The Effect of Required Minimum Distribution Rules on Withdrawals from Traditional Individual Retirement Accounts

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Abstract

Traditional Individual Retirement Accounts (IRAs) are a substantial source of retirement savings for current retirees. In 2013, individuals age 60 or older held $3.8 trillion in wealth in IRAs. Under current law, some fraction of these funds must be withdrawn each year beginning the year one turns 70.5 years of age, with the required fraction increasing in age. We study the effects of these Required Minimum Distribution (RMD) rules on the decumulation behavior of retirees using a 16-year panel of administrative tax data. Our data consist of a 5% random sample of individuals age 60 and older from 1999 to 2014, with approximately 2.6 million individuals per year. This period encompasses a unique policy change that we exploit for identification: a one-year suspension of the RMD rules in 2009. Though the RMD rules are modest – leaving one third of the original balance intact by age 90 even if investments generate zero returns – our empirical analysis shows they have large effects on individual behavior. Using a semiparametric technique developed by DiNardo et al. (1996), we estimate the counterfactual density of IRA distributions in 2009 that would have prevailed if the rules had not been suspended. We estimate that at least 41% of the individuals subject to the RMD rules would take an IRA distribution less than their required minimum if they were unconstrained. In addition, we document an extensive margin effect among individuals newly subject to the rules, and provide suggestive evidence of optimization frictions in retirees' financial decisions.

Keywords: Asset decumulation, income taxation, Individual Retirement Accounts, investment, required minimum distributions, retirement.

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1 Introduction

Individual Retirement Accounts (IRAs) are an important source of retirement savings for a large portion of the population. We estimate that over six trillion dollars in wealth was held in IRAs by approximately 45 million Americans in 2013.[1] The plans were created to encourage working-age individuals to save for their retirement, as they allow individuals to delay the taxation of both their contributions and the investment income accruing within the plans. Under current law, individuals may not keep their full balances in the tax-deferred account indefinitely. A certain fraction of the IRA balance must be withdrawn each year beginning the year the account-holder turns 70.5 years of age, with the required fraction increasing in age.[2] In this paper, we examine the effect of these required minimum distribution (RMD) rules on distributions (i.e. withdrawals) from traditional IRAs. We find that the rules represent a binding constraint for a large fraction of individuals, and that they also play a role in determining unconstrained distribution behavior. Understanding these responses is crucial for revenue and welfare analyses of retirement savings policy.

The tax expenditures used to encourage saving through traditional IRAs are substantial, estimated to be $11.1 billion in 2013 (Joint Committee on Taxation, 2013). RMD rules help to limit these tax expenditures by mandating distributions, which are taxed as ordinary income. Some policymakers are actively considering proposals to change RMDs.[3] In a policy change that we exploit for identification of the effect of the RMD rules on behavior, the rules were temporarily suspended in 2009. Specifically, on December 23, 2008, in a provision of the Worker, Retiree, and Employer Recovery Act of 2008, Congress suspended the RMD rules for one year, likely in response to decreasing account balances associated with the Great Recession. Except for the 2009 suspension, the RMD schedule has remained relatively stable over the last 20 years, with a small change in 2002 to adjust for increasing life expectancies.[4]

A large literature studies the effect of retirement savings policies on contributions to retirement savings accounts (Gale and Scholz, 1994; Engen, Gale, and Scholz, 1996; Poterba, Venti, and Wise, 1996; Madrian and Shea, 2001; Bernheim, 2002; Chetty, Friedman, Leth-Petersen, Nielsen, and Olsen, 2014). In addition, there is a growing literature that studies the withdrawal patterns of retirement savings assets (Sabelhaus, 2000; Bershadker and Smith,

[1]This estimate was performed using perfected cross-sections of Form 5498, produced by the Statistics of Income division of the Internal Revenue Service.

[2]A distribution is required corresponding to the year the account-holder turns 70.5 years of age, but this may be delayed until the following year. Approximately 85% of individuals take their first required distribution – the distribution associated with the year they turn 70.5 – in the year that they turn 70.5, with only 15% delaying to the following year.

[3]For example, in January 2016 Representative Sensenbrenner of the U.S. House of Representatives introduced a bill, H.R. 4357, to suspend the RMD rules in 2016.

[4]In 2002, the entire RMD schedule was relaxed due to a change in the life expectancy tables used by the IRS. We plan to incorporate this policy change into our analysis.

2006; French, De Nardi, Jones, Baker, and Doctor, 2006; Love and Smith, 2007; Coile and Milligan, 2009; Poterba, Venti, and Wise, 2011, 2013; Holden and Bass, 2014; Bryant and Gober, 2013; Argento, Bryant, and Sabelhaus, 2015; Poterba, Venti, and Wise, 2015). However, relatively few studies rigorously analyze the effect of decumulation policies, such as the RMD rules, on withdrawals from retirement accounts. To better understand optimal retirement savings policy, research is needed on the effects of policy on savings and consumption during both working-age *and* retirement-age years. In this paper, we seek to inform the latter.[5] In one of few papers to study the effects of RMD rules on distributions from tax-deferred retirement savings accounts, Brown, Poterba, and Richardson (2014) use proprietary data on roughly 64,000 accounts at the Teachers Insurance and Annuity Association – College Retirement Equity Fund (TIAA-CREF), a large provider of retirement services for employees at nonprofit institutions.[6] In their sample, one-third of individuals who took distributions in 2008 suspended their distributions the following year. Extrapolating this figure to the general population, the authors estimate that the RMD suspension caused a 20% reduction in taxable distributions from 403(b)s in 2009.[7]

To study the effects of the RMD rules, we create a nationally representative panel data set of individuals ages 60 and older from 1999 to 2014 using Internal Revenue Service tax data, including information returns filed by fiduciaries, linked with data from the Social Security Administration. These data offer several advantages over other datasets that have been used to study decumulation behavior. First, our data have sufficient mass – representing 5% of the population, or approximately 2.6 million observations per year – to allow for analyses of narrowly defined age groups. This is important because the decumulation behavior of younger retirees may be different from that of older retirees, regardless of the rules. In addition, RMDs vary by age and younger retirees may respond to the rules differently than older retirees. Second, administrative tax data are subject to less measurement error than survey data, particularly in the case of information provided by third parties. Third, we have a complete view of an individual's traditional IRA balances and distributions across all fiduciaries. Fourth, we incorporate information from the tax data regarding non-IRA sources of income, marital status, household assets, and geographic location.

[5]One major limitation of our study is that we do not observe consumption or total savings in the tax data. Therefore, we cannot speak directly to the effect of decumulation policy on consumption. However, we do observe non-IRA sources of income and discuss the differential withdrawal behavior among individuals who vary along this dimension.

[6]Specifically, they study withdrawals from 403(b) plans, which provide tax advantages similar to IRAs and are available for public education organizations, cooperative hospital service organizations, self-employed ministers, and many other nonprofit employers in the United States. As noted by Brown et al., their sample is not nationally representative; TIAA-CREF plan participants tend to have larger accounts than the national average.

[7]Several of the noted studies have explored decumulation from retirement savings accounts using survey or tax data. However, the studies that use tax return data are primarily descriptive, while those that use data from household surveys generally have small sample sizes and are unable to differentiate between traditional IRAs, which are subject to RMD rules, and Roth IRAs, which are not.

An important determinant of retirees' welfare is their consumption, which is financed by savings, Social Security, defined benefit pensions, and transfers from government and family. Assets, inclusive of home equity and IRA balances, are equal to approximately one third of lifetime income for individuals who are near retirement age and represent one of the major sources of retiree consumption (Gustman and Steinmeier, 1999; Scholz et al., 2006; Love et al., 2009). While thirty years ago employer-provided defined benefit plans were a substantial source of retirement saving, personal retirement accounts, which include IRAs and 401(k)s, have become the primary form of retirement saving for private-sector workers (Poterba et al., 2013; Holden and Bass, 2014). We make several contributions to understanding IRA decumulation. First, we provide descriptive evidence of trends in the characteristics and behavior of retirement-age IRA account holders from 2000 through 2013. Second, we use the 2009 suspension of RMD rules to identify their causal effects on distributions across age groups. Third, we uncover an undocumented response to the rules: individuals who turn 70.5 and become subject to the rules exhibit an increased likelihood of emptying their IRA accounts. Finally, we provide suggestive evidence of optimization frictions in retirees' financial decisions, as many retirees continue taking distributions at the phantom RMD – the RMD they would have faced – when the rules were suspended in 2009.

Figures 2 and 3 visually capture many of the effects of the RMD rules on distribution behavior. First, the RMD rules affect individuals in non-suspension years. From 2008 to 2010, approximately one quarter of IRA-holders between the ages of 60 and 70 took a distribution, with an average distribution of 6.2% of the account balance, and with no statistically significant difference in 2009. In 2008 and 2010, the proportion taking a distribution increased to around 90% for 70.5-year olds, with their average distribution increasing to 10.9% of the account balance. Older retirees take larger distributions on average, with an overall mean among all individuals subject to the RMD rules of 13.1% of account balances. Second, the suspension of the RMD rules in 2009 caused a response among those who would have been subject to them. That year, only 60% of 70.5-year-old IRA-holders took a distribution, with an average distribution of 8.2% of account balances. These are significantly smaller than the comparable averages from 2008 and 2010. Older retirees are similarly less likely to take distributions. However, in 2009 the decumulation behavior of IRA-holders ages 70.5 or older remained different from the decumulation behavior of 60- to 70-year-olds. In particular, the proportion of 70.5-year-olds who take a distribution is roughly 32% larger than the proportion of younger individuals with distributions. This large, discrete jump in the likelihood of taking distributions suggests there may be optimization frictions associated with responding to (the suspension of) the RMD rules.

In a simple two-period model, we derive a parameter that reflects the proportion of IRA-holders who are RMD-constrained – that is, the proportion who would prefer to draw down their savings accounts less quickly than the RMD rules require. We implement two empirical strategies to identify this parameter and to more generally explore the effects of RMD rules on withdrawal behavior. Our first empirical strategy is based on two regression specifications. We first present results from reduced-form regressions that identify the elasticity of IRA distributions with respect to the RMD. In an alternative, first-differences specification, we estimate the effect of an unexpected change in the RMD on changes in distributions.

