explore which individuals are affected by 'catch-up limits' by estimating 1 on the sub-samples of high and low net worth individuals, both with and without access to a 401(k) plan. I define high net worth individuals as those whose predicted net worth is above the median for individuals of the same age. Eligibility for 'catch-up limits' increases total tax-deferred contributions among both high and low net worth individuals without access to a 401(k) plan. However, the increase in average contributions is larger in percentage terms for low net worth individuals. In particular, the tax-deferred contributions of this group increase by $43 compared to a control mean of $35 and participation rates increase by 1.8 percentage points compared to a control mean of 2.5 percent.

[INSERT TABLE 5 HERE]

[INSERT TABLE 6 HERE]

5.2 Discussion of Possible Mechanisms

Eligibility for 'catch-up limits' increases IRA and total tax-deferred contributions by 51 percent among those without access to a 401(k) plan. Moreover, the higher average IRA contributions are driven, at least in part, by an increase in the likelihood of making a deductible contribution, contrary to the predictions of the neoclassical-life cycle model. In this subsection, I discuss some possible mechanisms that may be driving this response.

Anecdotal evidence suggests that financial institutions may have increased their IRA product advertising following the introduction of 'catch-up limits'. This advertising appears to have been targeted towards those over the age of 50 as part of a strategy to increase assets under management (Dalton (2001)). Such targeted advertising may have raised awareness about 'catch-up limit' rules, leading to higher participation rates for those over 50. For example, a 2004 article in the American Banker's Association ABA Trust & Investments magazine encourages member institutions

[33] Appendix Table A12 also shows that those with access to a 401(k) plan are more likely to be white, married and veterans, and are less likely to be black, Hispanic and female.

to actively promote 'catch-up' contributions to their clients (Ellens (2004)). Another magazine for credit union executives specifically recommends mailing information about 'catch-up limit' rules to IRA customers over the age of 50: "For example, send a direct mail piece explaining the new 'catch-up' contributions to your IRA owners who are age 50 or older...Not only will you educate your members about the IRA changes, you will create member awareness of the products and services your credit union offers" (Zuehlke (2001)).

The idea that the 'catch-up limit' response may, at least in part, be due to advertising by financial institutions is consistent with the important role of promotional activities for explaining aggregate IRA contributions alluded to in Poterba et al. (1995), Bernheim (2002) and Saez (2009). It is also consistent with recent research that finds large advertising effects on the demand for checking accounts, mortgages and credit cards (Gurun, Matvos, and Seru (2016), Hastings, Hortaçsu, and Syverson (2013), Honka, Hortaçsu, and Vitorino (2015)). The estimates in Tables 4, 5 and 6 show that the contribution and participation rate response to eligibility for 'catch-up limits' is large for IRA owners that do not have access to a 401(k) plan. These individuals may not have access to timely information about retirement savings options from other sources, such as their employer. It is plausible that financial institutions looking to increase assets under management would direct advertising towards these savers. However, anecdotal evidence from industry magazines is not a perfect substitute for direct evidence that advertising is driving the participation response.[34]

Among those with access to a 401(k) plan, IRA contributions and participation rates may have increased because high savers were temporarily unable to contribute more to their 401(k).[35] This is because the final rules about the tax treatment of 'catch-up limits' for 401(k) plans was not issued by the IRS until the middle of 2003. Also, adopting 'catch-up limits' required employer sponsors to amend their plan contracts, which may have temporarily limited the ability of some workers to make higher contributions (Kaplan (2002)). Online Appendix Table A13 reports coefficient estimates from regression specifications that allow for the effect of eligibility for 'catch-up limits' to differ for those that are likely constrained by the 401(k) contribution limit. Specifically, I proxy

[34]In Online Appendix C, I explore whether the presence of fixed costs of making a deductible IRA contribution can explain the increase in participation rates. I conclude that this potential explanation is unlikely to be the main driver of the observed extensive margin response.

[35]I thank David Richardson for suggesting this.

for limit contributor status with a dummy variable equal to one for those who report a 401(k) contribution within 10 percent of the pre-EGTRRA limit (i.e. $9,000), and equal to zero otherwise. While this variable is endogenous to tax-deferred contributions, if individuals over the age of 50 are more likely to be limit contributors, the bias is downwards.

With this caveat in mind, the evidence in Appendix Table A13 is inconclusive. The point estimates suggest that IRA contributions fell for 401(k) limit contributors over the age of 50 between 2002 and 2005, while 401(k) contributions increased over the same period. This is consistent with high-savers temporarily substituting between IRAs and 401(k)s as firms eventually adopt 'catch-up limits'. However, the the standard errors for these estimates are large. As a result, I cannot reject the null hypothesis that the average 2002 and 2005 IRA or 401(k) contributions for this group are statistically significantly different from each other.

6 Conclusion and Policy Implications

Using an empirical strategy that aims to address the limitations of prior research, this paper asks whether the introduction of 'catch-up limits' leads to increases in retirement saving. This topic is particularly relevant given the recent debates about the adequacy of retirement saving. I argue that using eligibility for 'catch-up limits', an IRA and 401(k) contribution rule allowing individuals over the age of 50 to contribute more than those under 50, permits clearer identification of the savings effect of raising limits than previous empirical strategies.

The main result is that while eligibility for 'catch-up limits' does not have a statistically significant effect on overall retirement contributions, this masks significant heterogeneity both acrossindividuals and types of retirement savings accounts. In particular, eligibility for 'catch-up limits' leads to a large and statistically significant increase in tax-deferred contributions by individuals without access to a 401(k) plan. Figure 4 displays the implied average total tax-deferred contribution for positive contributors using the estimates from Table 4. Among positive contributors just under 50 without access to a 401(k) plan, the average tax-deferred contribution is $\$78/0.049 \approx \$1,592$. For those without access to a 401(k) plan, the likelihood of making an IRA contribution increases by 1.5 percentage points (31 percent) at age 50. This increase implies an average tax-deferred contribution of $(\$40 + \$78)/0.049 \approx \$2,408$, a more than $800 increase compared to those just under 50. In contrast to the overall effects for IRAs, I find small and insignificant effects of eligibility for 'catch-up limits' on the total contributions of those that do have access to a 401(k).

In the neoclassical life-cycle model we do not expect that a change in the contribution limit will affect the choices of agents for whom the constraint is not binding. The finding that eligibility for 'catch-up limits' leads to large increases in IRA participation rates, however, suggests that the initial response to the provision was not limited to constrained savers. I discuss possible mechanisms that may be driving this result. For example, anecdotal evidence suggests that financial institutions directed advertising specifically towards IRA owners over the age of 50. This advertising may have increased awareness about the IRA limit increases, leading to higher contributions and participation rates.

The results have important policy implications for our understanding of the effect of raising contribution limits on retirement savings. One is that policy makers should consider the responses by other economic agents, such as financial advisors, banks, credit unions and mutual fund companies, when designing retirement savings programs. These agents can complement the intended design of policies. Also, throughout the sample period the statutory contribution limit for IRAs was far below the limit for 401(k) plans. While the two plans are similar, there are some important differences. For example, most 401(k) contributions are made through regular payroll deductions, whereas savers have much more flexibility about the amount and timing of their IRA contributions. Some individuals that prefer saving in IRAs may opt for a 401(k) plan because of the relatively low deductible limit for their preferred account. As a result, a reform that reduces the difference between the contribution limits of the two accounts may be welfare improving (without necessarily generating new saving) if it allows individuals to save in their preferred account.

While informative about how expanding IRAs and 401(k)s affects contributions to these plans, the results in this paper do suffer from some limitations. First, the age-related RDD identifies the effect of eligibility for 'catch-up limits' on savings at age 50. While studying the behavior of individuals at this prime savings age is of great interest to policy makers and economists, the results in this paper may not generalize to those in other age groups. Second, the observed jump in IRA participation rates is consistent with several explanations, each of which may be partially responsible for driving the results. Further exploring these possible explanations, such as the potential for advertising by financial institutions to affect retirement savings decisions, may be a fruitful area of future research. Finally, the analysis in this paper does not address how eligibility for 'catch-up limits' affects overall saving (i.e. tax-deferred retirement saving plus saving in taxable accounts and home equity). Therefore, the question of whether the increase in retirement saving, especially for those that do not own a 401(k), leads to higher total saving requires further study.

References

ANGRIST, J. D. AND J.-S. PISCHKE (2009): *Mostly Harmless Econometrics: An Empiricist's Companion*, Princeton, NJ: Princeton University Press.

ATTANASIO, O. P. AND T. DELEIRE (2002): "The Effect of Individual Retirement Accounts on Household Consumption and National Saving," *Economic Journal*, 112, 504–538.

BENARTZI, S. AND R. THALER (2007): "Heuristics and Biases in Retirement Savings Behavior," *Journal of Economic Perspectives*, 21, 81–104.

BENJAMIN, D. J. (2003): "Does 401(k) eligibility increase saving? Evidence from propensity score subclassification," *Journal of Public Economics*, 87, 1259–1290.

BERNHEIM, B. D. (2002): "Taxation and Saving," in *Handbook of Public Economics*, ed. by A. J. Auerbach and M. Feldstein, Elsevier, vol. 3, 1173–1249.

CARROLL, G. D., J. J. CHOI, D. I. LAIBSON, B. C. MADRIAN, AND A. METRICK (2009): "Optimal Defaults and Active Decisions," *Quarterly Journal of Economics*, 124, 1639–1674.

CHETTY, R., J. N. FRIEDMAN, S. LETH-PETERSEN, T. H. NIELSEN, AND T. OLSEN (2014): "Active vs. Passive Decisions and Crowd-out in Retirement Savings Accounts: Evidence from Denmark," *Quarterly Journal of Economics*, 129, 1141–1219.

CHOI, J. J., D. I. LAIBSON, AND B. C. MADRIAN (2004): "Plan Design and 401(k) Savings Outcomes," *National Tax Journal*, 57, 275–298.

CLARK, R. L., J. A. MAKI, AND M. S. MORRILL (2014): "Can Simple Informational Nudges Increase Employee Participation in a 401(k) Plan?" *Southern Economic Journal*, 80, 677–701.

CRUZ, H. AND D. LADE (2001): *Congress May Renew Efforts to Raise IRA Limits*, Sun Sentinel, http://articles.sun-sentinel.com/2001-03-05/business/0103020758_1_roth-iras-retirement-savings-contribution.

DALTON, P. (2001): *Tax law creates deposit potential*, American Bankers Association: ABA Bankers News, print.

DONG, Y. (2015): "Regression Discontinuity Applications with Rounding Errors in the Running Variable," *Journal of Applied Econometrics*, 30, 422–446.

DUFLO, E., W. GALE, J. LIEBMAN, P. ORSZAG, AND E. SAEZ (2006): "Saving Incentives for Low- and Middle-Income Families: Evidence from a Field Experiment with H&R Block," *Quarterly Journal of Economics*, 121, 1311–1346.

——— (2007): "Savings Incentives for Low- and Middle-Income Families in the United States: Why is the Saver's Credit no More Effective," *Journal of the European Economic Association*, 5, 647–661.

ELLENS, J. (2004): *Retirement Catch-up Contributions*, American Bankers Association: ABA Trust & Investments, print.

ENGELHARDT, G. V. AND A. KUMAR (2007): "Employer matching and 401(k) saving: Evidence from the health and retirement study," *Journal of Public Economics*, 91, 1920–1943.

FEENBERG, D. AND J. SKINNER (1989): "Sources of IRA savings," in *Tax Policy and the Economy*, ed. by L. H. Summers, Cambridge, MA: National Bureau of Economic Research, vol. 3, 25–46.

FRIEDMAN, J. N. (2016): "Tax Policy and Retirement Savings," in *The Economics of Tax Policy*, ed. by A. J. Auerbach and K. Smetters, Oxford University Press, chap. 10.

GALE, W. G. AND J. K. SCHOLZ (1994): "IRAs and Household Saving," *American Economic Review*, 84, 1233–1260.

GELBER, A. M. (2011): "How do 401(k)s Affect Saving? Evidence from Changes in 401(k) Eligibility," *American Economic Journal: Economic Policy*, 3, 103–122.

GREMBI, V., T. NANNICINI, AND U. TROIANO (2016): "Do Fiscal Rules Matter," *American Economic Journal: Applied Economics*, 8, 1–30.

GURUN, U. G., G. MATVOS, AND A. SERU (2016): "Advertising Expensive Mortgages," *Journal of Finance*, 71, 2371–2416.

HASTINGS, J. S., A. HORTAÇSU, AND C. SYVERSON (2013): "Advertising and Competition in Privatized Social Security: The Case of Mexico," NBER Working Paper 18881, National Bureau of Economic Research, Cambridge, MA.

HOLDEN, S. AND S. BASS (2014): "The IRA Investor Profile: Traditional IRA Investors' Activity, 2007-2012," ICI Research Report, Investment Company Institute, Washington, D.C.

HOLDEN, S., K. IRELAND, V. LEONARD-CHAMBERS, AND M. BOGDAN (2005): "The Individual Retirement Account at Age 30: A Retrospective," ICI Perspective 11(1), Investment Company Institute, Washington, D.C.

HOLDEN, S. AND D. SCHRASS (2014): "The IRA Investor Profile: Roth IRA Investors' Activity, 2007-2012," ICI Research Report, Investment Company Institute, www.ici.org/pdf/rpt_14_ira_roth-investors.pdf.

HONKA, E., A. HORTAÇSU, AND M. A. VITORINO (2015): "Advertising, Consumer Awareness and Choice: Evidence from the U.S. Banking Industry," *Rand Journal of Economics*, forthcoming.

IMBENS, G. W. AND K. KALYANARAMAN (2012): "Optimal Bandwidth Choice for the Regression Discontinuity Estimator," *Review of Economic Studies*, 79, 933–959.

JOINES, D. H. AND J. G. MANEGOLD (1995): "IRA and Saving: Evidence from a Panel of Taxpayers," Manuscript, University of Southern California.

KAPLAN, R. M. (2002): "Catch-Up Contribution Guidance is Released," *The ASPA Journal*, 32, 2,10–11.

KARLAN, D., M. MCCONNELL, S. MULLAINATHAN, AND J. ZINMAN (2010): "Getting to the Top of Mind: How Reminders Increase Saving," NBER Working Paper 16205, National Bureau of Economic Research, Cambridge, MA.

LEE, D. S. (2009): "Training, Wages, and Sample Selection: Estimating Sharp Bounds on Treatment Effects," *Review of Economic Studies*, 76, 1071–1102.

LEE, D. S. AND D. CARD (2008): "Regression Discontinuity Inference with Specification Error," *Journal of Econometrics*, 142, 655–674.

LEE, D. S. AND T. LEMIEUX (2010): "Regression Discontinuity Designs in Economics," *Journal of Economic Literature*, 48, 281–355.

MADRIAN, B. C. AND D. F. SHEA (2001): "The Power of Suggestion: Inertia in 401(k) Participation and Savings Behavior," *Quarterly Journal of Economics*, 116, 1149–1187.

MILLIGAN, K. (2003): "How do contribution limits affect contributions to tax-preferred savings accounts?" *Journal of Public Economics*, 87, 253–281.

ORSZAG, P. AND J. ORSZAG (2001): "Would Raising IRA Contribution Limits Bolster Retirement Security for Lower- and Middle-Income Families," Tech. rep., Center on Budget and Policy Priorities, Washington, D.C., http://www.cbpp.org/archives/4-2-01tax2.htm.

POTERBA, J. M. (2014): "Retirement Security in an Aging Society," NBER Working Paper 19930, National Bureau of Economic Research, Cambridge, MA.

POTERBA, J. M., S. F. VENTI, AND D. A. WISE (1995): "Do 401(k) contributions crowd-out other personal saving?" *Journal of Public Economics*, 58, 1–32.