Our second empirical strategy employs the method developed by DiNardo, Fortin, and Lemieux (1996) to construct the counterfactual density of IRA distributions that would have occurred had the rules not been suspended. We do this for each age group for ages 73 through 85 separately, allowing us to identify the fraction of RMD-constrained individuals by age. Crucially, the DiNardo et al. technique allows us to control for the effects of time-varying characteristics associated with distribution behavior – e.g. account balances and alternative sources of income – that changed in 2009 for reasons unrelated to the suspension of RMD rules. This is especially important, as the rules were suspended during (and we believe in response to) the Great Recession. Figures 17 and Figure 18 illustrate the importance of studying the effect of the rules on the entire density of IRA distributions. The two figures show the densities of IRA distributions, measured as a percent of the account balance, among various age groups during 2005-2008 and 2008-2009, respectively. Figure 17 shows that the densities for a particular age group are strikingly consistent across time. However, Figure 18 shows substantially different densities of IRA distributions in 2009 relative to 2008. In both figures, the RMD for the relevant age group is marked by a vertical line. The figures show the RMD compresses the lower tail of the density of IRA distributions across all age groups, suggesting that a large proportion of individuals are RMD-constrained.

Both estimation strategies produce robust evidence that RMD rules have large effects on decumulation behavior. Results from our second estimation strategy suggest that on average, 41% of individuals subject to the rules are RMD-constrained at current RMD levels, with this parameter increasing slightly in age. Furthermore, an average 13% of individuals would prefer to withdraw nothing at all, a parameter that is decreasing in age. Consistent with Brown et al., 35% of individuals subject to the rules that took distributions in 2008 suspended their distributions in 2009, with the probability of suspension decreasing in age and increasing in account balance.

In 2009, approximately 20% of individuals made a withdrawal within half a percentage point of the distribution they would have been required to take. This is surprisingly large given that only for a very limited set of circumstances is the RMD an optimal distribution, as discussed in Brown et al. (2014) and Sun and Webb (2012).[8] The most likely explanation for the extra mass located at the phantom RMD in 2009 is the presence of optimization frictions: costs associated with deciding upon or adjusting IRA distributions. There is a

[8]For example, in the context of the standard life-cycle model, setting consumption equal to the RMD is optimal if three conditions are met: preferences are represented by log utility, the interest rate and the discount rate are equal to zero, and expected mortality is equal to that used by the IRS to construct the RMD schedule (Brown et al., 2014).

growing literature that analyzes the extent to which individuals face frictions in adjusting behavior to policy in a variety of settings, most frequently with respect to labor supply and taxable income (Chetty et al., 2009, 2011, 2013; Chetty, 2012; Kleven and Waseem, 2013; Gelber et al., 2015). In the context of IRA distributions, one plausible friction is attention, which is consistent with Brown et al.'s evidence that a substantial number of individuals did not know about (or remember) the 2009 suspension when asked about it five years later. Alternatively, retirees may perceive the rules as a form of financial advice from the government. This, too, is consistent with Brown et al.'s survey evidence. To the extent there are optimization frictions or retirees perceive the rules as financial advice, the rules play an important role in determining distribution behavior beyond simply constraining distribution amounts. Frictions may affect the immediate and long-term adjustment to policy changes, and the welfare consequences associated with the rules.

The parameter estimates presented in this paper can be used directly to estimate the tax revenue consequences of proposed changes in IRA decumulation policy. In addition, they can be used to study the welfare implications of RMD rules and the optimal design of tax policy regarding retirement savings. These issues are increasingly important despite the relative dearth of attention they have received.

2 Conceptual Framework

In this section, we present a two-period model to characterize the effects of RMD rules on withdrawals from Traditional IRAs. We opt for a simple model, rather than the life-cycle models typically studied in the literature on retirement (e.g. Brown et al., 2015), because we do not observe many variables needed to estimate such a model, such as household consumption or the allocation of savings across non-IRA accounts. Moreover, life-cycle models do not yield closed-form analytical expressions that can be used in our empirical implementation.[9] Here and in our empirical work we abstract away from the indirect effects of RMD rules, for example through the lifetime budget constraint, focusing on their contemporaneous effect on IRA distributions. We also abstract away from a more complicated portfolio decumulation problem with several asset types. Each of these abstractions are made for empirical

[9] In the life-cycle setting, individuals maximize the expected discounted value of lifetime utility by choosing their consumption path in their retired years, given an endowment of wealth at the beginning of retirement, survival probabilities in each period, a discount rate, and an interest rate. In such models there are two ways RMD rules affect distribution decisions. The first is a direct effect: RMD rules in period t constrain distribution decisions in period t. The second is an indirect effect via the budget constraint. If an individual is forced to distribute more than they would prefer in period t, this affects the account balance in later periods, which in turn may affect distribution decisions in any period, including periods prior to t. Therefore, unless optimal consumption paths are unconstrained in all periods, RMD rules may affect the entire path of distributions, including distributions not subject to the rules.

tractability, not because the other features of retiree's decision problems are uninteresting.[10]

In our model, individuals live for two periods in retirement and they enter the first period with a Traditional IRA balance equal to B. Each period they are endowed with exogenous income X_t (e.g. Social Security income), and in the first period they must take a distribution d from their IRA greater than or equal to the RMD $\bar{d}$.[11] The undistributed portion of the IRA from period one grows at a rate of $1 + r$, and the IRA balance in period two is fully distributed. Distributions in each period face a flat tax rate of τ.

Individuals choose $d \geq \bar{d}$ to maximize the present discounted value of utility,

$$u(c_1) + \beta u(c_2), \tag{1}$$

where $u(\cdot)$ is a smooth, concave function, $\beta \in (0, 1]$ denotes the individual's discount factor, and consumption in periods one and two is given by

$$\begin{aligned} c_1 &= X_1 + (1 - \tau)d \\ c_2 &= X_2 + (1 - \tau)(1 + r)(B - d). \end{aligned} \tag{2}$$

Similar to the extant literature, we do not explicitly study the effect of bequest motives on IRA distributions. To the extent that individuals prefer to maintain more of their savings in tax-preferred plans for bequest reasons, this is reflected empirically in the fraction of RMD-constrained individuals. As noted by Poterba et al. (2013) and De Nardi et al. (2015), U.S. retirees decumulate their assets more slowly than implied by the standard life-cycle model, especially higher income individuals. This may be because of bequest motives, or the risks that the elderly face, for example due to uncertain life expectancy and medical costs. Our empirical strategy allows us to remain agnostic about the determinants of optimal distributions and the semiparametric estimation strategy that we present in Section 4 is robust to the underlying theory behind distribution decisions.

In the first period there are two types of individuals: the constrained and the unconstrained with respect to the RMD rule. We refer to individuals who would prefer to take a distribution smaller than the RMD as the "RMD-constrained." Letting $d^*(\bar{\delta})$ denote the optimal distribution given an RMD of $\bar{\delta}$, the RMD-constrained are those with $d^*(0) < \bar{d}$. Note that the fraction of individuals who are RMD-constrained will generally depend on the prevailing RMD. Thus, in the empirical portion of this paper, we focus on estimating the fraction of individuals who are RMD-constrained *given current RMD policy*.

Given the same required distribution $\bar{d}$, individuals may or may not find the RMD a

[10] De Nardi et al. (2015), Webb et al. (2009), and Sun and Webb (2012) discuss in detail many of the considerations in devising an optimal decumulation path, for example, uncertain mortality and asset returns, rules of thumb (e.g. the 4% rule), uncertain end-of-life medical expenses, and bequest motives.

[11] The simple theory presented here assumes full compliance with RMD rules and therefore abstracts away from penalties for non-compliance. In any given year, approximately 90% of individuals subject to the RMD rules comply. The 10% non-compliance rate attenuates our estimates for the fraction of RMD-constrained individuals and for the overall effect of RMDs on distributions towards zero.

binding constraint. The difference is generated by heterogeneity in other resources (X), tax rates (τ), investment rates of return (r), discount factors (β), and utility (u). Let $\alpha_c(\bar{d})$ denote the fraction of RMD-constrained individuals given RMD policy $\bar{d}$. These individuals choose $d = \bar{d}$, however, not all individuals who choose $d = \bar{d}$ are RMD-constrained. Given a smooth distribution of the underlying fundamentals, some fraction of individuals will have $d^*(0) = \bar{d}$, and therefore will have $d^*(\bar{d}) = \bar{d}$. Thus we cannot distinguish between the RMD-constrained and the RMD-unconstrained based on observation of d alone. In Section 4, we present two strategies for estimating the fraction $\alpha_c(\bar{d})$ using the 2009 RMD suspension for identification.[12]

We are also interested in estimating the effect of eliminating RMD rules on the density of distributions. Figure 1 graphically illustrates this effect. Two densities of distributions are plotted. The density f_0 describes distributions, measured as a percent of the IRA account balance, absent any RMD. The density f_1 describes distributions, measured as a percent of the IRA account balance, given a positive RMD $\bar{d}$. Above $\bar{d}$ the two densities coincide, however, any individuals who choose $d < \bar{d}$ when there is no RMD must relocate, choosing $d = \bar{d}$ when facing the RMD. The individuals who relocate are the RMD-constrained, and their mass ($\alpha_c(\bar{d})$) is marked in the figure: it is precisely the mass near the RMD under f_1 less the mass near the RMD under f_0. For a given age group, we estimate this parameter using the actual 2009 density of distributions as the analog of f_0 and using the predicted counterfactual density in 2009 that would have occurred were the rules not suspended as the analog of f_1.[13]

[12] To identify the fraction of RMD-constrained individuals under a range of potential RMD levels not observed in the data, we require policy variation that modifies, rather than suspends, RMD rules. In 2002, the entire RMD schedule was relaxed due to a change in the life expectancy tables used by the IRS. We plan to incorporate this policy change into our analysis to explore this issue further.

[13] This estimation strategy, and the theory behind it, ignores the optimization frictions that kept some individuals' distributions near the phantom RMD in 2009. In future work, we plan to address this shortcoming by measuring these frictions.

Figure 1: Theoretical Effect of RMDs

The figure plots hypothetical densities of distributions from Traditional IRAs, both with and without the RMD constraint.