RUTLEDGE, M. S., A. Y. WU, AND F. M. VITAGLIANO (2014): "Do Tax Incentives Increase 401(k) Retirement Saving? Evidence from the Adoption of Catch-up Contributions," CRR WP 2014-17, Center for Retirement Research at Boston College, Boston, MA.

SAEZ, E. (2009): "Details Matter: The Impact of Presentation and Information on the Take-up on Financial Incentives for Retirement Saving," *American Economic Journal: Economic Policy*, 1, 204–228.

VENTI, S. F. AND D. A. WISE (1990a): "The Determinants of IRA Contributions and the Effect of Limit Changes," NBER Working Paper 1731, National Bureau of Economic Research, Cambridge, MA.

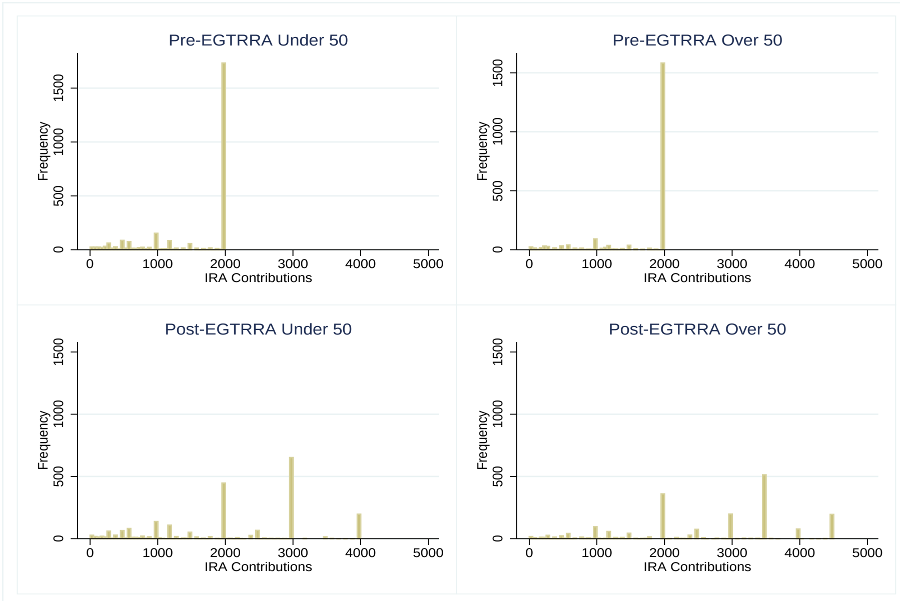
——— (1990b): "Have IRAs Increased US Saving? Evidence from Consumer Expenditure Surveys," *Quarterly Journal of Economics*, 105, 661–698.

WEST, S. (2006): "The Role of IRAs in Americans' Retirement Preparedness," ICI Research Fundamentals 15(1), Investment Company Institute, Washington, D.C.

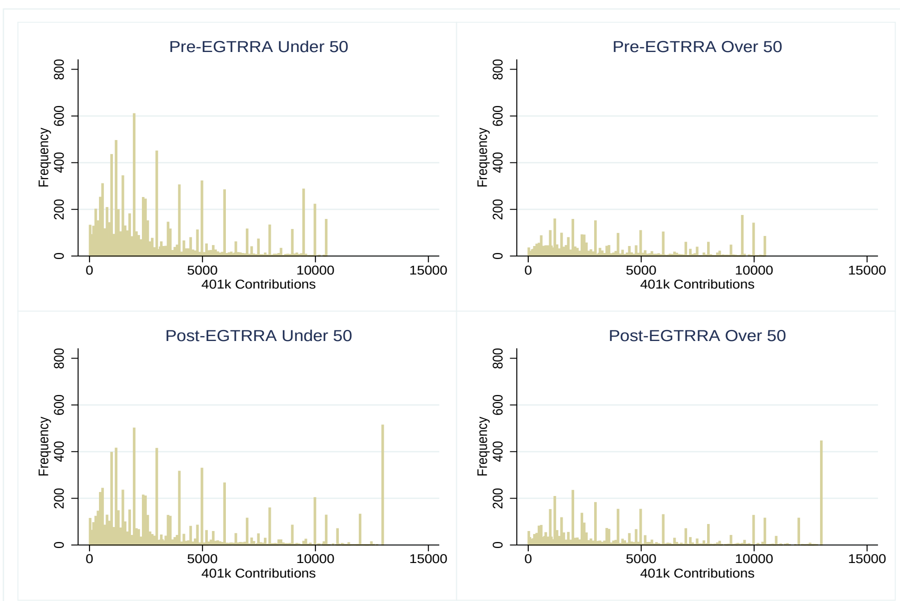
Zuehlke, D. (2001): "Tax-cut bill creates new IRA opportunities," *Credit Union Executive Journal*, 41, 12–15.

Figure 1

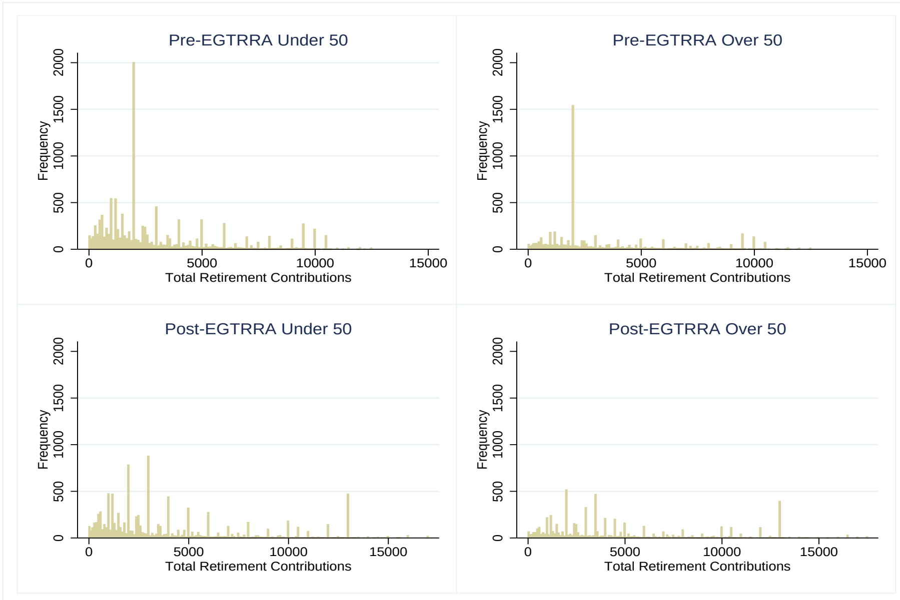
(a) Distribution of IRA Contributions



(b) Distribution of 401(k) Contributions



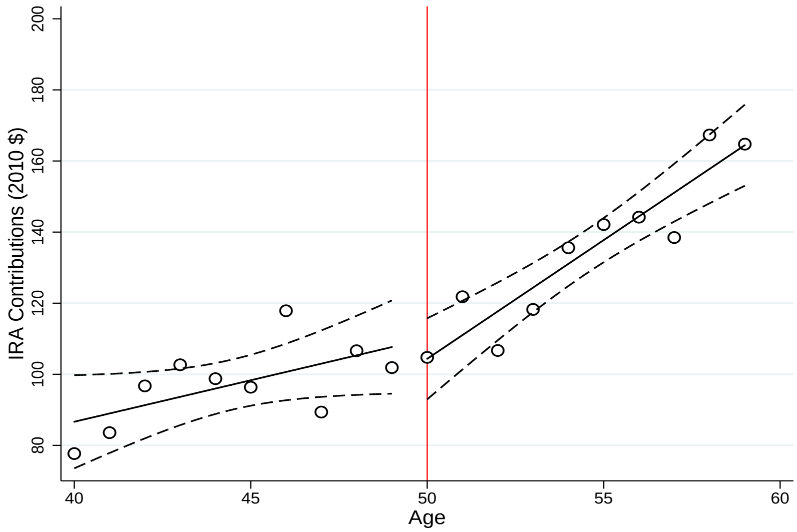
(c) Distribution of Total Tax-Deferred (IRA + 401(k)) Contributions



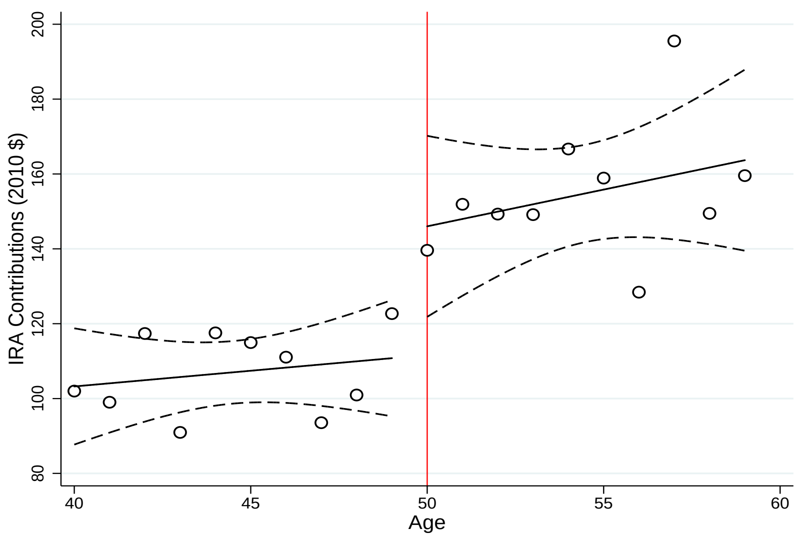
Notes: All dollar amounts are inflated to 2010 dollars using the Bureau of Labor Statistics Inflation Calculator. The sample is all individuals in the 1996, 2001 and 2004 SIPP panels that respondent to the IRA or 401(k) ownership questions. The top panel of each figure shows the distribution of reported tax-deductible contributions (for positive contributors) for the Pre-EGTRRA years (1996-1998, 2001). The bottom panel shows the distribution of reported tax-deductible contributions (for positive contributors) for the Post-EGTRRA years (2002, 2004-2005).

Figure 2

(a) IRA Contributions (2010 $): Pre EGTRRA



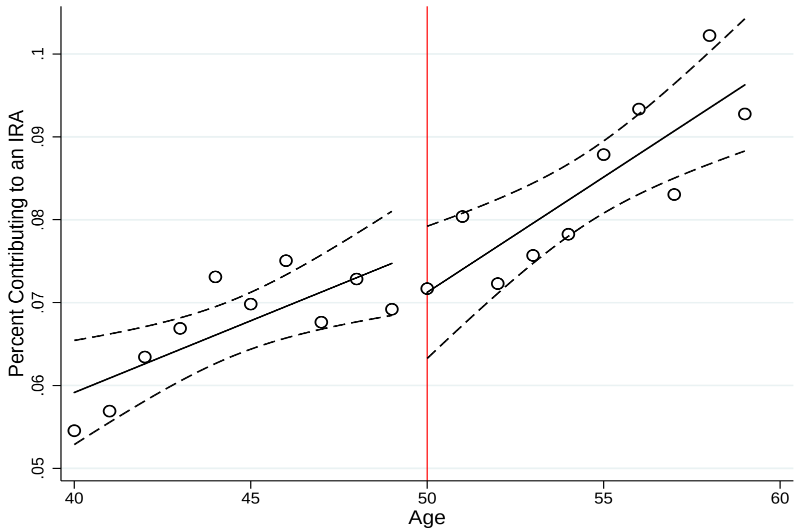
(b) IRA Contributions (2010 $): Post EGTRRA



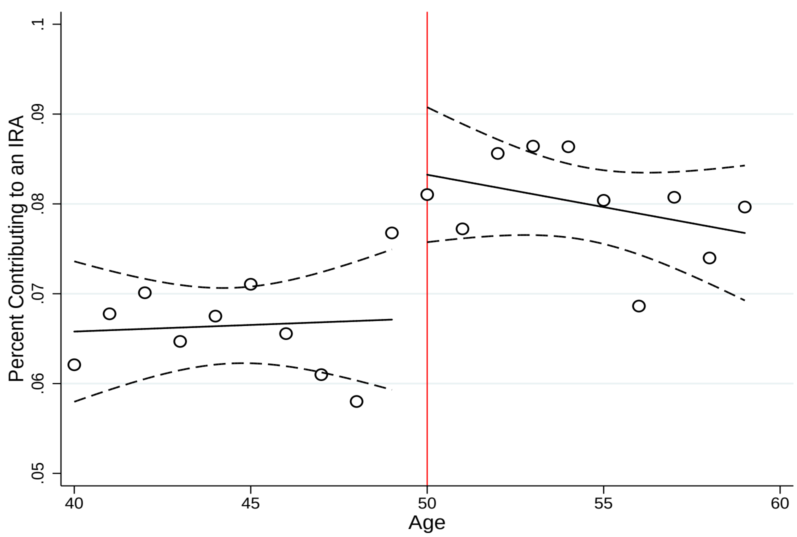
Notes: All dollar amounts are inflated to 2010 dollars using the Bureau of Labor Statistics Inflation Calculator. The sample is all individuals between the ages of 40 and 59 that respond to either the IRA or 401(k) ownership questions in the relevant years. Contributions for those that do not respond to one of the two ownership questions are coded as zero.

Figure 3

(a) IRA Participation Rates: Pre EGTRRA

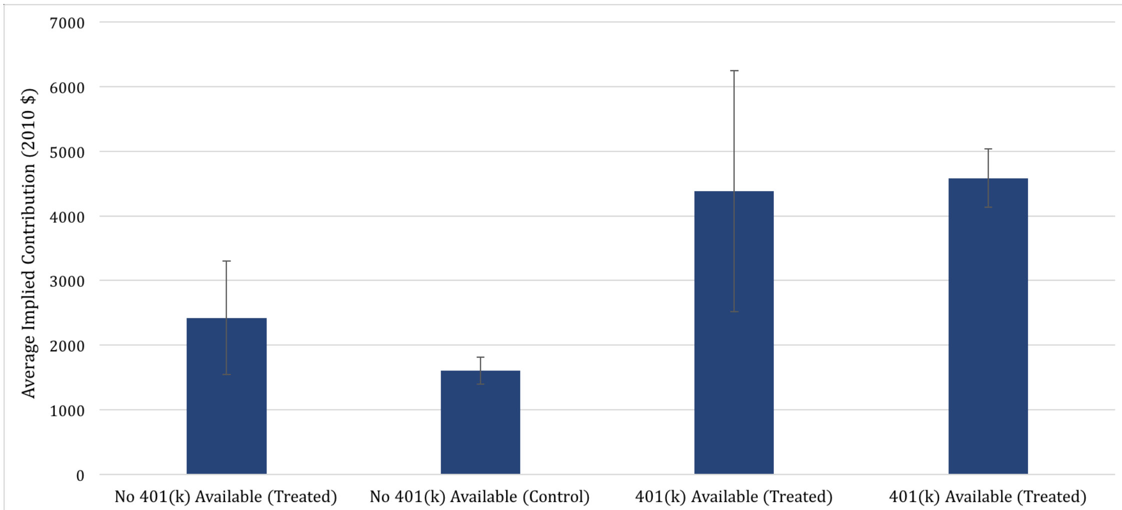


(b) IRA Participation Rates: Post EGTRRA



Notes: The sample is all individuals between the ages of 40 and 59 that respond to either the IRA or 401(k) ownership questions in the relevant years. Contributions for those that do not respond to one of the two ownership questions are coded as zero.

Figure 4: Implied Total Tax-Deferred (IRA plus 401(k)) Contributions by Positive Savers



Notes: This figure reports the implied average total tax-deferred (IRA plus 401(k)) contribution (and associated 95% confidence intervals) for SIPP respondents with and without access to an employer-sponsored 401(k) plan. Average contributions for treated (control) individuals correspond to those just above (below) the age 50 cutoff for 'catch-up limits'. The implied average contributions are calculated using the contributions and participation rates for individuals for those just below age 50. For example, consider individuals without access to a 401(k) plan. 4.9 percent of these individuals just under age 50 contribute to either an IRA or 401(k) and the average unconditional contribution is \$78. The implied average total tax-deferred contribution for those just below age 50 (control group) is \$78/0.049 $\approx$ \$1,592. The implied average total tax-deferred contribution for those just above age 50 (treated group) is (\$40+\$78)/0.049 $\approx$ \$2,408.

Table 1: The Effect of Eligibility for 'Catch-up Limits' on Retirement Account Contributions

	(1)	(2)	(3)
A. IRA Contributions			
over50	34.324***	34.699***	28.758***
	(10.223)	(7.305)	(7.040)
Constant	111.422***	91.118***	-64.231***
	(5.978)	(6.765)	(20.143)
B. 401(k) Contributions			
over50	-14.939	-9.801	-45.329
	(105.235)	(38.178)	(34.031)
Constant	896.076***	628.050***	-214.339***
	(82.287)	(38.262)	(72.377)
C. Total Tax-Deferred (IRA + 401(k)) Contributions			
over50	19.384	24.899	-16.571
	(112.457)	(39.917)	(34.932)
Constant	1,007.498***	719.168***	-278.570***
	(84.415)	(37.776)	(77.627)
Year FE	N	Y	Y
Covariates	N	N	Y
Observations	54,748	54,748	54,748

Notes: All dollar amounts are inflated to 2010 dollars using the Bureau of Labor Statistics CPI Inflation Calculator. The sample is individuals between the ages of 40 and 59 in the 2001 and 2004 SIPP panels that responded to either the IRA or 401(k) ownership questions (spanning the 2002, 2004 and 2005 calendar years). The dependent variable in Panel A is a respondent's reported deductible IRA contribution. In Panel B the dependent variable is the respondent?s reported deductible 401(k) contribution; in Panel C it is the sum of the respondent?s IRA and 401(k) contribution. Contributions for those that do not respond to one of the two ownership questions is coded a zero. The independent variable of interest, over50, is a dummy variable equal to one if a respondent will by 50 or older by the end of the calendar year, zero otherwise. The specification in column 1 is from a regression of outcomes on a polynomial of degree 1 that is allowed to vary on either side of the cutoff. The specification in column 2 adds year fixed effects to the specification in column 1. The specification in column 3 adds the following covariates: white, black, Hispanic, female, married, personal earned income, number of kids under the age of 18 and three education attainment dummies.The sample is Standard errors are clustered at the state level. * $p < 0.1$, ** $p < 0.05$ and *** $p < 0.01$.

Table 2: The Effect of Eligibility for 'Catch-up Limits' on Retirement Account Ownership and Participation Rates

	(1) IRA	(2) 401(k)	(3) IRA or 401(k)	(4) Both IRA & 401(k)
A. Account Ownership				
over50	0.001	-0.023**	-0.013	-0.009
	(0.009)	(0.009)	(0.010)	(0.006)
Constant	-0.074***	0.014	-0.015	-0.004***
	(0.017)	(0.020)	(0.019)	(0.009)
B. Participation (Contribution) Rates				
over50	0.014***	-0.019***	-0.005	-0.000
	(0.004)	(0.006)	(0.007)	(0.002)
Constant	-0.022**	0.005	-0.008	-0.008
	(0.009)	(0.014)	(0.014)	(0.003)
Observations	54,748	54,748	54,748	54,748

Notes: The sample is individuals between the ages of 40 and 59 in the 2001 and 2004 SIPP panels that responded to either the IRA or 401(k) ownership questions (spanning the 2002, 2004 and 2005 calendar years). In Panel A, the dependent variable is a dummy variable equal to 1 if a respondent reports owning a particular retirement account. The dependent variable in Panel B is a dummy variable equal to 1 if a respondent reports making a contribution to a particular retirement account. The account ownership and contribution status of those that do not respond to one of the two ownership questions is coded as zero. The independent variable of interest, over50, is a dummy variable equal to one if a respondent will by 50 or older by the end of the calendar year, zero otherwise. All specifications regress outcomes on a polynomial of degree 1 that is allowed to vary on either side of the cutoff and the following covariates: white, black, Hispanic, female, married, personal earned income, number of kids under the age of 18 and three education attainment dummies. Each observation is weighted by its inverse sampling probability in the SIPP. Standard errors (brackets) are clustered at the birth cohort (year) level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 3: The Effect of Eligibility for 'Catch-up Limits' on Retirement Account Contributions (Intensive Margin)

	(1) IRA	(2) 401(k)	(3) IRA or 401(k)	(4) Both IRA & 401(k)
A. Conditional on Positive (COP) Contributions				
over50	95.248	123.157	-25.412	744.492
	(72.553)	(141.207)	(143.915)	(699.701)
Constant	1,490.048***	762.846	962.578**	4,458.366
	(277.372)	(479.959)	(385.926)	(4,507.194)
Observations	2,548	9,120	10,941	719
B. Lee (2009) Bounds: Bandwidth of 2				
Lower bound	-301.792	181.429	173.388	885.596
	(215.117)	(283.462)	(516.757)	(1,661.738)
Upper bound	493.239***	1,104.958***	271.028	1,629.895
	(189.802)	(452.510)	(230.231)	(1,385.021)

Notes: The sample is individuals between the ages of 40 and 59 in the 2001 and 2004 SIPP panels that responded to either the IRA or 401(k) ownership questions (spanning the 2002, 2004 and 2005 calendar years). In Panel A, the sample is restricted to those that make a positive: (i) IRA contribution (column 1), (ii) 401(k) contribution (column 2), (iii) total tax-deferred account contribution (IRA or 401(k)) (column 3); (iv) total tax-deferred contribution (both IRA and 401(k)) (column 4). The sample in Panel B is restricted to those between the ages of 48 and 51. The independent variable of interest, over50, is a dummy variable equal to one if a respondent will by 50 or older by the end of the calendar year, zero otherwise. The specifications in Panel A are from a regression of retirement account contributions on the over50 dummy, a polynomial of degree 1 that is allowed to vary on either side of the cutoff and the following covariates: white, black, Hispanic, female, married, personal earned income, number of kids under the age of 18 and three education attainment dummies. Each observation is weighted by its inverse sampling probability in the SIPP. In Panel A, standard errors (brackets) are clustered at the birth cohort (year) level. In Panels B and C, standard errors are calculated using the delta method. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 4: The Effect of Eligibility for 'Catch-up Limits' on Retirement Saving By Availability of a 401(k) Plan

	(1) Baseline	(2) 2002 and 2005 Years Only	(3) No 401(k) Available	(4) 401(k) Available
A. Total Tax-Deferred (IRA + 401(k)) Contributions				
over50	-16.571	0.610	39.992**	-83.231
	(34.932)	(47.605)	(19.136)	(76.718)
Constant	-278.570***	-144.719	-70.050**	73.821
	(77.627)	(1115.802)	(26.198)	(276.789)
B. Participation (Contribution) Rates				
over50	-0.005	-0.006	0.015*	-0.034**
	(0.007)	(0.009)	(0.009)	(0.014)
Constant	-0.008	0.005	-0.023***	0.218***
	(0.014)	(0.017)	(0.010)	(0.041)
Observations	54,748	30,188	17,471	12,717
% of population	100	100	57.8	42.4

Notes: All dollar amounts are inflated to 2010 dollars using the Bureau of Labor Statistics CPI Inflation Calculator. The sample in column 1 is individuals between the ages of 40 and 59 in the 2001 and 2004 SIPP panels that responded to either the IRA or 401(k) ownership questions (spanning the 2002, 2004 and 2005 calendar years). The sample in column 2 is restricted to the 2002 and 2005 calendar years only. The sample in column 3 (4) is further restricted to those that do not have a 401(k) plan available (do have a 401(k) plan available). In panel A, the dependent variable is a respondent's reported total deductible tax-deferred account (IRA + 401(k)). In panel B, the dependent variable is a dummy variable equal to 1 if the respondent reports making a tax-deferred account (IRA or 401(k)) contribution and zero otherwise. The independent variable of interest, over50, is a dummy variable equal to one if a respondent will by 50 or older by the end of the calendar year, zero otherwise. All specifications are from a regression of outcomes on the over50 dummy, a polynomial of degree 1 that is allowed to vary on either side of the cutoff and the following covariates: white, black, Hispanic, female, married, personal earned income, number of kids under the age of 18 and three education attainment dummies. Each observation is weighted by its inverse sampling probability in the SIPP. Standard errors (brackets) are clustered at the birth cohort (year) level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 5: The Effect of Eligibility for 'Catch-up Limits' on Retirement Account Contributions By Availability of a 401(k) Plan and Wealth

	(1) All	(2) High Wealth	(3) Low Wealth
A. No 401(k) Available			
over50	39.992**	45.754	43.326**
	(19.136)	(36.532)	(15.667)
Constant	-70.050**	-142.496**	-22.773
	(26.198)	(63.604)	(34.450)
Observations	17,471	7,250	10,221
B. 401(k) Available			
over50	-83.231	-37.999	-174.091
	(76.718)	(130.589)	(108.144)
Constant	73.821	211.075	-248.860
	(276.789)	(544.922)	(410.423)
Observations	12,717	7,760	4,957

Notes: All dollar amounts are inflated to 2010 dollars using the Bureau of Labor Statistics CPI Inflation Calculator. The sample in Panel A is restricted to individuals that do not have a 401(k) plan available. The sample in Panel B is restricted to those that do have a 401(k) plan available. The dependent variable is a respondent's total tax-deductible retirement account (IRA plus 401(k)) contribution. Columns 2 and 3 further restrict the sample to high and low wealth individuals respectively. High (low) wealth individuals are those whose predicted net-worth/earnings ratio is above (below) the median for their age. The independent variable of interest, over50, is a dummy variable equal to one if a respondent will by 50 or older by the end of the calendar year, zero otherwise. All specifications are from a regression of outcomes on the over50 dummy, a polynomial of degree 1 that is allowed to vary on either side of the cutoff and the following covariates: white, black, Hispanic, female, married, personal earned income, number of kids under the age of 18 and three education attainment dummies. Each observation is weighted by its inverse sampling probability in the SIPP. Standard errors (brackets) are clustered at the birth cohort (year) level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 6: The Effect of Eligibility for 'Catch-up Limits' on Retirement Account Participation Rates By Availability of a 401(k) Plan and Wealth

	(1) All	(2) High Wealth	(3) Low Wealth
A. No 401(k) Plan Available			
over50	0.015*	0.016	0.018**
	(0.009)	(0.016)	(0.008)
Constant	-0.023**	-0.048**	-0.006
	(0.010)	(0.023)	(0.014)
Observations	17,471	7,250	10,221
B. 401(k) Available			
over50	-0.034**	-0.001	-0.083***
	(0.014)	(0.024)	(0.016)
Constant	0.218***	0.266**	0.162**
	(0.041)	(0.095)	(0.058)
Observations	12,717	7,760	4,957

Notes: The sample in Panel A is restricted to individuals that do not have a 401(k) plan available. The sample in Panel B is restricted to those that do have a 401(k) plan available. The dependent variable is a dummy variable equal to 1 if an individual makes a tax-deductible contribution (IRA or 401(k)) and zero otherwise. Columns 2 and 3 further restrict the sample to high and low wealth individuals respectively. High (low) wealth individuals are those whose predicted net-worth is above (below) the median for their age. The independent variable of interest, over50, is a dummy variable equal to one if a respondent will by 50 or older by the end of the calendar year, zero otherwise. All specifications are from a regression of outcomes on the over50 dummy, a polynomial of degree 1 that is allowed to vary on either side of the cutoff and the following covariates: white, black, Hispanic, female, married, personal earned income, number of kids under the age of 18 and three education attainment dummies. Each observation is weighted by its inverse sampling probability in the SIPP. Standard errors (brackets) are clustered at the birth cohort (year) level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Online Appendix (Not For Publication)

A Robustness Checks

Eligibility for 'catch up limits' causes a large and statistically significant increase in IRA contributions and the likelihood of making a contribution. In this Appendix, I test the sensitivity of the RDD estimates reported in Tables 1-3 with several robustness checks. For brevity, most of the robustness checks reported here are for unconditional IRA contributions, ownership rates and participation rates. Additional robustness checks supporting the small and statistically insignificant effect of eligibility for 'catch-up limits' on 401(k) contributions and total tax-deferred account (IRA plus 401(k)) contributions are available from the author upon request.

Appendix Figure A8 shows RDD estimates for the effect of eligibility for 'catch-up limits' on IRA contributions, ownership rates and participation rates as a function of the bandwidth (age window). Figure A8a shows RDD estimates for IRA contributions, while ownership rates and participation rates are displaced in Figures A8b and A8c respectively. Each figure reports RDD estimates (y-axis) as the age window on each side of the cutoff varies from 4 (46 to 53 year olds) to 20 (30 to 69 year olds). In Figure A8a, the RDD estimates for IRA contributions are very similar to the baseline estimate of $34 across bandwidth choices, increasing slightly for the largest bandwidths. As expected, the confidence intervals narrow for wide bandwidths, although estimates are still statistically significant at the 5 percent level for at least a bandwidth of 6.[36] The dependent variable in Figure A8b is the IRA ownership rate. Regardless of the age window chosen, the RDD estimate for β is always small in magnitude and is never statistically significant, confirming the result in Table 2. Finally, Figure A8c shows that the effect of eligibility for 'catch-up limits' on IRA participation rates is also relatively robust to the choice of bandwidth. Although the RDD estimate is somewhat smaller for narrower bandwidths, I cannot reject that these estimates are statistically different than the baseline estimate of 0.014.

[36]The Imbens and Kalyanaraman (2012) (IK) data driven optimal bandwidth for IRA contributions is 30 years. However, the IK optimal bandwidth is designed for cases when the running variable is continuous. The running variable in this application, age in years, is relatively coarse. To the best of my knowledge, there is no data driven optimal bandwidth selector for cases when the running variable is coarse (discrete). Interestingly, the IK optimal bandwidth when the running variable is age in quarters (and when the dependent variable is IRA contributions) is 43 quarters on each side of the cutoff, which is close to 10 years. In addition to showing that my main results are robust smaller bandwidths, Online Appendix Table A7 shows that the main results similar when the running variable is a SIPP respondent's age in quarters.

It is also standard in RDDs to ask whether the observed ”jump” in IRA contributions and participation rates attributed to eligibility for ‘catch-up limits’ is larger than or similar in magnitude to other random jumps in the data (Lee and Lemieux (2010)). This may be especially important in this application given that savings data in surveys are notoriously noisy. Figures A9, A9b and A9c examine this possibility for IRA contributions, ownership rates and participation rates respectively. Each figure is constructed as follows; I first estimate 1 for 20 placebo cutoffs ranging from age 40 to age 60. A frequency plot for these 20 estimates of β is then plotted; the solid vertical line indicates the RDD estimate for age 50. For IRA contributions (Figure A9c) and participation rates (Figure A9c), the estimate for β at age 50 is the second largest of the 20 placebo RDD estimates. This suggests that the baseline estimates are outliers relative to other random jumps in the data, and are unlikely simply due to chance.

As a final robustness check, I estimate the effect of eligibility for ‘catch-up limits’ on retirement account contributions, ownership rates and participation rates using a differences-in-differences (DD) empirical strategy. One advantage of the DD empirical strategy is that pooling pre- and post-EGTRRA data increases the sample size, allowing me to consider a narrower age window than 10 years. Given that the RDD point estimates are somewhat smaller for narrow bandwidths for both IRA contributions and participation rates, obtaining similar estimates for β using a DD methodology reinforces the baseline results. The disadvantage the DD empirical strategy is that the identification assumption, that the counterfactual savings path of those over age 50 would be similar to those under age 50 in the absence of the introduction of ‘catch-up limits’, is stronger than that the continuity assumption required for the RDD. Online Appendix Tables A5, A6 and A7 report estimates for the effect of eligibility for ‘catch-up limits’ for contributions, ownership rates and participation rates. I report results for a variety of age-windows, ranging from 45-54 to 49-50, with the latter comparing only that savings of 50 and 49 year-olds before and after the signing of the EGTRRA. Reassuringly, estimates using the DD empirical strategy are similar to the baseline RDD estimates in Tables 1 and 2. I conclude that the weight of evidence from these robustness checks supports the baseline results.