3 Institutional Background and Data

Here we briefly describe the relevant features of IRAs, including their tax treatment. We then describe the nature of our data and present summary statistics on the population of individuals ages 60 or older.

3.1 Individual Retirement Accounts and Distribution Rules

IRAs offer significant tax advantages to individuals saving for retirement. Several types of IRAs exist, but the vast majority of IRA funds are held in Traditional IRAs. We use the term "IRA" to refer specifically to Traditional, SEP and SIMPLE IRAs throughout the remainder of the paper. When contributed to an IRA, earned income is exempt from taxation until withdrawal, as are any investment returns that accumulate within an IRA account. Thus the primary benefit of IRAs is tax-deferral on contributions. Distributions from IRAs are taxed as ordinary income and are subject to required minimum distribution (RMD) rules. Employer-provided qualified retirement plans, such as 401(k)s, are also subject to RMD rules, however we do not study decumulation within these plans because we do not observe their account balances in the data.[14] We also refrain from analyzing withdrawals from Roth

[14]Qualified retirement plans include tax-qualified plans described in section 401 of the Internal Revenue Code, employee retirement annuities described in section 403(a), tax-sheltered annuities described in section 403(b), and a plan for government employees described in section 457(b).

IRAs, which are not subject to RMD rules because distributions from these accounts are tax-free.

Required minimum distribution rules apply to an IRA-holder beginning the year in which she turns 70.5 years of age.[15] However, the first year features a grace period: the first required distribution may be delayed until April 1 of the subsequent year. This allows the taxpayer to avoid penalties in the event that she becomes aware of the rules during tax-filing season. For IRAs and defined contributions plans, the required minimum distribution for each year generally is determined by dividing the account balance as of the end of the prior year by an applicable age-specific factor in the Uniform Lifetime Table of IRS Publication 590.[16] This schedule is depicted in Figure 5. It begins at age 70.5 with an RMD of approximately 3.7% of account balances, and rises gradually to approximately 8.0% by age 90. This leaves 30% of the original account balance intact by age 90 even if investments generate zero returns.

A different RMD schedule is used for married individuals whose spouses are at least eleven years younger than they are. These individuals follow the Joint Life and Last Survivor Expectancy Table, which specifies a smaller RMD. We incorporate this variation in RMDs for our regression analysis, but when employing the technique of DiNardo et al. (1996) we limit our sample of married individuals to those with spousal age differences of 10 years or less. This restriction is unlikely to bias our estimates as it results in few observations being dropped – only 3.4% of married individuals – and our estimates suggest the RMDs affect their distribution behavior similarly to that of single individuals or married individuals with a spousal age difference of less than eleven years.

Inherited IRAs are subject to a separate set of RMD rules. Beneficiaries who are not spouses and who elect to treat the inherited IRA as their own may opt to treat the IRA according to the inheritance-specific RMD rules or to take distributions according to the alternative five-year rule. Under the five-year rule, the entire account must be distributed by the end of the fifth year following the previous owner's death and no distribution is required for any year before the fifth year. However, we do not observe which treatment beneficiaries elect and cannot measure the amount distributed relative to the RMD (because some beneficiaries do not have an RMD).[17]

Fiduciaries that serve as trustees of IRAs are required to inform account holders if the RMD rules apply to them and the date by which their required distribution must be taken. In addition, they must either specify the amount of the RMD or offer to calculate it. If an individual does not make a withdrawal that is at least as large as their RMD, the penalty is a 50-percent excise tax on the undistributed required amount. The tax is generally imposed

[15] Warshawsky (1998) provides a thorough discussion of the historical development and intent of the rules.

[16] If an individual has multiple IRAs, the RMD is calculated by dividing the sum of account balances by the age-specific factor. It is satisfied if the sum of distributions exceeds this amount. Note that this means an individual could potentially distribute a sufficient amount from one account and leave the others untouched.

[17] Five percent of individuals take an inheritance-related distribution annually. We plan to explore inheritance-related distributions in future work.

during the taxable year in which the distribution was required. Thus, a taxpayer who discovers in March that he did not satisfy the prior year's RMD should use Form 5329 to calculate the excise tax penalty and report this amount on his tax return for the prior year.[18]

While the RMD schedule has changed occasionally, the RMD amount has always been related to a measure of average remaining life expectancy. In 2002, the entire schedule shifted down: that is, conditional on age, owners were required to make smaller distributions measured as a fraction of their account balance compared to previous years. This was because of a change in the life expectancy tables used by the IRS, reflecting an increase in average life expectancy. The effect of the schedule change can be seen in Figure 5.

Under the provision entitled Pension Provisions Relating to Economic Crisis of the Worker, Retiree, and Employer Recovery Act of 2008, individuals were not required to make a distribution for calendar year 2009 from individual retirement plans and employer-provided qualified retirement plans that are defined contribution plans (within the meaning of section 414(i)). While there is no official explanation for the 2009 RMD suspension, we believe it was implemented because of the decreasing asset prices associated with the Great Recession. Thus, any annual minimum distribution for 2009 from these plans required under the then-current law, otherwise determined by dividing the account balance by a distribution period, was not required to be made. The RMD rules were in effect for calendar years after 2009, beginning with 2010. In the case of an individual whose required beginning date was April 1, 2010 (e.g., the individual attained age 70.5 in 2009), the first year for which a minimum distribution was required would have been 2009. Under the RMD suspension, no distribution was required for 2009 and, thus, no distribution was required to be made by April 1, 2010. However, the provision did not change the individual's required beginning date for the purposes of determining the required minimum distribution for calendar years after 2009. Thus, for an individual whose required beginning date was April 1, 2010, the required minimum distribution for 2010 was required to be made no later than the last day of calendar year 2010. The provision was effective for calendar years beginning after December 31, 2008. However, the provision did not apply to any required minimum distribution for 2008 that was permitted to be made in 2009 by reason of an individual's required beginning date being April 1, 2009.

3.2 Nationally Representative 5% Random Sample

Prior to Brown, Poterba, and Richardson (2014) – hereafter, "BPR" – few studies rigorously analyzed the extent to which RMD rules affect IRA distributions, largely due to data constraints. The administrative tax data we use are well-suited to explore the effects of RMD rules on IRA distribution behavior for several reasons. First, the data have sufficient sample

[18] The IRS may waive the penalty if the failure to satisfy the RMD was due to reasonable error and steps were taken to remedy the violation.

size to construct smooth distributions for individual age groups. Second, tax data suffer from a lesser degree of measurement error than most survey data. Third, these data allow us to construct a complete profile of individuals' IRAs, as opposed to being limited to a single fiduciary. Finally, tax data include a variety of information on income (including other asset-based income), household structure, and geographic location, and can be organized as a panel.

The primary set of data used in this study is a 5% random sample drawn from the population of individuals in the United States with an identification number recorded by the Social Security Administration (SSA) who are not known to be deceased by SSA. Our sampling method is based on an administrative identifier called a "masked taxpayer identification number" (TIN). The IRS randomly generates this number for every individual with a date of birth recorded by the Social Security Administration. We draw our sample by limiting our analysis to observations with certain TIN endings.

The base sample – hereafter, the "5% Sample " – is limited to individuals aged 60 and older from 1999 to 2014. An observation is an individual-year combination. We impose the following sample restrictions. First, individuals with no tax returns or information returns in any year are dropped. This restriction results in roughly 350,000 individuals being dropped, though many of these individuals are likely deceased. The sample remains representative of the national population despite this restriction, as Cilke (2014) finds that 99.5% of the Census resident population had information filed with the IRS in 2011 and that this proportion is roughly constant across birth-year cohorts. Second, observations are dropped if the individual dies in the current year, previous year, or following year.[19] This restriction causes our sample to under-count the resident population, but reduces the effect of end-of-life decisions on our empirical estimates.

The data are organized as a panel, with roughly 37 million person-year observations.[20] The panel is balanced for individuals alive and 60 or older in every year of our sample, and is unbalanced for those who die or age into our sample during the sampling period. We prefer this sampling structure to a purely balanced panel, as the data better approximate the U.S. population age 60 or older in every year, with younger individuals aging in to replace those leaving the panel. We supplement these data with information from the Social Security Administration on dates of birth and death, as well as sex at the time of birth.

Information returns are individual-specific and are typically filed by third parties, such as financial fiduciaries or employers. We use the following information returns: Form 5498 (contributions to retirement savings accounts), Form 1099-R (distributions from pensions and retirement savings accounts), Form 1099-SSA (Social Security benefits), Form W-2 (wages and 401(k) contributions), Form 8606 (Roth conversions), Form 1099-INT (interest income),

[19] Approximately 31% of individuals die during the 16-year sample period.

[20] An individual has an observation in a given year even if they have no tax information for that year, as long as they satisfy the two criteria in the previous paragraph.

Form 1099-DIV (dividend income), and Form 5329 (penalties for failure to take a RMD). From these we observe IRA balances, contributions, distributions, and other income information. Individuals may receive multiple information returns of a given type – because they have multiple jobs or multiple IRAs – and we collapse the data to one observation per individual-year, summing and counting relevant variables. Importantly, these forms are not limited to those individuals appearing on a tax return, though most individuals who have an IRA also file a tax return.

Tax returns are Form 1040s, which are filed by tax units, a proxy for households. Multiple individuals may appear on a tax return as a primary or secondary filer or a dependent. From the Form 1040 we observe income information, including many items not reported on information returns such as business income, deductions and credits, and total income.

We make two additional restrictions to our base sample to construct our empirical sample. First, we limit the sample to the years 2000 through 2013. The RMD of an individual is based on the fair-market value of their IRA account balance at the end of the previous year, as reported by their fiduciary on Form 5498. As discussed previously, an individual calculates their RMD by multiplying their account balance in the previous year by the RMD percentage that is relevant for them (e.g. 5%). We cannot measure individual-specific RMDs in 1999 because we do not have Form 5498 data in 1998. We exclude 2014 from our analysis due to concerns that not all returns have been filed at this time. Second, we exclude observations in the top 1% of distributions measured as a percent of the previous year's account balance (more than 103%). Many of these distributions are implausibly large, and are likely data errors.