B Testing For Changes In The Age Profile of Saving

In Figures 2 and 3, the age profile of IRA contributions and participation rates appears flatter for those over the age of 50 in the post-EGTRRA years. In this Appendix, I test whether the observed flattening of the age profile of IRA saving is statistically significant. I estimate the following regressions[37]

$$R_i = \beta_0 + \beta_1 \text{ over50}_i + \beta_2 \text{ post}_t + \beta_3 \text{ over50} \cdot \text{post}_t + \beta_4 \text{ age}_i + \beta_5 \text{ over50}_i \cdot \text{age}_i$$
$$+\beta_6 \text{ age}_i \cdot \text{post}_t + \beta_7 \text{ over50}_i \cdot \text{age}_i \cdot \text{post}_t + Z_i'\beta_8 + e_i \qquad \text{(B1)}$$

where R_i is the reported IRA contribution (or participation dummy) for individual i, $over50_i$ is a dummy variable equal to 1 if the respondent is 50 or older and post is a dummy variable equal to 1 in the post-EGTRRA years and zero otherwise. Z_i' are baseline covariates and age_i is the RDD running variable, normalized so that age 50 is equal to zero.

This model allows IRA contributions to vary as a flexible linear function of age for those over and under 50, as well as for before and after the introduction of 'catch-up limits'. The specification is similar to the differences-in-discontinuities design described in Grembi et al. (2016). β_3 captures the differential jump in contributions at age 50 between the pre- and post-EGTRRA years. The parameters β_4 to β_7 estimate the change in slope of the age profile of IRA saving. In particular, β_7 captures the differential change in the age profile of saving for those over the age of 50, following the introduction of 'catch-up limits'. Interpreting this estimate as a causal effect requires the additional assumption that the slope of the age profile of saving (at age 50) would have remained unchanged in the absence of 'catch-up limits'. This assumption is strong, both because of differences in economic conditions between the late 1990s and early 2000s, and cohort differences in savings patterns (i.e. the tastes for and ability to save for 50 year olds in 1996 may be very different than for 50 year olds in 2004). The coefficient estimates for IRA contributions are reported in columns 1 and 2 of Appendix Table A10 (the coefficients for participation rates are reported in columns 3 and 4). Not surprisingly, the estimates for β_3, the average effect of eligibility for

[37] This specification is similar to the differences-in-discontinuity design in Grembi, Nannicini, and Troiano (2016).

‘catch-up limits’, are similar to those in Tables 1 and 2. This is because there is no evidence that IRA contributions are discontinuous in age at age 50 in the pre-EGTRRA years. The estimates for β_7 suggests that the age profile of saving flattened after the introduction of ‘catch-up limits’, although the estimates are only marginally statistically significant after the inclusion of covariates (columns 2 and 4).

C Fixed Cost of Making A Contribution

The increases in IRA participation rates described in the text could be rationalized if making a contribution entails significant fixed costs. For example, making a contribution of any size may require incurring time costs to determine the asset allocation for the new funds. How might fixed costs of contributing explain the empirical results? With significant fixed costs of contributing, a saver that would otherwise make the maximum IRA contribution may be deterred from doing so due to the fixed cost. Raising the contribution limit may induce these savers to begin contributing to their IRA. If fixed costs are driving the observed increase in IRA participation rates, however, then the new contributions of those induced to participate must be greater than the initial contribution limit; otherwise contributing prior to the limit change would have been optimal. In the case of 'catch-up limits', this means that those induced to participate must contribute more than \$2,000, the pre-EGTRRA limit.

I test the plausibility of this explanation in two ways. The first test exploits the fact that the jump in IRA contributions at age 50 (the estimate for β) is a weighted average of the increased likelihood of making a contribution and the (mechanical) increase in contributions from those constrained by the pre-EGTRRA limit. By decomposing the estimate for β into these two responses using the RDD coefficient estimates from Tables 1 and 2, I recover an estimate for the average new contribution for those induced to participate. To simplify notation, define the 'catch-up limit' eligibility indicator $D_i = 1$ if $over50_i = 1$ and $D_i = 0$ otherwise. Using formula (3.4.4, p. 98) in Angrist and Pischke (2009), the effect of eligibility for 'catch-up limits' on IRA contributions, $\beta^C = E[Y_i|D_1 = 1, age_i = 50] - E[Y_i|D_i = 0, age_i = 50]$, can be written as

$$\beta^C = \Big(\underbrace{P[R_i > 0|D_i = 1] - P[R_i > 0|D_i = 0]}_{\text{Participation Effect}}\Big) E[R_i > 0, D_i = 1]$$
$$+ \Big(\underbrace{E[R_i|R_i > 0, D_i = 1] - E[Y_i|Y_i > 0, D_i = 0]}_{\text{Conditional-on-positive (COP) Effect}}\Big) P[R_i > 0|D_i = 0] \quad \text{(C1)}$$

For convenience, I suppress the fact that each of the conditional expectations on the right side of C1 are also conditional on $age_i = 50$. Thus, β^C is a weighted average of the increase in IRA participation rates (the participation effect) and the increase in contributions at age 50 by those that would have otherwise (in the absence of 'catch-up limits') made a positive contribution (the COP effect). Under the RDD assumptions, $\beta^P = P[R_i > 0|D_i = 1] - P[R_i > 0|D_i = 0]$ is a consistent estimate of the participation effect, and the probability that those just under 50 make an IRA contribution is $\alpha^P = P[R_i > 0|D_i = 0]$. However, it is not possible to recover an estimate for the average new contributions of those induced to participate directly from this expression. This is because the average new contribution by those at age 50 who contribute a positive amount, $E[R_i|R_i > 0, D_i = 1]$, is itself a weighted average of the new contributions of those induced to participate and the contributions of those constrained by the limit (who would have saved anyway).

Let $s = M$ denote the (marginal) savers induced to participate and s = I denote the inframarginal savers who would have contributed in the absence of 'catch-up limits' The fraction of IRA contributors that are marginal savers (at age 50) is $\psi = \frac{\beta^P}{\alpha^P + \beta^P}$. $E[R_i|R_i > 0, D_i = 1]$ can be written as

$$E[R_i|R_i > 0, D_i = 1] = \psi E[R_i|R_i > 0, D_i = 1, s = M] + (1 - \psi)E[R_i|R_i > 0, D_i = 1, s = I] \quad \text{(C2)}$$

where is the average contribution by inframarginal savers. The statistic of interest, $E[R_i|R_i > 0, D_i = 1, s = M]$, is the average new contribution by those induced to participate. Substituting this expression into C1 and simplifying gives

$$\beta^C = \beta^P E[R_i|R_i > 0, D_i = 1, s = M] + \alpha^P \Big(E[R_i|R_i > 0, D_i = 1, s = I] - E[R_i|R_i > 0, D_i = 0] \Big) \quad \text{(C3)}$$

Although the intensive margin effect, $E[R_i|R_i > 0, D_i = 1, s = I] - E[R_i|R_i > 0, D_i = 0]$, cannot be estimated consistently (because $E[R_i|R_i > 0, D_i = 1, s = I]$ is unobserved), it is bounded below by \$0. It is also bounded above by \$500, since 'catch-up limits' allow those over 50 to contribute at most \$500 more to their IRA than those under the age of 50 during my sample period. Assuming that 'catch-up limits' do not affect the savings decisions of those currently ineligible implies that $\alpha^C = E[R_i|R_i > 0, D_i = 0]$, the estimate for the average IRA contribution by those just under age 50. As described earlier, the parameters β^C, β^P and α^P can be consistently estimated if the RDD is

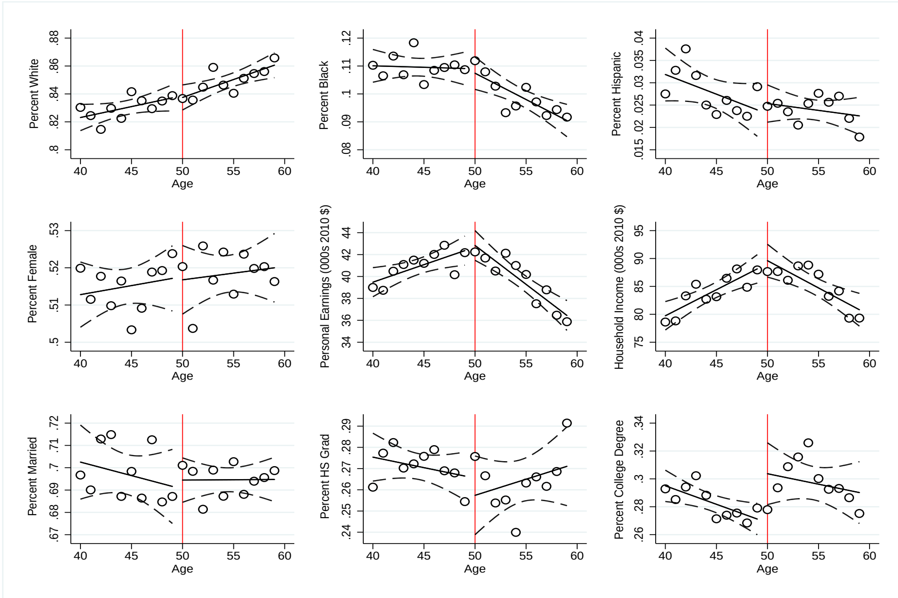
	Value for $E[R_i \| R_i > 0, D_i = 1, s = M] - \alpha^C$ (the intensive margin effect)		
	\$100	\$250	\$400
$E[R_i \| R_i > 0, D_i = 1, s = M]$	\$1,624.160	\$883.884	\$143.607
	(364.429)	(394.925)	(539.347)

valid.

I substitute the RDD estimates for these parameters from Tables 1 and 2 to recover an estimate of $E[R_i|R_i > 0, D_i = 1, s = M]$ for various values of the increase in IRA contributions for infra-marginal savers, $E[R_i|R_i > 0, D_i = 1, s = I] - \alpha^C$ (i.e the intensive margin effect). Standard errors are calculated using the delta method. Regardless of the magnitude of the intensive margin effect, the average contribution by those induced to participate is relatively small and less than the initial IRA contribution limit of \$2,000. For example, even when the intensive marign effect is only \$100, similar to the estimate in Table 3, the average IRA contribution for those induced to participate is only \$1,624 (column 3); the upper 95 percent confidence interval is \$2,338.

To complement the decomposition analysis I also use information in the SIPP about how long individuals have contributed to an IRA to assess whether those induced to participate make large deductible contributions. I calculate the average nominal IRA contribution for those between the ages of 50 and 52 who report that they have contributed to an IRA for less than one year. This procedure is not without limitations however. Notably, the average IRA contribution for those just over 50 and who contributed for less than one year includes those induced to participation by 'catch-up limits', as well as those who would have contributed anyway. With this caveat in mind, the average contribution for these respondents is \$2,669 (\$1,995 in 2001 dollars). Despite the relatively small sample size for this group (77 respondents across all three post-EGTRRA years), varying the age window leads to similar estimates. Overall, there is no strong evidence that most new IRA contributors made deferred contributions larger than \$2,000. This suggests that potentially large fixed costs of making an IRA contribution explaining the participation response in the text is unlikely.

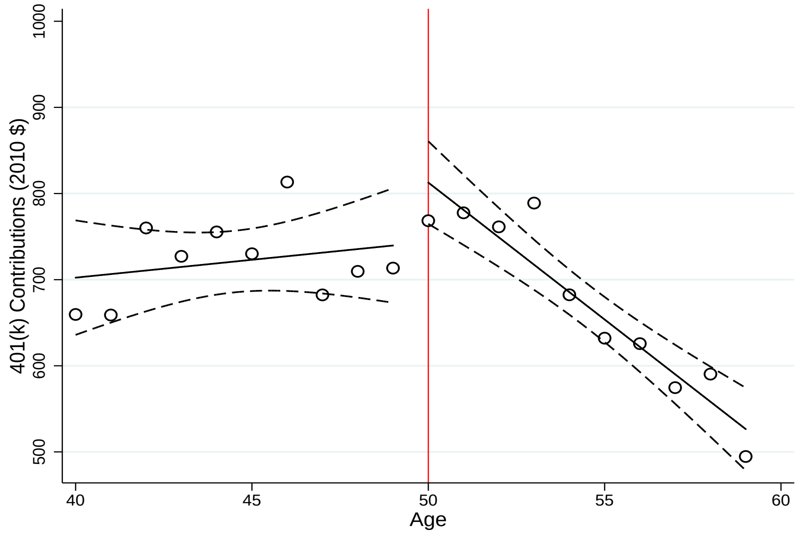
Figure A1: Covariates Balance Test



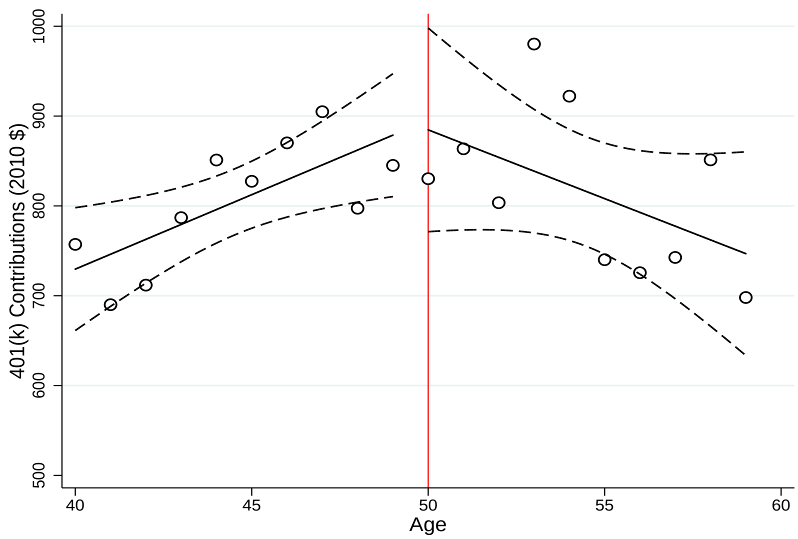
Notes: All dollar amounts are inflated to 2010 dollars using the Bureau of Labor Statistics Inflation Calculator. The sample is all individuals between the ages of 40 and 59 that respond to either the IRA or 401(k) ownership questions in the relevant years. Each figure plots mean values of a covariate against age. The age 50 cutoff is indicated by the solid vertical line.