For the bulk of our empirical analysis, we create a separate sample further limited to individuals who have a positive IRA balance in at least one year. We refer to this as the IRA Holders Sample. Note that a person-year observation in the IRA Holders Sample may or may not have a positive IRA balance in that year. We also refer to the RMD Sample, which is the subset of individuals in the IRA Holders Sample aged 70.5 or older with a positive RMD for the observation year (including 2009).[21]

3.3 Summary Statistics

Table 1 presents a variety of summary statistics for the 5% sample. This sample contains 37.58 million individual-year observations for the years 2000 through 2013. Seventy-three percent of individuals appear on a Form 1040 as a primary or secondary filer, 36% have

[21] We make two small additional timing-related restrictions in our construction of the RMD Sample. First, we exclude individuals in their second year of being subject to RMD rules for the year 2000. That is, we exclude individuals who turn 71 during 2000 if their birth month is January-June and individuals who turn 72 during 2000 if their birth month is July-December. We do this because we cannot determine whether these individuals satisfied their first-year RMD in 1999. Second, we exclude individuals who are first subject to RMD rules in 2013 because we cannot determine whether they satisfy their first RMD by April 2014, as the 2014 data are incomplete.

a Form 5498 filed on their behalf, and 54% receive a 1099-R.[22] Further, 29% have a Form 1099-DIV, 55% have a Form 1099-INT, and 28% have a Form W-2. A negligible proportion file Form 5329, which indicates a failure to satisfy the RMD.

We observe marital status only for individuals filing a tax return. Conditional on filing, 67% of individuals in the sample are married. However, 27% of observations are associated with a non-filing individual in a given year. For these observations, we impute marital status and spousal age difference as follows. If an individual filed a tax return in a previous or later year, we use their marital status (and spousal age difference) from the nearest year, provided that the spouse is still alive in the current year. If the spouse has died by the current year, we do not impute a marital status for that year. Using the imputed marital status variable, we find that 61% of individuals in the sample are married. We do not have an imputed marital status for the 8.7% of individuals who fail to file a tax return in any sampled year. Instead, we calculate their RMD based on the Uniform Lifetime Table, which is the RMD schedule used for over 96% of observations for which we know the marital status and spousal age difference from the Form 1040.[23]

Over 35% of individuals in the 5% sample have an IRA. The average size of an IRA is $151,604 in inflation-adjusted 2014 dollars and there is substantial variation in balance sizes, with the distribution of IRA balances exhibiting a long right tail. We focus on distributions from IRAs categorized as "normal distributions." We define a normal distribution as a distribution from a traditional IRA that could be used to satisfy the RMD rules, regardless of whether an individual is subject to the RMD rules. A normal distribution does not include distributions that are associated with rollovers, Roth conversions, recharacterizations, disability or inheritance-related distributions, distributions from a Designated Roth account, or those from IRAs that have been structured to have annuity payments. In our sample, 19% of individuals make a "normal distribution" and the average annual size of normal distributions is $12,991, or about 15% of the previous years' account balance.[24]

Four percent of individuals have a total distribution, which is the distribution prior to an account closure. Specifically, we define a total distribution as the annual distribution associated with the year before a year in which an individual ceases to have a positive

[22] The 1099-R/5498 discrepancy comes from the fact that Form 5498 is filed for IRAs only, while Form 1099-R is for distributions from IRAs, pensions, annuities, and life insurance contracts. Therefore, if an individual receives a distribution from a defined benefit pension and does not have an IRA, they will receive a Form 1099-R but not a Form 5498.

[23] When we exclude non-filers from the sample for the regression specifications discussed in Section 4, we get slightly smaller effects associated with the RMD. This is likely because non-filers tend to be lower income individuals and it may be that the rules are more binding for them.

[24] The sample size varies slightly for the two variables because the size of a distribution measured as a percentage of the account balance requires that we observe the size of the account in the *previous* year, whereas the levels variable does not.

account balance.[25] The average size of total distributions is \$46,972.

Table 2 shows summary statistics for the IRA Holders and RMD samples – the latter is a subset of the former: those IRA holders required to take a minimum distribution. The average RMD in 2014 dollars is \$5,893, approximately 5% of the IRA balance. The size of the average normal distribution is 15% of account balances for the entire sample and 12% among individuals in the RMD Sample. Among individuals in their 70.5 year, over 84% take their first RMD in their 70.5 year, instead of postponing to the following year. This is potentially for tax-smoothing reasons: if an individual chooses to postpone their first RMD to their second year, they are responsible for taking both their first and second RMDs in that year and both are included in taxable income.

Ninety-one percent of individuals take a normal distribution that satisfies their RMD, which suggests the rules are binding for the majority of RMD-relevant individuals. Among individuals who fail to satisfy their RMD, only 0.54% file a Form 5329 for the purpose of paying the excise tax penalty associated with an excess accumulation in an IRA account. It is unclear if the non-compliance is due to deliberate tax evasion or simply forgetfulness or confusion on the part of the individuals that comprise our sample. Figure 7 suggests it is likely the latter, as the average percentage of individuals that satisfy their RMD is above 90% until age 85, after which it declines substantially with increasing age. Furthermore, individuals in their first two years of being subject to the rules are slightly more likely (less than one full percentage point) to satisfy their RMD relative to older individuals. It does not appear there are many repeat non-compliers: for any two year combination, only 2-3% of individuals do not comply in both years.

These data reveal the increasing importance of IRAs as a savings vehicle for older Americans. The percentage of individuals age 60 or older in the United States with a Traditional IRA steadily increased from 29% in 2000 to 35% 2013, as shown in Figure 8. The percentage with Roth IRAs increased by a similar magnitude, from around 0% in 2000 to 7% in 2013. The amount of assets held in IRAs grew significantly over this time period. Assets held in Traditional IRAs – shown in Figure 9 – more than doubled since 2000, increasing from \$1.9 trillion to approximately \$3.8 trillion in 2013 (in inflation-adjusted 2014 dollars). The amount of assets held in Roth IRAs also increased substantially relative to 2000 levels, but remains a small fraction of Traditional IRA assets.

The Great Recession was associated with a substantial drop in assets in 2009 – account balances are measured at the beginning of the calendar year – but by 2011 assets exceeded their 2008 levels. Average account balances – displayed in 10, along with quartile measures – also fluctuated with the Great Recession, but only recently regained their inflation adjusted 2008 levels. The pattern for the 75th percentile of account balances was similar. Median

[25]Form 1099-R has a box that indicates a total distribution. However, because many people have multiple accounts, we define total distributions as described above to measure a true extensive margin instead of account consolidation.

account balances, on the other hand, rebounded relatively quicker. Figure 10 is indicative of the substantial right-skewness of the distribution of balances: the mean is close to the 75th percentile, and exceeds it for most sample years. The same is true of the distribution of normal distribution sizes, displayed in Figure 11.

Normal distributions also decreased in 2009. Distributions conditional on taking a distribution, however, do not show a dip analogous those in account balances and asset totals. This can been seen in Figure 12, as the trend for mean distributions is flat through the Great Recession and the RMD suspension in 2009. Coupled with Figure 11, this suggests two similar responses offset one another and resulted in conditional distributions levels remaining flat. First, many people with below average annual distribution amounts – for example, those taking distributions at the RMD threshold with average account balances – suspended their distributions in 2009. The effect of their exit is to push the average up in 2009, ceteris paribus. This was offset by individuals reducing their distributions who nonetheless took positive distributions.

4 Empirical Methods and Evidence

In this section we discuss two strategies to identify the effect of the Required Minimum Distribution rules (RMD) on distributions from traditional IRAs: reduced-form regressions and the estimation of counterfactual densities of IRA distributions.

4.1 Graphical Evidence of the Effect of the 2009 RMD Suspension

In this section, we provide a discussion of the descriptive graphical evidence with regard to the effect of the 2009 RMD suspension on distributions. Figures 2 and 3 visually capture many of the effects of the RMD rules. It is clear the RMD rules affect individuals in non-suspension years. Approximately 25% of individuals younger than 70.5 took a distribution, with an average distribution of 6.2%, measured as a percent of the account balance withdrawn. The fraction of individuals who make a distribution increases linearly with age from 60 to 70. In non-2009 years, the proportion taking a distribution increases to over 90% for 70.5-year olds. The average size of a distribution jumps by 76% to 10.9% of the IRA account balance for 70.5-year olds, with a 13.1% average among all individuals subject to the RMD rules.

The fraction of individuals in 2009 with a distribution is only 60% among 70.5-year olds: the analogous rate in non-suspension years is 90%. The average distribution size fell by roughly 25% from 10.9% of the IRA account balance to 8.2%. However, the size of distributions in 2009 still represents a "new" 70.5 year olds relative to the distribution patterns of 70 year olds (who are not yet subject to the rules) and younger. Similarly, the proportion of individuals aged 70.5 with a distribution from a traditional IRA in 2009 is roughly 32% larger than the proportion of younger individuals with distributions. This large, discrete jump in the proportion at age 70.5 – in a year where the RMD rules were suspended – suggests there may be optimization frictions associated with decumulation and the RMD rules.

Distribution patterns in 2009 also differ from 2008 and 2010 when examining those with non-zero distributions in Figure 4. Distribution levels as a percent of account balances are elevated for all ages in 2009, and are particularly elevated for those that would have been subject to RMD rules. This is because the level of distributions (conditional on taking a distribution) was flat from 2008 to 2010, as was discussed in the previous section and is shown in Figure 12. Holding the level of distributions constant (numerator) and reducing the size of the balance (denominator) results in larger distributions as a percentage of account balances.

Another interesting feature of Figure 3 is the local maxima in distribution sizes at age 70.5. This extra mass is entirely attributable to an increase in total distributions – distributions associated with closing an account – that occur at age 70.5, when individuals are first subject to the RMD rules. In fact, once we remove individuals who make total distributions the extra mass disappears.

Figure 17 and Figure 18 show the densities of IRA distributions among 73-, 75-, 80-, and 85-year olds from 2005-2008 and 2008-2009, respectively. Both Figures focus on distributions between zero and 15%, at the left tail of the distribution, as the tail to the right is long and flat (see Figure 16). The density for a particular age group is consistent across years other than 2009. In fact, the degree of consistency is such that it is difficult to visually differentiate between the density associated with different years.