Figure A2

(a) 401(k) Contributions (2010 $): Pre EGTRRA



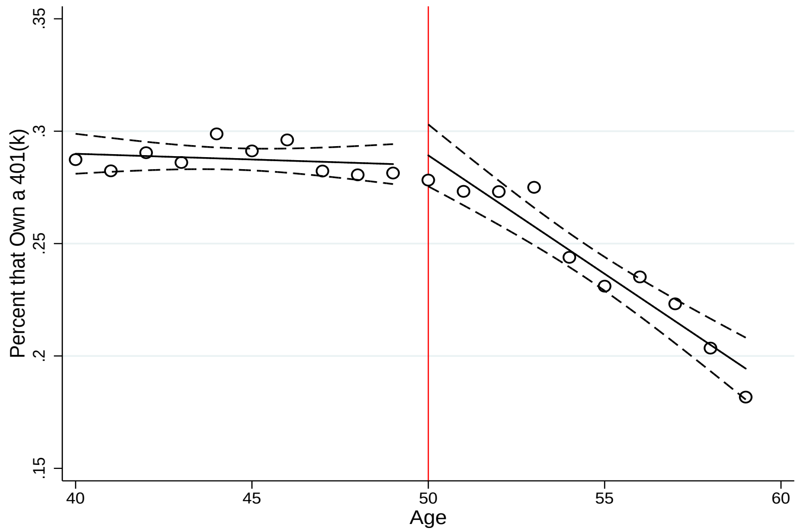
(b) 401(k) Contributions (2010 $): Post EGTRRA



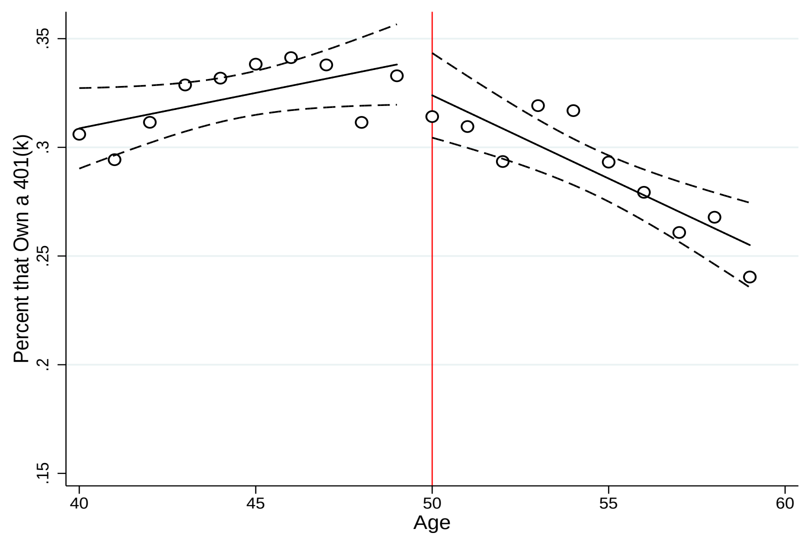
Notes: All dollar amounts are inflated to 2010 dollars using the Bureau of Labor Statistics Inflation Calculator. The sample is all individuals between the ages of 40 and 59 that respond to either the IRA or 401(k) ownership questions in the relevant years. Contributions for those that do not respond to one of the two ownership questions are coded as zero.

Figure A3

(a) 401(k) Ownership Rates: Pre EGTRRA



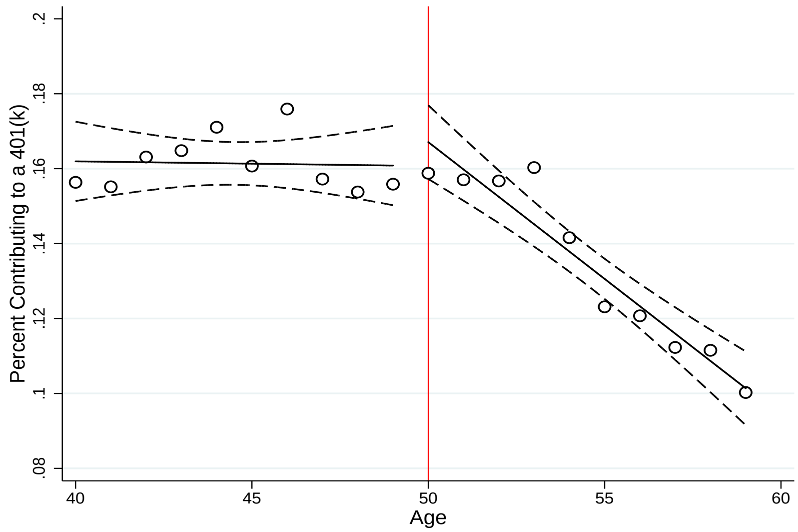
(b) 401(k) Ownership Rates: Post EGTRRA



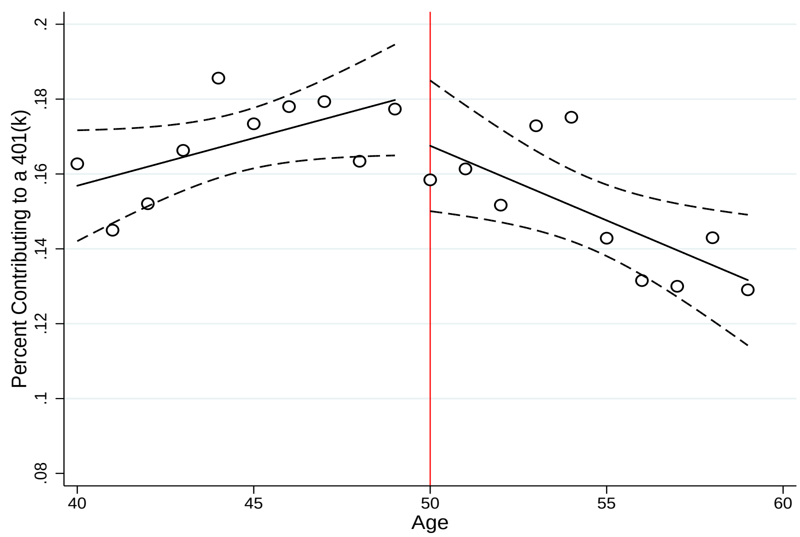
Notes: The sample is all individuals between the ages of 40 and 59 that respond to either the IRA or 401(k) ownership questions in the relevant years. Contributions for those that do not respond to one of the two ownership questions are coded as zero.

Figure A4

(a) 401(k) Participation Rates: Pre EGTRRA



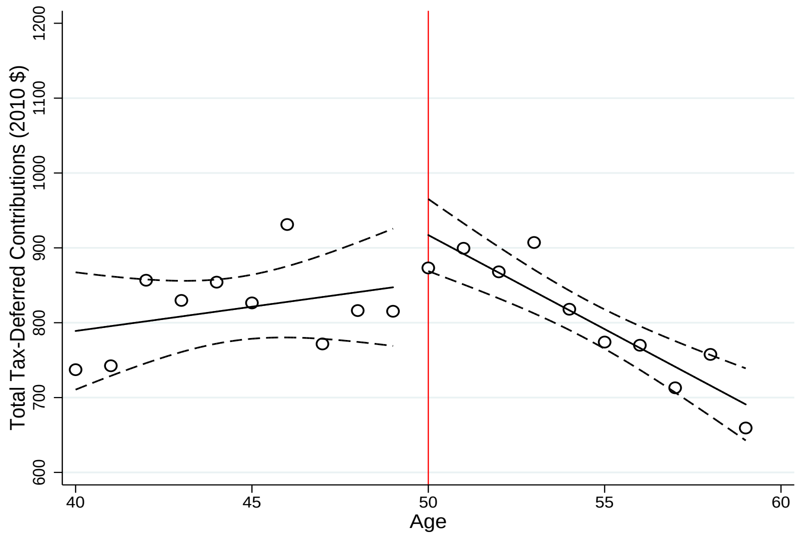
(b) 401(k) Participation Rates: Post EGTRRA



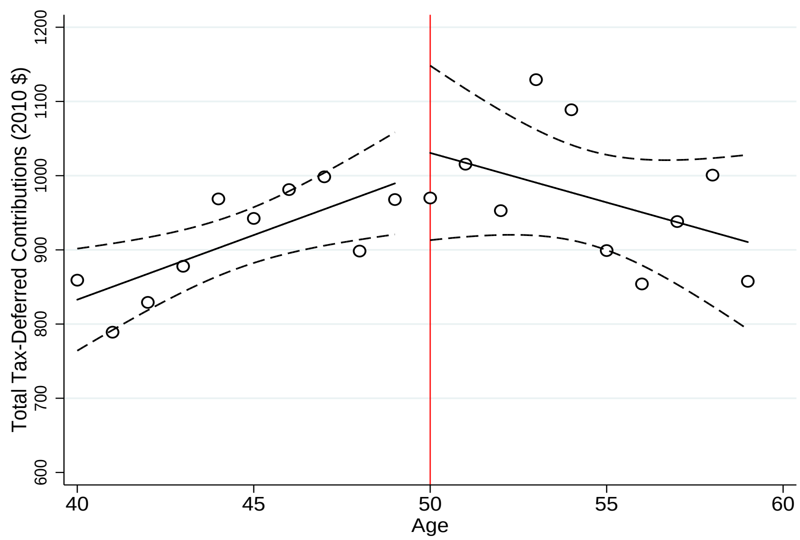
Notes: The sample is all individuals between the ages of 40 and 59 that respond to either the IRA or 401(k) ownership questions in the relevant years. Contributions for those that do not respond to one of the two ownership questions are coded as zero.

Figure A5

(a) Total Tax-Deferred Account (IRA + 401(k)) Contributions: Pre EGTRRA



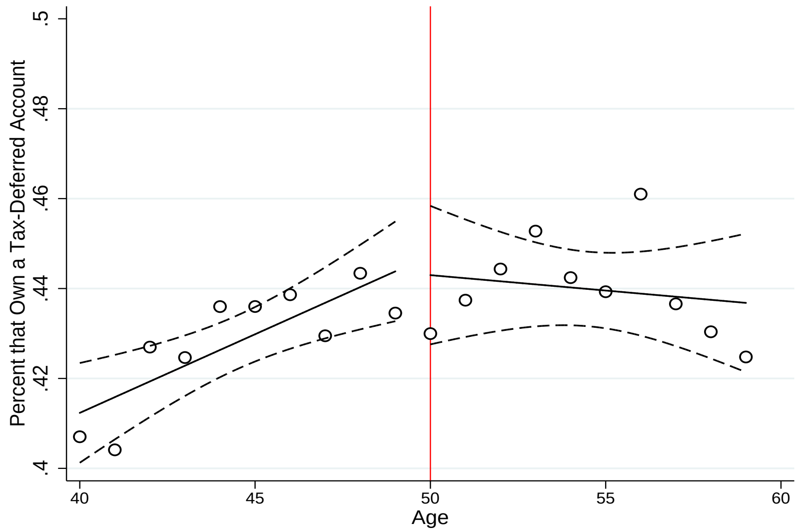
(b) Total Tax-Deferred Account (IRA + 401(k)) Contributions: Post EGTRRA



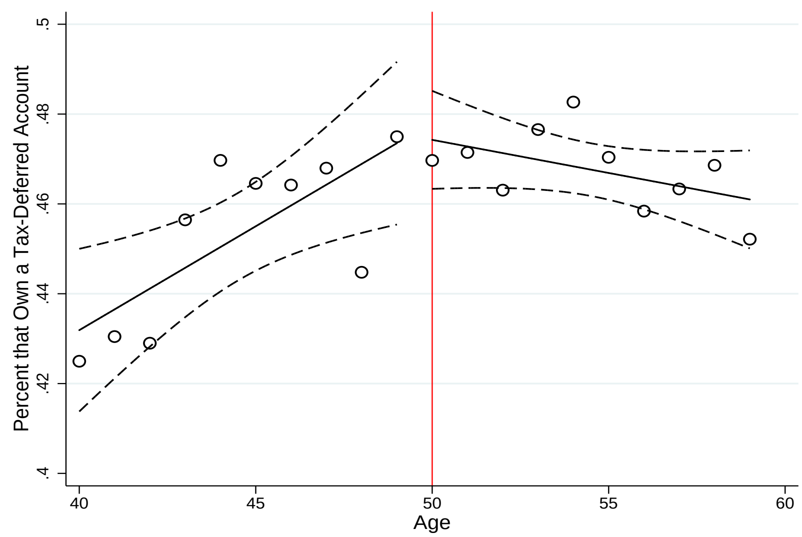
Notes: All dollar amounts are inflated to 2010 dollars using the Bureau of Labor Statistics Inflation Calculator. The sample is all individuals between the ages of 40 and 59 that respond to either the IRA or 401(k) ownership questions in the relevant years. Contributions for those that do not respond to one of the two ownership questions are coded as zero.

Figure A6

(a) Tax-Deferred Account (IRA + 401(k)) Ownership Rates: Pre EGTRRA



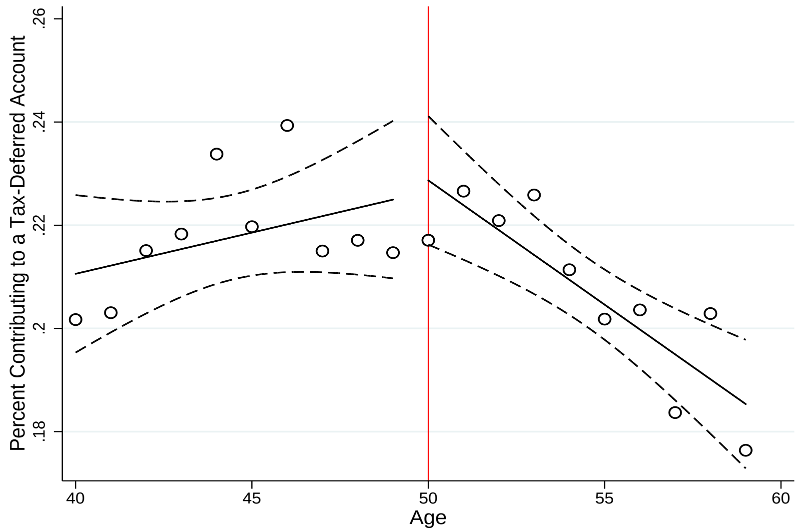
(b) Tax-Deferred Account (IRA + 401(k)) Ownership Rates: Post EGTRRA



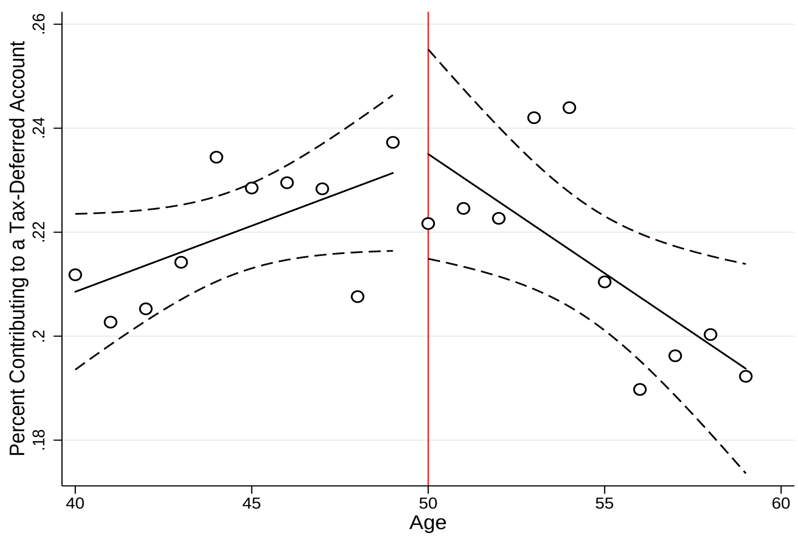
Notes: The sample is all individuals between the ages of 40 and 59 that respond to either the IRA or 401(k) ownership questions in the relevant years. Contributions for those that do not respond to one of the two ownership questions are coded as zero.