In contrast, Figure 18 shows substantially different densities of IRA distributions among 73-, 75-, 80-, and 85-year olds in 2009 relative to 2008. The value of the RMD according to the Uniform Lifetime Table is shown by the vertical line. For example, the RMD shown in panel (b), for 75-year olds, is 4.37% which applied to over 96% of 75-year olds in 2008. From this figure, there is clear evidence that the RMD compresses the lower tail of the density of IRA distributions across all age groups and suggests that a large proportion of individuals are RMD-constrained. Prior research shows that only for a very limited set of circumstances is the RMD an optimal distribution, and the extra mass at the non-existent RMD in 2009 is indicative of optimization frictions.

IRA distributions may have been different in 2009 regardless of the policy change because of macroeconomic factors, for example, declining housing values. However, the average size of distributions by age group and year shown in Figure 3 suggest that changing macroeconomic factors from 2008-2009 may not have a large effect on distribution behavior. Individuals younger than 70.5 were not affected by the 2009 RMD suspension and, therefore, the change in their average distributions in 2009 is a good approximation of the average effect of those macroeconomic factors on distributions for older individuals, assuming the macroeconomic factors affect the two age groups similarly. As Figure 3 clearly shows, average distributions for the younger, unaffected group did not change at all in 2009: they are extremely similar to those in 2008 and 2010. To explore this further, Figure 19 shows the distributions of IRA distributions, measured as a percent of the account balance in the previous year, among individuals ages 60-69 from 2008 to 2010. While similar, the 2009 distribution is not perfectly aligned with that of 2008 or 2010: individuals took slightly larger distributions in 2009 relative to 2008 or 2010, as evidenced by the lesser amount of mass in the left tail and shift to the right. This is likely, at least partly, due to the decline in account balances.

4.2 Reduced-Form Estimation

In Section 2, we present a comparative static that shows the effect of changes in the RMD on IRA distributions. In this section, we perform an analogous regression analysis on the individuals in our sample age 70.5 or older with a non-zero account balance (the RMD sample). The regression equation below shows the effects of changes in the RMD, measured as a percent of the previous year account balance, of individual i in period t, RMD_{it}, on IRA distributions, also measured as a percent of the previous year account balance, d_{it} in year t:

$$d_{it} = \alpha_{0t} + \alpha_{1i} + \alpha_2 RMD_{it} + \alpha_3 X_{it} + \epsilon_{it} \tag{3}$$

where α_{0t} are year fixed effects, α_{1i} are individual fixed effects, and X_{it} represents a vector of time-varying individual characteristics. Specifically, X_{it} includes variables that determine the individual's RMD: age group dummy variables, marital status, and an indicator variable equal to 1 if an individual is more than 10 years older than their spouse and equal to 0 otherwise. In some specifications, we also include the natural log of the IRA account balance in the previous year. The year fixed effects control for any determinants of distributions that are common to all individuals, for example, due to macroeconomic conditions. The age group fixed effects control for any determinants that are common to all individuals within the same age group, for example, a decreased remaining life span.[26] Individual fixed effects control for any unobserved, time-invariant heterogeneity in determinants of distributions, such as savings preferences, household resources, life expectancy deviations from age-specific averages, medical expense uncertainty, and attitudes toward risk. The ϵ_{it} is an unobserved, additive error component that represents sampling error or unobserved, time-varying heterogeneity at the individual-year level in determinants of IRA distributions. We allow for the errors to be correlated at the individual level.

The parameter of interest is the coefficient on RMD, α_2, which represents the average effect of a one percent increase in the RMD on IRA distributions, measured as a percent of the account balance. As discussed in Section 2, if every individual who is subject to the

[26] We can include age fixed effects because not all individuals who are the same age have the same RMD.

RMD rules is RMD-constrained, that is, they would prefer to withdraw less than the required amount, this coefficient will be equal to one. Alternatively, if no one is RMD-constrained and every individual withdraws at least their required minimum, the coefficient will be zero. Variation in RMD_{it} comes from within-individual, across-time variation in the RMD. The individual-level RMD is exogenous after controlling for the variables that determine it, which allows us to identify α_2.

In our preferred specification, we measure the dependent variable and the RMD as the natural log of the level, instead of as percents. In this specification, α_2 also represents an (average) elasticity: it measures the percentage change in IRA distributions due to a one percent change in the RMD. While point estimates from both specifications suggest a similar elasticity, around 0.6, we view the log specification as preferable because the relationship between IRA balance size and distributions is non-linear.

In general, α_2 is not equal to α_c, the fraction of RMD-constrained individuals at the 2008 RMD levels, from Section 2 for two reasons. First, for the specification given in equation 3, we cannot include 2009 because we include year fixed effects and all individuals have an RMD equal to zero in 2009. Second, for the entire 2000-2013 empirical sample, there are similarly aged individuals subject to two separate RMD schedules: the 2000-2001 and the 2002-2014 schedules. We run the following first-differences specification that enables us to include the large, unexpected changes in RMDs induced by the 2009 policy suspension:

$$\Delta ln(d_{it}) = \alpha_2 \Delta ln(RMD_{it}) + \alpha_3 \Delta X_{it} + \mu_{it} \tag{4}$$

We include time and age-group fixed effects and changes in the covariates included in the previous specification. The coefficient α_2 measures the effect of an *unexpected* change in the RMD on distributions. Because the 2009 policy suspension did not go into effect until December 23, 2008 and, it is unlikely that distributions in 2008 were affected.

4.2.1 Results

Tables 3 and 4 show the regression results for equation 3 for the RMD Sample, excluding the year 2009 (the year of the RMD holiday). In our preferred specification, with the results shown in Table 4 Column (3), the estimated coefficient on the natural log of the RMD indicates that a 10% increase in the RMD causes a 5.82% increase in IRA distributions. The coefficient on the RMD is statistically significant at the 1 percent level across all specifications. The magnitudes of the estimates suggests that the RMD rules have a substantial effect on IRA distributions. While the estimated coefficient on marital status is inconsistent across specifications, it is often negative, which is consistent with married households having more resources in retirement than unmarried households. Surprisingly, individuals with spouses 10 or more years younger have larger distributions than singles or those with spouses closer in age. Finally, account size and distributions exhibit a sizable and strong relationship: the estimates in our preferred specification suggest that a 10% increase in IRA balance size is associated with a 33% increase in distributions. Because all of these non-RMD covariates are likely endogenous, we cannot attribute causality to the estimated coefficients associated with them.

Table 5 shows the regression results for the first differences specification shown in equation 4. The first column presents the first differences estimates for all years, including 2009. The coefficient estimates are similar to those in the levels specification (Column 3 of Table 4) and show that a 10% increase in the RMD causes a 5.4% increase in distributions. Column 2 presents the results for all years excluding the change from 2008 to 2009, while Column 3 presents the results just for the change from 2008 to 2009. The estimates indicate that an unexpected change in the RMD has a larger effect (0.61) on distributions than an expected change in the RMD (0.49). In the last column, we present results from a specification that includes an interaction between the (change in the) natural log of the RMD and the (change in the) natural log of the IRA balance. As expected, the interaction term is negative: account holders who experienced larger increases in their balance between 2008 and 2009 were less responsive to the change in the RMD induced by the policy suspension than those who experience small (or negative) changes in their account balances.

4.3 Counterfactual Densities of IRA Distributions

The estimating equation discussed in the previous section is confined to studying the average effect of the RMD. In this section, we instead focus on the entire density of IRA distributions. To illustrate the importance of studying the entire density, Figure 17 and Figure 18 show the densities of IRA distributions among 73-, 75-, 80-, and 85-year olds from 2005-2008 and 2008-2009, respectively. In years other than 2009, the density for a particular age group is very consistent. In contrast, Figure 18 shows substantially different densities of IRA distributions among 73-, 75-, 80-, and 85-year olds in 2009 relative to 2008. The value of the RMD according to the Uniform Lifetime Table is shown by the vertical line. For example, the RMD shown in panel (b), for 75-year olds, is 4.37% which applied to over 96% of 75-year olds in 2008. From this figure, there is clear evidence that the RMD compresses the lower tail of the density of IRA distributions across all age groups and suggests that a large proportion of individuals are RMD-constrained, which is consistent with the reduced form results presented in the previous section.

Below, we discuss the procedure we use to estimate a counterfactual density of IRA distributions for each RMD-constrained age group in 2009. For example, consider unmarried 75-year olds (or those with spouses not more than 10 years younger): before and after 2009, these individuals faced an RMD of 4.37% of their account balance. We observe the actual distribution of IRA distributions for 75-year olds in 2008 and 75-year olds in 2009, as shown in panel (b) of Figure 18. However, the 75-year olds in 2009 did not have a required distribution and the mass at a distribution level of 0 increased. The purpose of the method presented here is to estimate the density of IRA distributions of 75-year olds in 2009 as if RMDs had *not* been suspended.

The observed 2008 distribution for 75-year olds is not a perfect counterfactual for that of 75-year olds in 2009 for 2 reasons. First, macroeconomic factors changed substantially and, therefore, the density for 75-year olds in 2009 may have been different from that of the same age group in 2008 independent of the RMD suspension. Second, 75-year olds in 2008 are not the same individuals as 75-year olds in 2009: if the characteristics associated with the density of IRA distributions for 75-year olds vary over time, the same age group from a different year is not a perfect comparison group.

To address these concerns, we use the method developed in DiNardo, Fortin, and Lemieux (1996), referred to as "DFL", which was developed to estimate counterfactual wage densities associated with institutional features of the U.S. labor market, such as the minimum wage or unionization rates. The method is well-suited to a decomposition of changes in the distribution of IRA distributions in 2009 because it allows for us to separate the effect of time-varying characteristics associated with distribution behavior from the 2009 RMD suspension. The DFL method is a generalization of the Oaxaca-Blinder wage decomposition, which uses regression techniques to measure how the average wage of one group (e.g. women) would be different if they had the characteristics of another group (e.g. men). While the Oaxaca-Blinder method focuses on mean wages, the DFL method generalizes measurement to the entire wage distribution.

Our formal explanation of the method follows DFL. We use 75-year olds in 2008 and 2009 as an example, though in our empirical implementation we use the method for all RMD-constrained age groups and various years. We limit our analysis to individuals subject to RMDs given by the Uniform Lifetime Table so that we can hold constant the RMD – measured as a percent of account balance – for all similarly aged individuals.[27]

Consider each observation in the pooled dataset as a vector (d, z, t), where d is an IRA distribution measured as a percent of the IRA account balance, z contains individual characteristics, and t takes on one of two year values (2008 or 2009). Each individual observation belongs to the joint distribution $F(d, z, t)$ of distributions, individual characteristics, and dates. The joint distribution of IRA distributions and characteristics at one point in time is the conditional distribution $F(d, z|t)$. For a particular age group, this joint distribution may depend on distributional characteristics, such as the RMD measured as a percent of the account balance that must be withdrawn, RMD_t. The density of IRA distributions at one point in time, $f_t(d)$, is written as the integral of the density of distributions conditional on a set of individual characteristics and date t_d, $f(d|z, t_d; RMD_t)$ over the distribution of

[27]We omit the less than 4% of individuals subject to a different RMD schedule due to a spousal age gap of over 10 years. Their RMD schedule is not conducive to implementing the estimation methods presented here.

individual characteristics $F(z|t_z)$ at date t_z:

$$\begin{aligned} f_t(d) &= \int_z dF(d, z|t_{d,z} = t; RMD_t) \\ &= \int_z f(d|z, t_d = t; RMD_t) dF(z|t_z = t) \\ &\equiv f(d; t_d = t, t_z = t, RMD_t) \end{aligned} \tag{5}$$

Therefore, while $f(d; t_d = 2009, t_z = 2009, RMD_{2009})$ represents the actual density of IRA distributions in 2009 among 75-year olds, $f(d; t_d = 2009, t_z = 2009, RMD_{2008})$ represents the density that would have prevailed in 2009 if the RMD of 75-year olds had been that of the 2008 cohort, keeping the individual characteristics of the 2009 75-year old cohort the same.

To construct the counterfactual density of interest $f(d; t_d = 2009, t_z = 2009, RMD_{2008})$, we need to make the following assumptions. First, we need to assume that the RMD has no spillover effects on the distribution of IRA distributions above the RMD. That is, for any two values RMD_0 and RMD_1 of the RMD with $RMD_0 \leq RMD_1$, the conditional densities $f(d|z, t_d; RMD_0)$ and $f(d|z, t_d; RMD_1)$ are the same for IRA distributions above the highest value of the RMD, which is RMD_1. Formally, this implies:

$$[1 - I(d \leq RMD_1)]f(d|z, t_d; RMD_0) = [1 - I(d \leq RMD_1)]f(d|z, t_d; RMD_1) \tag{6}$$

where $I(\cdot)$ is the indicator function. This assumption will be satisfied if individuals maximize their utility by choosing how much to withdraw from their IRA account, compare that amount to their RMD, and either distribute an amount equal to their optimum or, in the case where their optimal distribution is less than the RMD, take their RMD. However, the assumption will be violated if individuals "target" their distribution according to the RMD. For example, if the schedule requires that an individual distribute 4.37% of their account and their decision rule is to withdraw this amount plus 2 percentage points the assumption will be violated. In Section 4.4, we provide empirical evidence that this assumption is satisfied. In our implementation, we use the RMD plus one percentage point to allow for rounding error.[28]

The second assumption is that the shape of the conditional density of real IRA distributions at or below the RMD only depends on the value of the RMD. For two years, t_0 and t_1, and two values of the RMD, RMD_0 and RMD_1 with $RMD_0 \leq RMD_1$, the shape of the conditional density $f(d|z, t_0; RMD_1)$ that would prevail at t_0 if the RMD were RMD_1 is proportional to the shape of the conditional density $f(d|z, t_1; RMD_1)$ for distributions at or below the highest value of the RMD, RMD_1. In other words, for IRA distributions that are

[28] We are conducting analysis to determine the optimal threshold value.

at or below the value of the 2008 RMD, the conditional density of distributions that would prevail in 2009 if the RMD were at the 2008 level instead of equal to zero is proportional to the conditional density of IRA distributions in 2008. This implies:

$$\begin{aligned} &I(d \leq RMD_{2008}) f(d|z, t_d = 2008; RMD_{2008}) \\ &\qquad = \psi_d(z, RMD_{2008}) I(d \leq RMD_{2008}) f(d|z, t_d = 2009; RMD_{2008}) \end{aligned} \tag{7}$$

where $\psi_d(\cdot)$ is a re-weighting function to be defined below. This assumption will be violated if the distribution behavior of individuals who do not comply with the RMD rules changes over time. We find no empirical evidence that this assumption is violated: for example, the RMD compliance rate is relatively stable over time.[29]

Finally, the third assumption is that the RMD has no effect on the probability of having an IRA among individuals subject to RMD rules. This assumption rules out extensive margin effects of the RMD rules. Opening an account in response to RMD rules is unlikely to occur, as individuals subject to RMD rules are ineligible to open an account. Keeping open an account that would have otherwise being closed is also unlikely, as ceteris paribus RMD rules restrict IRA use. Closing an account in response to the rules, however, is potentially a concern. There is graphical evidence of a small increase in total distributions among 70.5 year olds. Because of this and timing issues associated with the RMD rules for 70.5-72 year olds, we do not use the DFL method to construct counterfactual densities for these age groups. In Section 4.5, we discuss this in more detail and provide empirical evidence that the assumption is reasonable for the older age groups.

We construct a 2009 conditional density with the RMD at its 2008 level by selecting the part of the 2009 density above RMD_{2008} and the part of the 2008 density at or below RMD_{2008} with an indicator function. To make sure the overall counterfactual density integrates to one, we pre-multiply the 2008 density by a re-weighting function $\psi_d(z, RMD_{2008})$. Formally, this implies:

$$\begin{aligned} f(d|z, t_d = 2009; RMD_{2008}) &= I(d \leq RMD_{2008}) \psi_d(z, RMD_{2008}) f(d|z, t_d = 2008; RMD_{2008}) \\ &\quad + [1 - I(d \leq RMD_{2008})] f(d|z, t_d = 2008; RMD_{2008}) \end{aligned} \tag{8}$$

where the re-weighting function $\psi_d(z, RMD_{2008}) = \frac{Pr(d \leq RMD_{2008}|z, t_d = 2009)}{Pr(d \leq RMD_{2008}|z, t_d = 2008)}$. To obtain the effect of the RMD on the overall distribution of IRA distributions in 2009, we integrate the conditional density given by equation 8 over the distribution of individual characteristics:

[29] An exception is 2001, when there was a 4 percentage point decrease in the percentage of individuals who satisfy their RMD.

$$
\begin{aligned}
&f(d;t_d=2009,t_z=2009;RMD_{2008})\\
&\quad=\int f(d|z,t_d=2009;RMD_{2008})dF(z|t_z=2009)\\
&\quad=\int I(d\leq RMD_{2008})\psi_d(z,RMD_{2008})f(d|z,t_d=2008;RMD_{2008})dF(z|t_z=2009)\\
&\qquad+[1-I(d\leq RMD_{2008})]f(d|z,t_d=2008;RMD_{2008})dF(z|t_z=2009)\\
&\quad=\int I(d\leq RMD_{2008})\psi_d(z,RMD_{2008})f(d|z,t_d=2008;RMD_{2008})\psi_z(z)^{-1}dF(z|t_z=2008)\\
&\qquad+[1-I(d\leq RMD_{2008})]f(d|z,t_d=2008;RMD_{2008})dF(z|t_z=2009)
\end{aligned}
\tag{9}
$$

where the re-weighting function $\psi_z(z)^{-1}=\frac{Pr(t_z=2009|z)}{Pr(t_z=2008|z)}\cdot\frac{Pr(t_z=2008)}{Pr(t_z=2009)}$ and the product of the two re-weighting functions in equation 9 is given by:

$$
\begin{aligned}
\psi(z,RMD_{2008})&\equiv\psi_d(z,RMD_{2008})\cdot\psi_z(z)^{-1}\\
&=\frac{Pr(t_d=2009|z,d\leq RMD_{2008})}{Pr(t_d=2008|z,d\leq RMD_{2008})}\cdot\frac{Pr(t_z=2008)}{Pr(t_z=2009)}
\end{aligned}
\tag{10}
$$

In the DFL method, the two dates are viewed as possible events in the date space: therefore, the unconditional probabilities in the above equation, $Pr(t_z=2008)$ and $Pr(t_z=2009)$, are equal to the number of observations in the respective year divided by the total number of observations in the pooled dataset. To measure the conditional probability terms, we estimate the probability of being at date t, given certain individual characteristics and an IRA distribution below the 2008 RMD using a probit model

$$
Pr(t_d=t|z,d\leq RMD_{2008})=Pr(\epsilon>-\beta^{'}H(z))=1-\Phi(-\beta^{'}H(z))
\tag{11}
$$

where $\Phi(\cdot)$ is the cumulative normal distribution and $H(x)$ is a vector of covariates that is a function of x. We construct the vector $H(x)$ to consist of: a gender dummy, imputed marital status, a quartic of the previous year account balance, Social Security benefits, wage income, taxable pension benefits, and income from interest, dividends, and capital gains.[30] We estimate the probit model by pooling observations from 2008 and 2009 that have IRA distributions, measured as a percent of the account balance, smaller or equal to the 2008 RMD. In the empirical implementation, we use the RMD plus 1 percentage point (e.g. 5.37) because of the abnormal concentration of distributions just above the RMD (4.37), which

[30]For a large subset of individuals in our sample, we also explored including the effect of median housing prices at the zip-code level. The results for the subsample with this inclusion are similar as to that for the entire sample without.

suggests either small spillover effects or rounding. We discuss potential spillover effects in the next section.