Figure A7

(a) Tax-Deferred Account (IRA + 401(k)) Participation Rates: Pre EGTRRA



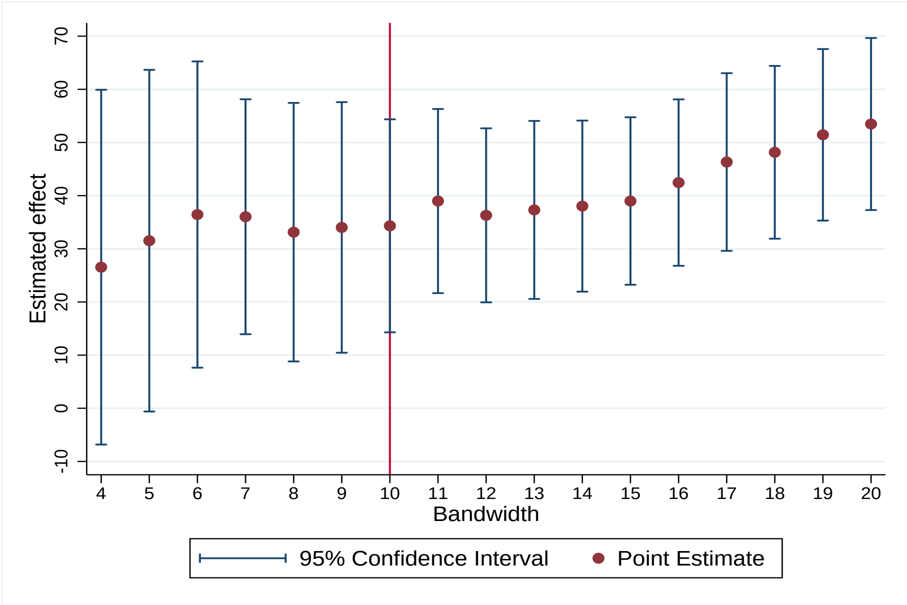
(b) Tax-Deferred Account (IRA + 401(k)) Participation Rates: Post EGTRRA



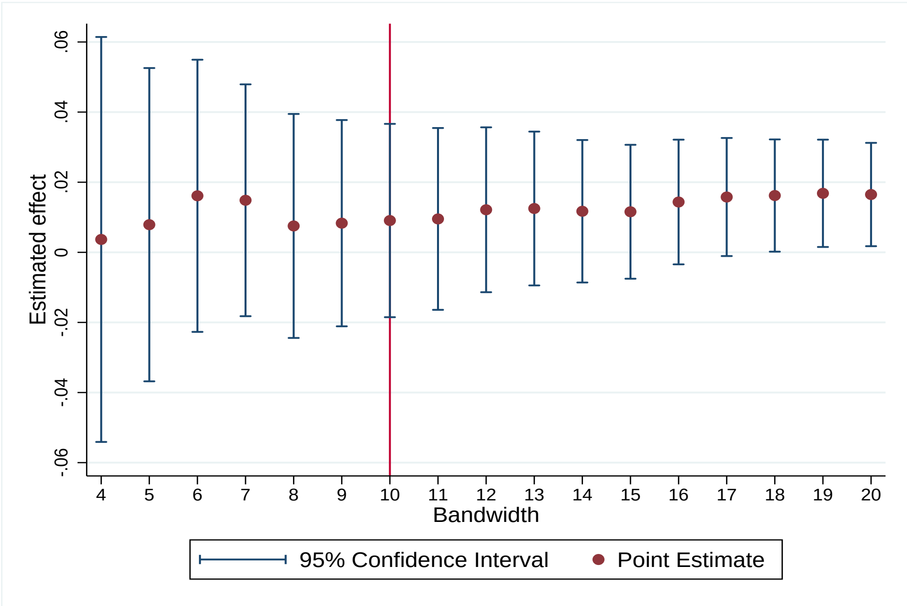
Notes: The sample is all individuals between the ages of 40 and 59 that respond to either the IRA or 401(k) ownership questions in the relevant years. Contributions for those that do not respond to one of the two ownership questions are coded as zero.

Figure A8

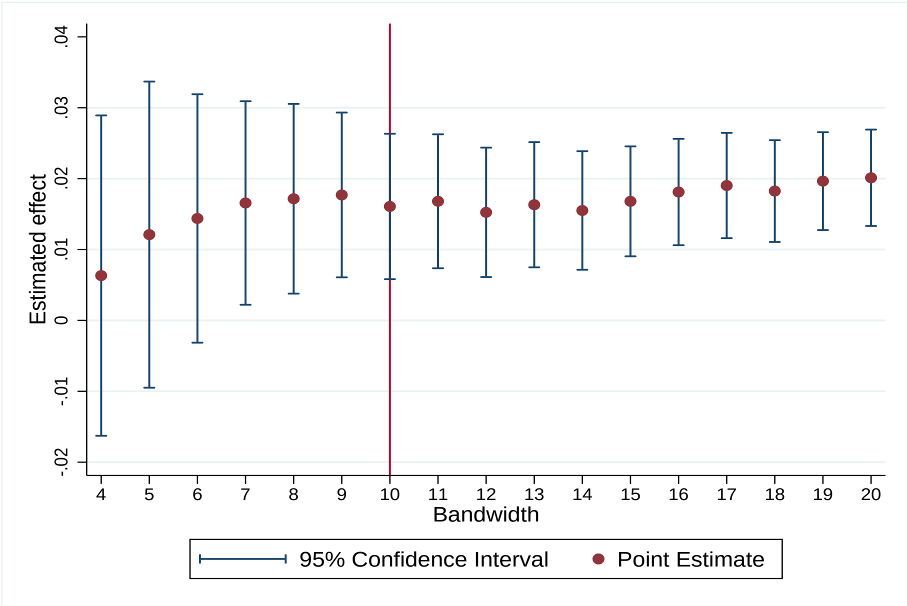
(a) Bandwidth Sensitivity: IRA Contributions (2010 $)



(b) Bandwidth Sensitivity: IRA Ownership Rates



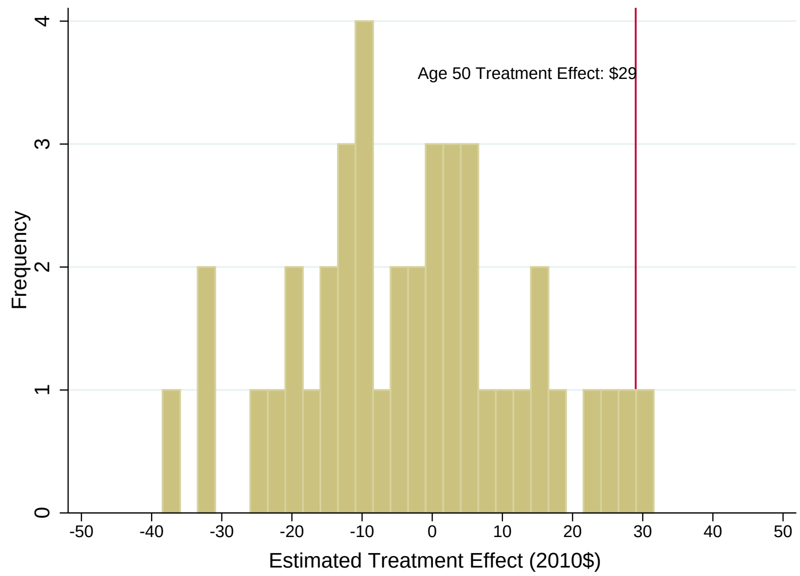
(c) IRA Participation Rates



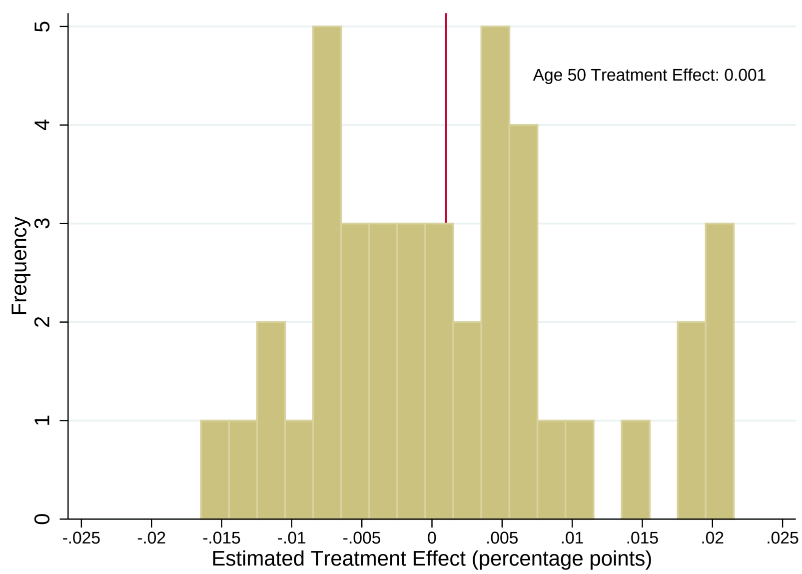
Notes: All dollar amounts are inflated to 2010 dollars using the Bureau of Labor Statistics Inflation Calculator. The sample is all individuals between the ages of 40 and 59 that respond to either the IRA or 401(k) ownership questions in the relevant years. Contributions for those that do not respond to one of the two ownership questions are coded as zero. Figure A8a plots the estimated RDD treatment effects for the effect of eligibility for 'catch-up limits' on IRA contributions for various bandwidths. Figures A8b and A8c plot the same relationship when the dependent variable is the IRA ownership dummy (Figure A8b) and the IRA contribution (participation) dummy (Figure A8c), respectively. The baseline bandwidth of 10 years is indicated by a solid line.

Figure A9

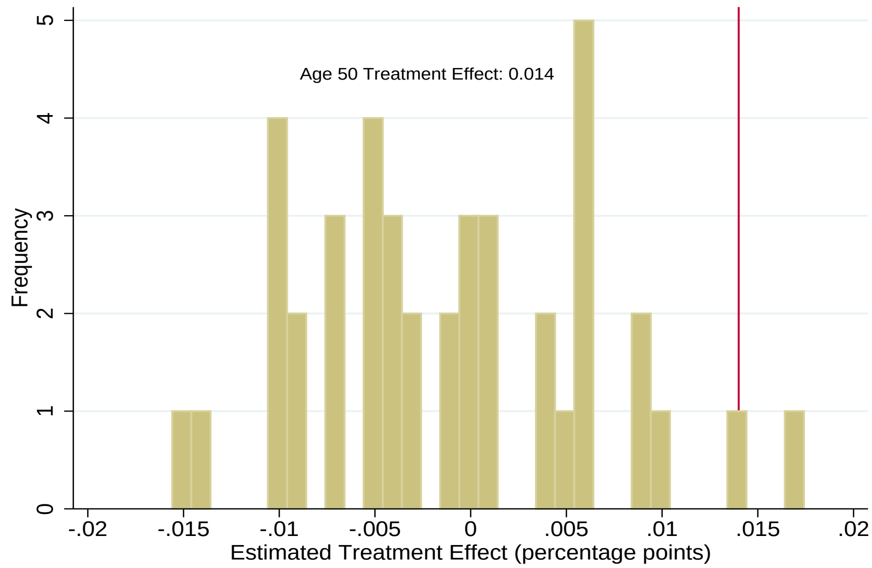
(a) Placebo Cutoffs: IRA Contributions



(b) Placebo Cutoffs: IRA Ownership Rates



(c) IRA Participation Rates



Notes: All dollar amounts are inflated to 2010 dollars using the Bureau of Labor Statistics Inflation Calculator. The sample is all individuals between the ages of 40 and 59 that respond to either the IRA or 401(k) ownership questions in the relevant years. Contributions for those that do not respond to one of the two ownership questions are coded as zero. Appendix Figure A9a is a frequency plot of placebo treatment effect estimates of the effect of eligibility for 'catch-up limits' on IRA contributions. Each placebo estimate is from a local linear regression with an age bandwidth of 10. The placebo age cutoffs vary from age 40 to age 59. The RDD estimate for the "true" age 50 cutoff is indicated by the solid vertical line. Appendix Figures A9b and A9c plot the same relationship when the dependent variable is the IRA ownership rate and IRA participation rate, respectively.

Table A1: Summary Statistics: Post-EGTRRA (pooled)

	Sample		
	(1)	(2)	(3)
Variable	Full Sample	IRA Owners	401(k) Owners
Own IRA	0.217	1.000	0.357
	(0.412)	(0.000)	(0.479)
Made IRA Contribution	0.057	0.260	0.092
	(0.232)	(0.438)	(0.289)
IRA Contribution	99	454	143
	(566)	(1,145)	(672)
Own 401(k)	0.251	0.413	1.000
	(0.434)	(0.492)	(0.000)
Made 401(k) Contribution	0.129	0.228	0.512
	(0.335)	(0.420)	(0.500)
401(k) Contribution	614	1,409	2,439
	(2,224)	(3,446)	(3,901)
Age	42.01	47.32	43.92
	(12.90)	(10.53)	(10.09)
Female	0.512	0.498	0.461
	(0.500)	(0.500)	(0.498)
White	0.826	0.906	0.861
	(0.379)	(0.291)	(0.346)
Black	0.113	0.042	0.084
	(0.316)	(0.200)	(0.277)
Hispanic	0.028	0.028	0.027
	(0.164)	(0.164)	(0.163)
Personal Earnings	32,498	52,279	57,648
	(48,983)	(70,949	(54,757)
HH Income	78,285	108,950	98,798
	(74,867)	(96,544)	(73,823)
HS grad	0.274	0.167	0.207
	(0.446)	(0.373)	(0.405)
Some college	0.346	0.323	0.354
	(0.476)	(0.468)	(0.478)
College degree	0.255	0.491	0.409
	(0.436)	(0.500)	(0.492)
Observations	108,954	23,906	28,063

Notes: All dollar amounts are inflated to 2010 dollars using the Bureau of Labor Statistics CPI Inflation Calculator. The sample in column 1 is individuals between the ages of 18 and 65 in the 2001 and 2004 SIPP panels that responded to either the IRA or 401(k) ownership questions (spanning the 2002, 2004 and 2005 calendar years). The sample in column 2 (3) is IRA owners (401(k) owners) between the ages of 18 and 65 in the 2001 and 2004 SIPP panels. For each variable, the sample mean and standard deviation (parenthesis) is reported.