4.3.1 Results

Figure 22 shows the 2009 actual and counterfactual densities using 2008 as the baseline year for four age groups: 73-, 75-, 80-, and 85-year olds. Each graph shows the actual density (the solid line) in contrast with the estimated counterfactual density (dotted line) that would have prevailed if the RMD rules had not been suspended in 2009, holding individual characteristics at 2009 levels. The age group-specific RMD level according to the Uniform Lifetime Table is represented by a vertical line, which increases across age groups. We limit the horizontal axis to distributions that are 15% of the account balance or less because this is where the differences between actual and counterfactual densities are located.[31]

Our graphical evidence suggests a large fraction of individuals are RMD-constrained across all age groups. The shift in mass from the age group-specific RMD to 0 is consistent with the 2009 RMD suspension inducing many individuals to suspend their distributions. Table 6 shows the difference in density between the 2009 actual and counterfactual densities (within half a percentage point) at two points: 0 and the level of the 2008 RMD, across all age groups. For example, among 73-year olds, 39% of individuals are RMD-constrained at the 2008 RMD level, with nearly 40% of them suspending distributions when not subject to the RMD rules, and the remainder taking distributions in 2009 between 0 and the 2008 RMD. As Figure 22 and Table 6 elucidate, there is heterogeneity in the difference in density at the RMD across age groups. In general, as individuals age, approximately the same proportion (41%) are RMD-constrained at current RMD levels. However, a smaller proportion prefer to suspend distributions completely and instead prefer to take a distribution between zero and the current RMD.

The difference in density at the RMD, 0.39 for 73-year olds, is an estimate of the proportion of RMD-constrained individuals α_c from Section 2 in a simple world with no inattention or inertia. However, all of the empirical evidence shows there is a substantial proportion of people in each age group who take a distribution very similar to the RMD they would have been subject to if the RMD suspension had not occurred. Figure 3 provides evidence of these potential optimization frictions. Individuals younger than 70.5 years take an average distribution of 6.2% in 2008-2010, with no statistically significant difference in 2009. In years other than 2009, the average distribution jumps by 76% to 10.9% for 70.5-year olds, with a 13.1% average among all individuals subject to the RMD rules. In contrast, in 2009, the average distribution among 70.5-year olds is 8.2%, which is a much smaller increase than in other years, but still a 32% increase. Similarly, the average distribution among all individuals subject to the RMD rules is around 20% lower in 2009 compared to non-2009 years, at

[31] Approximately 85% of the total mass is included with the 15% cut-off.

10.4%. To explore this issue further, we calculate the proportion of individuals who made a withdrawal within half a percentage point of their RMD in 2009, shown in the last column of Table 6. Approximately 20% of individuals made such a withdrawal, a substantial fraction given that only for a very limited set of circumstances is the RMD an optimal distribution, as discussed in Brown et al. (2014) and Sun and Webb (2012). The fraction increases slightly with age.

The most likely explanation for the "extra" mass located at the phantom RMD in 2009 is inattention. In a survey of TIAA-CREF participants, Brown, Poterba, and Richardson (BPR) document that 45% of individuals either did not know about or did not remember the temporary suspension. In addition, BPR provide evidence suggesting a large fraction of retirees view the RMD rules as a form of financial planning advice from policymakers.[32] In recent work, Gelber et al. (2015) document earnings adjustment frictions in response to changes in the Social Security Annual Earnings Test among U.S. retirees from 1983 to 1999.[33] They find that among this group of retirees, the fixed cost associated with adjustment is $280: if the gains associated with adjusting to policy changes exceed this level, then individuals adjust their earnings. In addition, bunching at old kink points dissipates by 3 years after the policy changes. While our sample is different from that of Gelber et al. (2015), our (suggestive) evidence of frictions is consistent with their findings. We expect that if the RMD rules were permanently removed, the mass at the pre-removal RMD would gradually disappear. Because of the apparent optimization frictions, for example due to inattention, the difference in density at the RMD is a lower bound on α_c at existing RMD levels.[34]

The densities presented in Figure 22 use 2008 as the baseline year from which the 2009 counterfactual densities are estimated. However, 2008 may not be a good control year because macroeconomic factors associated with the Great Recession that could affect distribution behavior were shifting.[35] Therefore, we also construct counterfactual densities using 2006, 2007, 2010 and 2011 as the baseline. The results for 75-year olds are shown in Figure 23. Estimates of the counterfactual density is robust across baseline years, with larger mass at the RMD for 2010 compared to 2006, 2007 and 2011.

As discussed in the previous section, the DFL method is sensitive to the empirical threshold value used as the RMD.[36] In Figure 24, we show counterfactual densities with 2008 as

[32] Specifically, they find that half of the 403(b) participants in their sample agreed that "...required minimum distribution [provide] ... some guidance on how much you can spend each year for the rest of your life without running out of money."

[33] Friedberg (2000) established that there was substantial bunching among Social Security beneficiaries and that the bunching shifts in response to changes in the earnings test kink. .

[34] We are working to estimate a frictionless measure of α_c.

[35] Figure 17 suggests that individuals not subject to the rules did not take substantially different distributions in 2009 relative to 2008, which is also supported in Poterba et al. (2013).

[36] This is a common issue that needs to be addressed when using the DFL method. DFL use the log of $3.00 instead of the log of the actual (1979) minimum wage of $2.90 because of spillovers, for example due to rounding error.

the baseline year and varying RMD threshold values. To generate the baseline graphs presented above, we use a threshold value of 1: that is, for an RMD value equal to 4.37, we use a value of 5.37 ($1 + 4.37$) as the point below which the counterfactual is estimated. As Figure 24 shows, a threshold value of 0 generates a counterfactual density with too little mass immediately to the right of the actual RMD. Threshold values of 0.5-0.63 provide a smoother counterfactual. In our main specifications, we use a threshold value of 1 to allow for RMD spillovers further in the distribution. The empirical cost associated with increasing the threshold value is that a larger portion of the counterfactual density is estimated, as opposed to using the actual density in 2009.

In our first-differences specification shown in equation 4, we find an average RMD elasticity of 0.6. In a context with perfect compliance and for the special case where the difference is measured from 2008 to 2009 exclusively, the coefficient on α_2 is equal to α_c and measures the (average) fraction of individuals who are RMD-constrained at current RMD levels. Using the DFL estimation strategy, the (weighted) average of the fraction of individuals who are RMD-constrained at current levels is 0.41. To further explore why these estimates from the two strategies differ, we present results from a regression of equation 4 for a subset of the original regression sample: we create a DFL-comparable sample that is limited to individuals aged 73 - 85 who are subject to the Uniform Lifetime RMD schedule. In addition, because of imperfect compliance, we limit the regression sample to individuals who complied in 2008, i.e. those who took a distribution at least as large as their RMD. The results are shown in Table 7. The coefficient on the (change in) the natural log of the RMD is 0.437 and more in line with the DFL estimates of the fraction of RMD-constrained among individuals ages 73-85. The difference between the estimated elasticity for the DFL-comparable sample and the entire sample is likely due to heterogeneous responses among individuals between the ages of 70.5 and 72, older than 85, and the imperfect compliers.

4.4 Determinants of 2009 RMD Suspension

In this section, we discuss the characteristics of individuals who suspended distributions in 2009. We define "suspenders" as individuals who: (1) had a positive IRA balance at the end of 2008, (2) did not take a distribution in 2009, and (3) took a normal distribution in 2008. Under this definition, 35% of individuals are suspenders in 2009 – very similar to the findings of BPR.

First, we examine suspenders' 2008 IRA distributions. In Section 2, we hypothesize that only people constrained by the RMD rules at the pre-2009 levels will suspend their distributions in 2009.[37] Here, we test whether suspenders appear to be RMD-constrained in the previous year. Figure 25 shows graphs of the 2008 densities for 73-, 75-, 80-, and

[37] Several other hypotheses are consistent with suspension, including beliefs that asset valuations were temporarily depressed in 2009.

85-year olds. Individuals in the "Everyone" category had a positive IRA balance at the end of 2008. The graphs are consistent with our hypothesis: compared to everyone, suspenders are much more likely to have been taking exactly their RMD in 2008. Figure 26 shows the analogous 2008 distributions for all individuals who did not take a 2009 distribution: that is, this includes suspenders *and* individuals who did not take a distribution in 2008. In 2009, 37.4% of individuals did not take a distribution, which includes individuals who may be non-compliers. Ignoring non-compliers would likely lead to an overestimate of the intensive margin effect, as non-compliers likely did not suspend their distributions in 2009 due to the policy and would have taken a zero distribution regardless.

We find that 65% of individuals in 2008 choose distributions amounts within 1 percentage point of their RMD. The probability of suspending in 2009, conditional on having a 2008 distribution that is within one percentage point of the RMD, is 41.1%. However, the probability of suspending in 2009 conditional on having a 2008 distribution that is more than one percentage point larger than the RMD is 16.6%. While Brown et al. find a small difference in the probability of suspending between these two groups, our results suggest that "suspenders" in 2009 are precisely those we expect to suspend: the RMD-constrained. Figure 25 provides visual evidence of this difference: the suspension probability is clearly decreasing in the difference between the previous years' distribution and RMD.

Next, we run probit regressions with the dependent variable as an indicator variable for being a 2009 suspender, similar to those in BPR. We include the following regressors: age group dummy variables, gender, marital status, the natural log of IRA balance in 2008, and the difference between the 2008 distribution and RMD, both measured as a percent of account balance. 8 displays the marginal effects from 2 specifications, one without and one with the last regressor: the difference between the 2008 distribution and RMD. Similar to BPR, we find the probability of suspension declines with age: the marginal effect is negative and statistically significant for all age groups older than the 70.5-74 group (the omitted group). In addition, we find that women and married individuals were more likely to suspend, and the suspension probability is increasing in the 2008 account balance. While BPR also find that married individuals were more likely to suspend, they find that men were more likely to suspend.

The first assumption of DFL is that there are no spillover effects of the RMD for IRA distributions above the RMD. While we cannot test this assumption directly, the evidence presented in this section provides strong support for the assumption. Individuals who take a distribution equal to or less than their RMD when required – and who suspend distributions when offered the opportunity – are likely influenced by RMD rules. If Figure 25 instead showed that most suspenders had 2008 distributions well above their RMD, we would view that as evidence in violation of the assumption.

4.5 Effect of the RMD on Total Distributions

The third DFL assumption is that the RMD has no effect on the probability of having an IRA among the individuals subject to the RMD rules. This assumption rules out extensive margin effects of the RMD rules. In essence, we assume that the (suspension of the) RMD rules do not induce individuals to close their IRAs. Given that the policy change we use for identification is a suspension, the relevant question is whether some individuals who would have taken a total distribution in 2008, and thus not been a part of our sample in 2009, instead chose to keep their IRAs because of the policy. However, the timing of the policy precludes violation of this assumption.