Table A2: Continuity of the Distribution of Respondents At Age 50

	(1) Respond to IRA or 401(k) ownership question	(2) Respond to Both IRA & 401(k) ownership question	(3) Respond to IRA ownership question	(4) Respond to 401(k) ownership question
over50	0.001	0.000	0.001	0.000
	(0.002)	(0.003)	(0.002)	(0.003)
Constant	0.913***	0.661***	0.910***	0.665***
	(0.013)	(0.018)	(0.013)	(0.018)
Observations	59,504	59,504	59,504	59,504
R-squared	0.000	0.002	0.000	0.008

Notes: The sample is individuals between the ages of 40 and 59 in the 2001 and 2004 SIPP Panels spanning the 2002, 2004 and 2005 calendar years. The dependent variable in column 1 is a dummy variable equal to one if a respondent answered either the IRA or 401(k) ownership question in the SIPP, zero otherwise. In column 2 the dependent variable is a dummy variable equal to one if a respondent answered the IRA ownership and 401(k) ownership question, zero otherwise. The dependent variable in column 3 (4) is a dummy variable equal to one if the respondent answered the IRA (401(k)) ownership question in the SIPP. The independent variable of interest, over50, is a dummy variable equal to one if a respondent will by 50 or older by the end of the calendar year, zero otherwise. The coefficient estimates are from regressions of outcomes on a polynomial of degree 1 that is allowed to vary on either side of the cutoff. Each observation is weighted by its inverse sampling probability in the SIPP. Standard errors (brackets) are clustered at the birth cohort (year) level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A3: Covariates Balance Test

	Full Sample		IRA Owners		401(k) Owners	
	(1)	(2)	(3)	(4)	(5)	(6)
Variable	Control Mean	over50	Control Mean	over50	Control Mean	over50
Female	0.518***	-0.001	0.505***	-0.010	0.470***	0.006
	(0.006)	(0.007)	(0.016)	(0.021)	(0.012)	(0.013)
White	0.839***	-0.001	0.919***	-0.004	0.875***	-0.002
	(0.007)	(0.009)	(0.006)	(0.008)	(0.011)	(0.010)
Black	0.109***	-0.001	0.041***	-0.003	0.087***	-0.007
	(0.006)	(0.006)	(0.004)	(0.006)	(0.010)	(0.010)
Hispanic	0.023***	0.002	0.019***	0.002	0.016***	0.008
	(0.004)	(0.006)	(0.005)	(0.006)	(0.005)	(0.005)
Married	0.690***	0.005	0.747***	-0.012	0.708***	0.012
	(0.010)	(0.011)	(0.019)	(0.024)	(0.014)	(0.018)
Veteran Status	0.082***	0.003	0.058***	0.011	0.098***	-0.003
	(0.004)	(0.008)	(0.009)	(0.013)	(0.010)	(0.013)
Personal Earnings	47,670***	91	60,610***	2,081	63,032***	-254
	(734)	(759)	(2,136)	(3,023)	(1,159)	(1,824)
HH Income	89,041***	363	116,966***	4,976	107,399***	3,652
	(1,747)	(1,433)	(4,683)	(3,679)	(2,610)	(3,083)
Kids $<$ 18	0.691***	-0.090***	0.855***	-0.248***	0.709***	-0.161**
	(0.021)	(0.030)	(0.039)	(0.055)	(0.044)	(0.062)
HS grad	0.266***	-0.007	0.176***	-0.003	0.223***	0.018
	(0.009)	(0.011)	(0.014)	(0.017)	(0.013)	(0.017)
Some college	0.366***	-0.016	0.320***	-0.011	0.390***	-0.046*
	(0.013)	(0.019)	(0.023)	(0.032)	(0.016)	(0.024)
College degree	0.268***	0.034***	0.486***	0.022	0.349***	0.073***
	(0.005)	(0.010)	(0.014)	(0.23)	(0.015)	(0.019)
Observations	54,748		14,651		17,196	

Notes: All dollar amounts are inflated to 2010 dollars using the Bureau of Labor Statistics CPI Inflation Calculator. The sample in columns 1 and 2 is individuals between the ages of 40 and 59 in the 2001 and 2004 SIPP panels that responded to either the IRA or 401(k) ownership questions (spanning the 2002, 2004 and 2005 calendar years). In columns 3 and 4 (5 and 6), the sample is restricted to IRA (401(k)) owners. The independent variable of interest, over50, is a dummy variable equal to one if a respondent will by 50 or older by the end of the calendar year, zero otherwise. The coefficient estimates are from regressions of outcomes on a polynomial of degree 1 that is allowed to vary on either side of the cutoff. Each observation is weighted by its inverse sampling probability in the SIPP. Standard errors (brackets) are clustered at the birth cohort (year) level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A4: Pre-EGTRRA Placebo Check

	(1) IRA	(2) 401(k)	(3) Total Deferred (IRA + 401(k))	(4) Both IRA + 401(k)
A. Contributions				
over50	-5.481	64.129	58.637	-
	(9.187)	(37.999)	(38.708)	-
Constant	110.163***	745.195***	855.357***	-
	(6.319)	(31.874)	(33.914)	-
B. Ownership Rates				
over50	-0.010	0.003	-0.006	-0.001
	(0.006)	(0.012)	(0.011)	(0.006)
Constant	0.268***	0.285***	0.448***	0.105***
	(0.005)	(0.008)	(0.008)	(0.004)
C. Participation Rates				
over50	-0.005	0.006	0.001	-0.001
	(0.005)	(0.008)	(0.008)	(0.003)
Constant	0.077***	0.161***	0.227***	0.011***
	(0.004)	(0.006)	(0.007)	(0.002)
Observations	59,066	59,066	59,066	59,066

Notes: All dollar amounts are inflated to 2010 dollars using the Bureau of Labor Statistics CPI Inflation Calculator. The sample is individuals between the ages of 40 and 59 in the 1996 and 2001 SIPP panels that responded to either the IRA or 401(k) ownership questions (spanning the 1996-1998 and 2001 calendar years). The independent variable of interest, over50, is a dummy variable equal to one if a respondent will by 50 or older by the end of the calendar year, zero otherwise. Each observation is weighted by its inverse sampling probability in the SIPP. Standard errors (brackets) are clustered at the birth cohort (year) level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A5: Retirement Contributions: Difference-in-Differences

Age Bandwidth	(1) 45-54	(2) 46-53	(3) 47-52	(4) 48-51	(5) 49-50
A. IRA Contributions					
over50*post	20.189*	25.657**	25.283**	22.057	13.359
	(10.228)	(8.893)	(11.551)	(16.830)	(17.521)
over50	15.115*	10.011	12.515	9.682	4.407
	(7.602)	(8.081)	(9.189)	(10.961)	(11.983)
post	7.017	3.787	6.972	8.928	21.567
	(5.080)	(5.768)	(5.321)	(8.198)	(12.070)
Constant	4.562	7.462	1.016	18.075	14.293
	(16.367)	(17.840)	(23.350)	(32.215)	(46.850)
B. 401(k) Contributions					
over50*post	-46.295	-70.421	-109.150	-65.258	-82.359
	(79.098)	(90.234)	(108.523)	(135.042)	(151.711)
over50	16.416	32.681	57.476*	61.265*	58.282
	(30.472)	(35.477)	(30.273)	(34.304)	(37.984)
post	113.804*	120.929*	146.327*	124.578	148.964
	(54.932)	(61.665)	(68.987)	(89.023)	(143.181)
Constant	25.876	55.235	65.958	138.281	207.018
	(74.244)	(90.233)	(106.096)	(114.655)	(131.538)
C. Total Tax-Deferred (IRA + 401(k)) Contributions					
over50*post	-26.106	-44.764	-83.867	-43.201	-69.001
	(80.521)	(90.761)	(113.072)	(147.847)	(157.248)
over50	31.531	42.691	69.991*	70.947	62.689
	(29.526)	(36.239)	(32.941)	(40.774)	(47.332)
post	120.821**	124.716*	153.299**	133.506	170.531
	(55.853)	(63.196)	(70.555)	(93.909)	(145.375)
Constant	30.402	62.697	66.974	156.356	221.310
	(78.206)	(91.185)	(109.331)	(108.824)	(133.117)
Observations	58,791	47,192	35,691	24,052	12,034

Notes: The sample is individuals that respondent to either the IRA or 401(k) ownership questions from the 1996, 2001 or 2004 SIPP panels. In each column, the sample is restricted to a particular age window. For example, in column 1, the sample is restricted to individuals between the ages of 45 and 54 (inclusive). The independent variable of interest, over50*post, is a dummy variable equal to one if an individuals is over the age of 50 in 2002, 2004 or 2005 (post-EGTRRA), zero otherwise. Each specification includes the same covariates as in column 3 of Tables 2 and 3. Each observation is weighted by its inverse sampling probability in the SIPP. Standard errors (brackets) are clustered at the birth cohort (year) level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A6: Retirement Account Ownership Rates: Difference-in-Differences

Age Bandwidth	(1) 45-54	(2) 46-53	(3) 47-52	(4) 48-51	(5) 49-50
A. IRAs					
over50*post	-0.006	0.002	0.005	0.005	0.003
	(0.010)	(0.009)	(0.013)	(0.015)	(0.014)
over50	0.029***	0.020***	0.014***	0.009**	0.005
	(0.007)	(0.005)	(0.004)	(0.004)	(0.003)
post	0.009	0.007	0.007	0.009	0.017*
	(0.005)	(0.006)	(0.010)	(0.011)	(0.008)
Constant	-0.034**	-0.035*	-0.039*	-0.016	-0.016
	(0.013)	(0.017)	(0.022)	(0.026)	(0.024)
B. 401(k)s					
over50*post	-0.014	-0.020	-0.020	-0.012	-0.017
	(0.026)	(0.027)	(0.032)	(0.037)	(0.046)
over50	-0.019*	-0.012	-0.007	-0.005	-0.003
	(0.010)	(0.009)	(0.008)	(0.009)	(0.009)
post	0.042**	0.043**	0.042*	0.040	0.049
	(0.017)	(0.017)	(0.020)	(0.026)	(0.040)
Constant	0.039**	0.038**	0.027	0.040*	0.051**
	(0.016)	(0.015)	(0.017)	(0.018)	(0.018)
C. IRAs or 401(k)s					
over50*post	-0.012	-0.011	-0.005	0.007	-0.001
	(0.018)	(0.019)	(0.023)	(0.028)	(0.033)
over50	0.006	0.006	0.003	-0.003	-0.004
	(0.007)	(0.006)	(0.006)	(0.008)	(0.007)
post	0.023*	0.024*	0.023	0.021	0.037
	(0.013)	(0.012)	(0.016)	(0.021)	(0.026)
Constant	0.010	0.011	-0.009	0.016	0.015
	(0.016)	(0.016)	(0.017)	(0.021)	(0.025)
D. Both IRAs and 401(k)s					
over50*post	-0.008	-0.007	-0.011	-0.014	-0.012
	(0.013)	(0.016)	(0.021)	(0.024)	(0.027)
over50	0.004	0.002	0.003	0.008	0.005
	(0.004)	(0.004)	(0.005)	(0.005)	(0.004)
post	0.028***	0.026**	0.026*	0.029	0.029
	(0.009)	(0.011)	(0.014)	(0.017)	(0.022)
Constant	-0.005	-0.007	-0.003	0.008	0.029
	(0.010)	(0.012)	(0.017)	(0.019)	(0.022)
Observations	58,791	47,192	35,691	24,052	12,034

Notes: The sample is individuals that respondent to either the IRA or 401(k) ownership questions from the 1996, 2001 or 2004 SIPP panels. In each column, the sample is restricted to a particular age window. For example, in column 1, the sample is restricted to individuals between the ages of 45 and 54 (inclusive). The independent variable of interest, over50*post, is a dummy variable equal to one if an individuals is over the age of 50 in 2002, 2004 or 2005 (post-EGTRRA), zero otherwise. Each specification includes the same covariates as in column 3 of Tables 2 and 3. Each observation is weighted by its inverse sampling probability in the SIPP. Standard errors (brackets) are clustered at the birth cohort (year) level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A7: Retirement Account Participation Rates: Difference-in-Differences

	(1)	(2)	(3)	(4)	(5)
Age Bandwidth	45-54	46-53	47-52	48-51	49-50
A. IRAs					
over50*post	0.008	0.010**	0.009	0.005	0.001
	(0.005)	(0.005)	(0.006)	(0.010)	(0.009)
over50	0.006*	0.005	0.005	0.005	0.003
	(0.003)	(0.003)	(0.004)	(0.005)	(0.005)
post	-0.004*	-0.006*	-0.004	-0.003	0.008
	(0.002)	(0.003)	(0.004)	(0.006)	(0.005)
Constant	0.001	0.002	0.002	0.012	0.021
	(0.007)	(0.007)	(0.009)	(0.014)	(0.022)
B. 401(k)s					
over50*post	-0.012	-0.017	-0.022	-0.018	-0.023
	(0.015)	(0.016)	(0.017)	(0.020)	(0.025)
over50	-0.006	-0.003	0.001	0.004	0.003
	(0.006)	(0.007)	(0.006)	(0.005)	(0.008)
post	0.011	0.012	0.016	0.015	0.022
	(0.010)	(0.010)	(0.012)	(0.014)	(0.023)
Constant	0.032***	0.036***	0.037***	0.046**	0.060***
	(0.008)	(0.009)	(0.012)	(0.015)	(0.013)
C. IRAs or 401(k)s					
over50*post	-0.005	-0.008	-0.013	-0.010	-0.019
	(0.013)	(0.014)	(0.016)	(0.022)	(0.022)
over50	-0.000	0.001	0.006	0.007	0.003
	(0.006)	(0.007)	(0.005)	(0.006)	(0.008)
post	0.003	0.002	0.007	0.007	0.023
	(0.009)	(0.010)	(0.011)	(0.015)	(0.020)
Constant	0.033***	0.037***	0.037**	0.053**	0.075***
	(0.010)	(0.011)	(0.015)	(0.019)	(0.021)
D. Both IRAs and 401(k)s					
over50*post	0.001	0.001	-0.000	-0.002	-0.002
	(0.003)	(0.004)	(0.005)	(0.006)	(0.008)
over50	-0.000	0.000	0.001	0.002	0.003
	(0.001)	(0.002)	(0.002)	(0.003)	(0.005)
post	0.004*	0.004	0.004	0.005	0.007
	(0.020)	(0.002)	(0.003)	(0.004)	(0.006)
Constant	-0.000	0.001	0.002	0.004	0.006
	(0.003)	(0.003)	(0.004)	(0.006)	(0.009)
Observations	58,791	47,192	35,691	24,052	12,034

Notes: The sample is individuals that respondent to either the IRA or 401(k) ownership questions from the 1996, 2001 or 2004 SIPP panels. In each column, the sample is restricted to a particular age window. For example, in column 1, the sample is restricted to individuals between the ages of 45 and 54 (inclusive). The independent variable of interest, over50*post, is a dummy variable equal to one if an individuals is over the age of 50 in 2002, 2004 or 2005 (post-EGTRRA), zero otherwise. Each specification includes the same covariates as in column 3 of Tables 2 and 3. Each observation is weighted by its inverse sampling probability in the SIPP. Standard errors (brackets) are clustered at the birth cohort (year) level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A8: Sensitivity to Sample Choice (Respondent to IRA and 401(k) Ownership Questions)

	(1)	(2)	(3)	(4)	(5)	(6)
	Baseline	Respond to Both	Baseline	Respond to Both	Baseline	Respond to Both
	Contributions		Ownership Rates		Participation Rates	
A. IRAs						
over50	34.315***	36.919***	0.009	0.013	0.016***	0.017***
	(10.222)	(11.892)	(0.014)	(0.016)	(0.005)	(0.005)
Constant	111.385***	113.847***	0.270***	0.290***	0.067***	0.070***
	(5.977)	(8.725)	(0.011)	(0.014)	(0.004)	(0.005)
B. 401(k)s						
over50	-14.939	5.015	-0.019	-0.015	-0.015	-0.016
	(105.216)	(140.958)	(0.028)	(0.037)	(0.016)	(0.020)
Constant	895.812***	1,235.830***	0.341***	0.468***	0.182***	0.252***
	(82.275)	(98.911)	(0.022)	(0.024)	(0.013)	(0.015)
C. Total Deferred (IRA + 401(k)						
over50	19.375	41.934	-0.004	0.001	0.000	-0.000
	(112.436)	(146.998)	(0.024)	(0.028)	(0.016)	(0.020)
Constant	1,007.197***	1,349.677***	0.478***	0.575***	0.234***	0.300***
	(84.401)	(102.401)	(0.018)	(0.020)	(0.013)	(0.016)
Observations	54,748	37,632	54,748	37,632	54,748	37,632

Notes: All dollar amounts are inflated to 2010 dollars using the Bureau of Labor Statistics CPI Inflation Calculator. The sample in columns 1, 3 and 5 is individuals between the ages of 40 and 59 in the 2001 and 2004 SIPP panels that responded to either the IRA or 401(k) ownership questions (spanning the 2002, 2004 and 2005 calendar years). The sample in columns 2, 4 and 6 is individuals between the ages of 40 and 59 in the 2001 and 2004 SIPP panels that respond to both the IRA and 401(k) ownership questions (spanning the 2002, 2004 and 2005 calendar years). The dependent variable in columns 1 and 2 is an individual?s retirement account contribution. In columns 3 and 4 (5 and 6), the dependent variable is a dummy variable equal to one if a respondent reports owning a retirement account (making a deductible contribution), zero otherwise. The independent variable of interest, over50, is a dummy variable equal to one if a respondent will by 50 or older by the end of the calendar year, zero otherwise. Each observation is weighted by its inverse sampling probability in the SIPP. Standard errors (brackets) are clustered at the birth cohort (year) level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A9: Age in Quarters Running Variable Robustness Check

	(1) IRAs	(2) 401(k)s	(3) Total Tax-Deferred (IRA + 401(k))
A. Contributions			
over50	35.062**	7.130	42.191
	(10.210)	(52.280)	(54.286)
Constant	110.077***	887.561***	997.638***
	(7.685)	(33.630)	(36.448)
B. Ownership Rates			
over50	0.010	-0.014*	-0.001
	(0.008)	(0.008)	(0.009)
Constant	0.268***	0.340***	0.476***
	(0.004)	(0.006)	(0.006)
C. Participation Rates			
over50	0.017***	-0.012	0.004
	(0.006)	(0.007)	(0.009)
Constant	0.067***	0.181***	0.232***
	(0.004)	(0.005)	(0.006)

Notes: The sample, dependent and independent variables of interest are defined as of Tables 2 and 3. The assignment (running) variable is a respondent's age in quarters, relative to a 50 year old in the current calendar year. Each observation is weighted by its inverse sampling probability in the SIPP. Standard errors (brackets) are clustered at the birth cohort (year) level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A10: Testing for Changes in the Age Profile of IRA Saving

	(1)	(2)	(3)	(4)
	Contributions		Participation Rates	
over50*post	39.796***	33.660**	0.021***	0.018**
	(14.175)	(14.564)	(0.007)	(0.007)
over50	-5.481	-4.765	-0.005	-0.005
	(9.161)	(9.356)	(0.005)	(0.004)
post	1.222	4.608	-0.010**	-0.008*
	(7.292)	(7.358)	(0.005)	(0.004)
age	2.381**	0.507	0.002***	0.001
	(0.941)	(0.961)	(0.001)	(0.001)
over50*age	4.234***	7.906***	0.001	0.003***
	(0.941)	(0.961)	(0.001)	(0.001)
age*post	-1.586	-0.623	-0.002**	-0.001*
	(0.957)	(0.978)	(0.001)	(0.001)
over50*age*post	-3.003	-5.866*	-0.002	-0.003***
	(3.009)	(2.935)	(0.001)	(0.001)
Constant	110.164***	-14.501	0.077***	-0.002
	(6.301)	(12.244)	(0.004)	(0.006)
Covariates	N	Y	N	Y
Observations	113,814	113,814	113,814	113,814

Notes: All dollar amounts are inflated to 2010 dollars using the Bureau of Labor Statistics CPI Inflation Calculator. The sample is individuals between the ages of 40 and 59 in the 1996, 2001 and 2004 SIPP panels that responded to either the IRA or 401(k) ownership questions (spanning the 1996-1998, 2001-2002, and 2004-2005 calendar years). The dependent variable in columns 1 and 2 is a respondent's reported deductible IRA contribution. The dependent variable in columns 3 and 4 is a dummy variable equal to one of a respondent reports making a deductible IRA contribution, and zero otherwise. Contributions for those that do not respond to one of the two ownership questions is coded a zero. The specifications in columns 2 and 4 add the following covariates: white, black, Hispanic, female, married, personal earned income, number of kids under the age of 18 and three education attainment dummies to the baseline specifications in columns 1 and 3. Each observation is weighted by its inverse sampling probability in the SIPP. Standard errors (brackets) are clustered at the birth cohort (year) level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A11: Continuity in the Percentage of Individuals Whose Employer Offers a 401(k) Plan

	(1)	(2)	(3)
over50	0.008	0.008	0.001
	(0.009)	(0.010)	(0.010)
Constant	0.438***	0.443***	0.103***
	(0.009)	(0.010)	(0.025)
Year FE	N	Y	Y
Covariates	N	N	Y

Notes: The sample is individuals between the ages of 40 and 59 in the Wave 7 Topical Modules of the 2001 and 2004 SIPP panels who also responded to either the IRA or 401(k) ownership questions (spanning the 2002 and 2005 calendar years). The dependent variable is a dummy variable equal to one if a respondent's employer offers a 401(k) plan and zero otherwise. The specification in column 1 is from a regression of outcomes on a polynomial of degree 1 that is allowed to vary on either side of the cutoff. The specification in column 2 adds year fixed effects to the specification in column 1. The specification in column 3 adds the following covariates: white, black, Hispanic, female, married, personal earned income, number of kids under the age of 18 and three education attainment dummies. Each observation is weighted by its inverse sampling probability in the SIPP. Standard errors (brackets) are clustered at the birth cohort (year) level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A12: Differences Between Individuals With and Without Access to a 401(k) Plan

	(1) White	(2) Black	(3) Hispanic	(4) Female	(5) Married	(6) Veteran
401(k) Available	0.037***	-0.019***	-0.005**	-0.072***	0.022***	0.025***
	(0.005)	(0.004)	(0.002)	(0.007)	(0.006)	(0.005)
Constant	0.826***	0.112***	0.025***	0.543***	0.695***	0.102***
	(0.004)	(0.003)	(0.002)	(0.004)	(0.004)	(0.012)

	(7) Personal Earnings	(8) HH Earnings	(9) Large Employer	(10) HS Grad	(11) Some College	(12) College Degree
401(k) Available	29,643***	25,888***	0.514***	-0.089***	0.022***	0.167***
	(693)	(1,100)	(0.007)	(0.006)	(0.005)	(0.008)
Constant	27,474***	72,690***	0.182***	0.322***	0.322***	0.220***
	(419)	(847)	(0.006)	(0.004)	(0.004)	(0.005)

Notes: The sample is individuals between the ages of 40 and 59 in the Wave 7 Topical Modules of the 2001 and 2004 SIPP panels who also responded to either the IRA or 401(k) ownership questions (spanning the 2002 and 2005 calendar years). The dependent variable in each column is the listed covariate. Each observation is weighted by its inverse sampling probability in the SIPP. Standard errors (brackets) are clustered at the birth cohort (year) level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A13: The Effect of Eligibility for 'Catch-up Limits' on Retirement Account Contributions By Availability of a 401(k) Plan, 401(k) Limit Status and Year

	(1)	(2)	(3)	(4)
	No 401(k) Available		401(k) Available	
	2002	2005	2002	2005
A. IRA Contributions				
over50*401(k) limit	-	-	184.789	2.057
	-	-	(167.084)	(136.845)
over50	19.799	60.549**	-28.959	-16.411
	(30.714)	(22.367)	(24.554)	(26.987)
401(k) limit	-	-	63.695	189.323**
	-	-	(113.051)	(77.691)
Constant	-8.453	-111.543***	82.688	-21.906
	(39.837)	(24.945)	(49.874)	(52.961)
B. 401(k) Contributions				
over50*401(k) limit	-	-	84.727	281.430*
	-	-	(79.728)	(144.665)
over50	-	-	-120.227	-243.120***
	-	-	(69.646)	(68.884)
401(k) limit	-	-	11,412.22***	11,488.67***
	-	-	(71.920)	(107.224)
Constant	-	-	697.025***	520.512***
	-	-	(240.938)	(130.800)
C. Total Tax-Deferred (IRA + 401(k)) Contributions				
over50*401(k) limit	-	-	269.515	283.487
	-	-	(224.862)	(213.941)
over50	19.799	60.549**	-149.185**	-259.532***
	(30.714)	(22.367)	(67.950)	(75.032)
401(k) limit	-	-	11,475.91***	11,677.99***
	-	-	(168.386)	(113.750)
Constant	-8.453	-111.543***	779.713***	498.606***
	(39.837)	(24.945)	(239.442)	(157.420)
Observations	7,231	10,240	5,237	7,480

Notes: All dollar amounts are inflated to 2010 dollars using the Bureau of Labor Statistics CPI Inflation Calculator. The sample in columns 1 (2) is restricted to individuals without access to an employer-sponsored 401(k) plan in 2002 (2005). The sample in columns 3 (4) is restricted to individuals with access to an employer-sponsored 401(k) plan in 2002 (2005). In panel A, the dependent variable is a respondent's reported IRA contribution. In panel B (C), the dependent variable is a respondent's reported 401(k) (total tax-deferred (IRA + 401(k)) contribution. All specifications are from a regression of outcomes on the over50 dummy, a 401(k) limit contributor indicator variable, the interaction of the over50 and 401(k) limit dummies, a polynomial of degree 1 that is allowed to vary on either side of the cutoff and the following covariates: white, black, Hispanic, female, married, personal earned income, number of kids under the age of 18 and three education attainment dummies. Each observation is weighted by its inverse sampling probability in the SIPP. Standard errors (brackets) are clustered at the birth cohort (year) level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A14: The Effect of Eligibility for 'Catch-up Limits' on Retirement Account Participation Rates By Availability of a 401(k) Plan, 401(k) Limit Status and Year

	(1)	(2)	(3)	(4)
	No 401(k) Available		401(k) Available	
	2002	2005	2002	2005
A. IRA Participation Rate				
over50*401(k) limit	-	-	-0.008	-0.005
	-	-	(0.058)	(0.033)
over50	0.010	0.021***	0.010	-0.011
	(0.016)	(0.007)	(0.011)	(0.013)
401(k) limit	-	-	0.025	0.015
	-	-	(0.049)	(0.025)
Constant	-0.018	-0.026**	0.086**	-0.004
	(0.018)	(0.011)	(0.030)	(0.031)
B. 401(k) Participation Rate				
over50*401(k) limit	-	-	0.022	0.021
	-	-	(0.014)	(0.014)
over50	-	-	-0.059***	-0.043**
	-	-	(0.016)	(0.018)
401(k) limit	-	-	0.753***	0.615***
	-	-	(0.013)	(0.014)
Constant	-	-	0.218***	0.296***
	-	-	(0.049)	(0.057)
C. Total Tax-Deferred (IRA + 401(k)) Participation Rate				
over50*401(k) limit	-	-	0.007	0.014
	-	-	(0.014)	(0.016)
over50	0.010	0.021***	-0.047***	-0.032*
	(0.016)	(0.007)	(0.011)	(0.018)
401(k) limit	-	-	0.673***	0.524***
	-	-	(0.015)	(0.014)
Constant	-0.018	-0.026**	0.299***	0.276***
	(0.018)	(0.011)	(0.051)	(0.060)
Observations	7,231	10,240	5,237	7,480

Notes: The sample is the same as in Table A13. In panel A, the dependent variable is a dummy variable equal to one if a respondent reports making a deductible IRA contribution, and is equal to zero otherwise. In panel B (C), the dependent variable is a dummy variable equal to one if a respondent reports making a deductible 401(k) contribution (either an IRA or a 401(k)) contribution, and is equal to zero otherwise. All specifications are from a regression of outcomes on the over50 dummy, a polynomial of degree 1 that is allowed to vary on either side of the cutoff and the following covariates: white, black, Hispanic, female, married, personal earned income, number of kids under the age of 18 and three education attainment dummies. Each observation is weighted by its inverse sampling probability in the SIPP. Standard errors (brackets) are clustered at the birth cohort (year) level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A15: Tobit Model Specification

	(1)	(2)	(3)
A. IRA Contributions			
over50	639.257***	642.547***	448.060***
	(210.861)	(175.499)	(167.547)
Constant	-10,392.581***	-10,757.504***	-14,889.517***
	(254.810)	(267.605)	(613.387)
B. 401(k) Contributions			
over50	-407.649	-382.475	-597.085***
	(614.510)	(241.752)	(190.134)
Constant	-8,910.912***	-10,722.858***	-17,152.007***
	(587.453)	(343.409)	(699.835)
C. Total Tax-Deferred (IRA + 401(k)) Contributions			
over50	-49.526	-28.119	-283.339*
	(512.934)	(215.605)	(158.602)
Constant	-7,234.776***	-8,713.553***	-15,211.721***
	(454.836)	(259.771)	(575.454)
Year FE	Y	Y	Y
Covariates	N	N	Y
Observations	54,748	54,748	54,748

Notes: All dollar amounts are inflated to 2010 dollars using the Bureau of Labor Statistics CPI Inflation Calculator. The sample is individuals between the ages of 40 and 59 in the 2001 and 2004 SIPP panels that responded to either the IRA or 401(k) ownership questions (spanning the 2002, 2004 and 2005 calendar years). The dependent variable in Panel A is a respondent's reported deductible IRA contribution. In Panel B the dependent variable is the respondent?s reported deductible 401(k) contribution; in Panel C it is the sum of the respondent's IRA and 401(k) contribution. Contributions for those that do not respond to one of the two ownership questions is coded a zero. The independent variable of interest, over50, is a dummy variable equal to one if a respondent will by 50 or older by the end of the calendar year, zero otherwise. The specification in column 1 is from a Tobit regression of outcomes on a polynomial of degree 1 that is allowed to vary on either side of the age-50 cutoff. The specification in column 2 adds year fixed effects to the specification in column 1. The specification in column 3 adds the following covariates: white, black, Hispanic, female, married, personal earned income, number of kids under the age of 18 and three education attainment dummies. All specifications assume that contributions are censored at $0. Each observation is weighted by its inverse sampling probability in the SIPP. Standard errors (brackets) are clustered at the birth cohort (year) level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A16: Consumer Expenditure Survey Data: Effect of Eligibility for 'Catch-up Limits' on Retirement Account Contributions

	(1)	(2)	(3)
A. IRA Contributions			
over50	47.473	47.828	44.858
	(28.553)	(28.636)	(26.109)
Constant	196.038***	196.173***	-126.613***
	(8.377)	(9.444)	(36.003)
B. 401(k) Contributions			
over50	0.550	2.683	-6.909
	(28.853)	(31.906)	(27.179)
Constant	140.4582***	415.438***	-24.238
	(22.337)	(34.916)	(37.569)
C. Total Tax-Deferred (IRA + 401(k)) Contributions			
over50	55.655	58.566	43.321
	(52.780)	(55.949)	(45.721)
Constant	398.083***	742.490***	-165.939**
	(30.327)	(45.158)	(58.321)
Year FE	Y	Y	Y
Covariates	N	N	Y
Observations	16,354	16,354	16,354

Notes: All dollar amounts are inflated to 2010 dollars using the Bureau of Labor Statistics CPI Inflation Calculator. The sample is individuals between the ages of 40 and 59 in the 2002, 2004 and 2005 Consumer Expenditure Survey (CEX). The dependent variable in Panel A is a respondent's reported IRA contribution. In Panel B the dependent variable is the respondent's reported private pension plan (e.g. 401(k)) contribution; in Panel C it is the sum of the respondent's IRA and 401(k) contribution. Contributions for those that do not respond the IRA or 401(k) contribution questions are coded as zero. The independent variable of interest, over50, is a dummy variable equal to one if a respondent reports being age 50 or older, zero otherwise. The specification in column 1 is from a regression of outcomes on a polynomial of degree 1 that is allowed to vary on either side of the age-50 cutoff. The specification in column 2 adds year fixed effects to the specification in column 1. The specification in column 3 adds the following covariates: white, black, female, married, personal earned income, number of kids under the age of 18 and three education attainment dummies. Standard errors (brackets) are clustered at the age level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A17: Consumer Expenditure Survey Data: Effect of Eligibility for 'Catch-up Limits' on Retirement Account Participation Rates

	(1) IRA	(2) 401(k)	(3) IRA or 401(k)	(4) Both IRA and 401(k)
over50	0.007	-0.005	0.003	-0.001
	(0.007)	(0.003)	(0.008)	(0.001)
Constant	-0.026**	0.031***	0.004	0.001
	(0.009)	(0.005)	(0.009)	(0.002)
Observations	16,354	16,354	16,354	16,354

Notes: The sample is individuals between the ages of 40 and 59 in the 2002, 2004 and 2005 Consumer Expenditure Survey (CEX). The dependent variable is a dummy variable equal to 1 if a respondent reports making a contribution to a particular retirement account. The independent variable of interest, over50, is a dummy variable equal to one if a respondent reports being age 50 or older, zero otherwise. All specifications regress outcomes on a polynomial of degree 1 that is allowed to vary on either side of the cutoff, year fixed effects and the following covariates: white, black, female, married, personal earned income, number of kids under the age of 18 and three education attainment dummies. Standard errors (brackets) are clustered at the age level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.