The policy was signed into law December 23, 2008 as part of the Worker, Retiree, and Employer Recovery Act of 2008. Because of the timing associated with the policy, namely that it occurred at the end of the year, it is highly unlikely that individuals who otherwise would have closed their accounts chose not to because of the policy at the end of 2008. Empirically, we do not see a decrease in the proportion of individuals who take a total distribution in 2008.[38]

We observe an effect of the RMD rules on the probability of taking a total distribution for 70.5-year olds. Figures 3 and 2 show the average size of total distributions and the percent that take total distributions by age group, respectively, for 2008-2010. The average size of distributions increases at age 70.5 by nearly 5 percentage points before decreasing slightly and eventually increasing for ages 74 and older. The extra "bump" at age 70.5 shown in Figure 3 is attributable to an increase in total distributions that occur at age 70.5 when individuals are first subject to the RMD rules. This is also shown in Figure 2. Figure 21 displays the average size of distributions across age groups after removing individual-year observations in which the individual makes a total distribution.

The year in which an individual turns 70.5 is the first year that they are subject to the RMD rules. Because there is a cost associated with complying with the rules, it may be that compliance costs for the marginal individual induces account closure. Figure 15 shows the average size of total distributions by age group. Among individuals who make a total distribution, the average size of the distribution declines substantially at age 70.5. This suggests individuals with smaller accounts are less willing to incur the cost associated with complying. In fact, Figure 15 shows that in 2009 when the cost of complying was zero, there is a smaller increase in the percent of 70.5-year olds with a total distribution relative to other years. Surprisingly, there is no offsetting increase in total distributions in 2010 among the individuals in their first year of being subject to the RMD rules in 2009.

[38]This may be partly attributable to market conditions, as individuals would not want to sell off all of their assets when the value of those assets is low.

4.6 Who Takes Distributions Near the RMD Threshold?

We expect the income profiles of those with IRA distributions near the RMD threshold to systematically differ from those with IRA distributions exceeding the thresholds. In particular, we expect individuals taking distributions near the minimum to have higher incomes, for two reasons. First, individuals with less non-IRA income sources may need to draw down their IRAs for consumption. Second, individuals may engage in tax-smoothing, whereby they take IRA distributions – taxed at ordinary income rates – during low-tax years.

Table 9 compares average and median income values, along with traditional IRA balances, for those near the RMD threshold (i.e. within 0.5 percentage points in absolute value) and those in excess of the threshold. As expected, individuals with distributions near the RMD threshold have higher adjusted gross incomes on average (and at the median), despite having lower taxable IRA distributions. This holds for all non-IRA distribution sub-types of income we analyzed – interest, dividends, business, Social Security, and pensions – except capital gains. It also holds for both single and married tax units.

Next, we analyze patterns over time at the individual level. That is, we make use of the panel aspects of our data, and compare income amounts in years where an individual takes distributions near the RMD threshold to years their distributions exceed the threshold. We expect the former to be larger than the latter, to the extent individuals are tax smoothing or need to consume out of their IRA in low-income years. However, after limiting the sample to those individuals with distributions near their RMD threshold in at least one year, we find no discernible difference between the two.

5 Conclusion

Traditional IRAs are an increasingly important vehicle for retirement savings. From 2000 to 2013, the percentage of Americans age 60 or older with an IRA increased from 29% to 35%. The same time period saw a doubling in the real wealth held in IRAs by these individuals, from $1.9 trillion in 2000 to $3.8 trillion in 2013 (both measured in 2014 dollars). While there is a large literature that studies the effect of retirement savings policies on contributions to retirement savings accounts, relatively few studies have analyzed the effect of decumulation policies on withdrawals from these accounts. In order to make recommendations with regard to optimal retirement savings policy, research is required on the effect of current policy on saving and consumption during both working-age *and* retirement-age years. In this paper, we inform the latter.

We examine the effects of the Required Minimum Distribution (RMD) rules – which affect IRAs, 401(k)s, and similar plans – on distributions from IRAs. To study these effects, we use a 16-year panel of administrative tax data that contains information on taxpayer IRAs and distributions. We exploit the 2009 suspension of RMD rules to identify their effect on distributions across age groups. We find that the rules have a large effect; we estimate that 41% of individuals would prefer to take an IRA distribution less than their required minimum. Using the semiparametric procedure developed by DiNardo, Fortin, and Lemieux (1996), we estimate the counterfactual density of IRA distributions that would have prevailed in 2009 if the rules had not been suspended. This allows us to separate the effect of time-varying characteristics associated with distribution behavior from the 2009 RMD suspension.

In addition to studying the distributional effects of the rules, we discuss the characteristics of those who suspended their distributions in 2009. We also document an extensive margin effect among individuals newly subject to the rules. Immediately upon aging into the population affected by RMD rules, retirees exhibit a higher probability of emptying their accounts. We also provide evidence suggestive of optimization frictions in retiree's financial decisions. When the RMD rules were suspended, a large fraction of individuals withdrew an amount equal to the phantom RMD they would have been subject to if the rules were not suspended. A future goal of this research project is to theoretically model and empirically estimate the magnitude of these frictions. Note that distributions near the phantom RMD could also plausibly be explained by retirees taking the RMD schedule as a form of officially-sanctioned advice. Research elsewhere suggests a significant fraction of individuals indeed take this view (Brown et al., 2014).

Our analysis is focused on decumulation of Traditional IRAs because these assets represent a large fraction of overall wealth, are subject to RMD rules, and have account balance and distribution information reported to the IRS. Other types of retirement accounts, such as 401(k)s and Roth IRAs, do not share all of these features, nor do ordinary savings accounts or non-retirement investment accounts. However, many retirees face a simultaneous decumulation problem with several options for financing consumption. A full theoretical and empirical treatment of such a problem is beyond the scope of this paper, but future research on this issue may yield further insights into the effects of RMD policy on the dis-savings decisions of retirees.

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Table 1: Summary Statistics for Entire 5% Sample, 2000-2013

Variable	Mean	Standard Deviation	Min	Max	Observations (Millions)
Age	71.72	8.94	60	100	37.58
#Years in Sample	12.17	4.07	1	16	37.58
Form 1040	0.73	0.44	0	1	37.58
Form 5498	0.36	0.48	0	1	37.58
Form 1099-R	0.54	0.50	0	1	37.58
Form 5329	0.00	0.04	0	1	37.58
Form 1099-INT	0.55	0.50	0	1	37.58
Form 1099-DIV	0.29	0.46	0	1	37.58
Form W-2	0.28	0.45	0	1	37.58
Deceased	0.30	0.46	0	1	37.58
Married (Conditional on Filing)	0.67	0.47	0	1	27.60
Married (Including Non-Filer Imputation)	0.61	0.49	0	1	34.06
IRA Balance Indicator	0.35	0.48	0	1	37.58
IRA Balance Size	151,604	5,936,713	1	*	13.16
#Years with Positive IRA Balance	4.17	5.68	0	15	37.58
Normal Distribution Indicator	0.19	0.40	0	1	37.58
Normal Distribution as % of Balance	0.15	0.23	0	1.03	6.93
Normal Distribution in Levels	12,991	34,139	1	*	7.32
Total Distribution Indicator	0.04	0.19	0	1	12.51
Total Distribution in Levels	46,972	177,686	1	*	0.46
Inheritance Distribution	0.05	0.23	0	1	37.58
Roth Conversion	0.00	0.06	0	1	13.16
Positive RMD	0.16	0.36	0	1	37.58

Summary statistics for the 5% sample, drawn from the universe of tax and information returns, representative of the population of individuals age 60 and older for the years 2000 through 2013. We exclude observations in the top 1% of distributions measured as a percent of the previous year's account balance (more than 103%). We also exclude the tax year observations of individuals who die in the current year, a previous year, or the following year. Finally, we exclude individuals who have no tax or information returns in any year during our sample period. Dollar figures are presented in inflation-adjusted 2014 dollars.
*Omitted to protect taxpayer privacy.

Table 2: Summary Statistics for Empirical Samples, 2000-2013

Variable	**IRA Holders Sample** Mean	Observations (Millions)	**RMD Sample** Mean	Observations (Millions)
Age	70.18	16.18	77.18	5.85
#Years in Sample	12.80	16.18	14.61	5.85
Form 1040	0.92	16.18	0.90	5.85
Form 5498	0.82	16.18	0.95	5.85
Form 1099-R	0.72	16.18	0.97	5.85
Form 5329	0.00	16.18	0.00	5.85
Form 1099-INT	0.71	16.18	0.79	5.85
Form 1099-DIV	0.46	16.18	0.55	5.85
Form W-2	0.34	16.18	0.14	5.85
Deceased	0.21	16.18	0.34	5.85
Married (Conditional on Filing)	0.72	14.88	0.65	5.29
Married (Including Non-Filer Imputation)	0.70	16.00	0.64	5.78
IRA Balance Indicator	0.81	16.18	0.95	5.85
IRA Balance Size	151,604	13.16	138,635	5.57
#Years with Positive IRA Balance	9.69	16.18	12.71	5.85
Normal Distribution Indicator	0.45	16.18	0.91	5.85
Normal Distribution as % of Balance	0.15	6.93	0.12	5.28
Normal Distribution in Levels	13,012	7.26	10,040	5.32
Total Distribution Indicator	0.04	12.51	0.05	5.85
Total Distribution in Levels	46,972	0.46	53,229	0.28
Inheritance Distribution	0.06	16.18	0.08	5.85
Roth Conversion	0.00	13.16	0.00	5.57
Positive RMD	0.36	16.18	1.00	5.85
RMD as % of Balance			0.05	5.85
RMD in Levels			5,893	5.85
Satisfied RMD			0.90	5.85
Positive RMD Excise Tax Penalty			0.00	5.85
Took First RMD in 70.5 Year			0.84	0.55
Took 70.5 Year RMD			0.91	0.55

The IRA Holders Sample is the subsample of individuals in the 5% sample who have a positive IRA account balance in at least one year during the 15-year sample period (1999-2014). The RMD Sample is the subset of individuals in the IRA Holders Sample age 70.5 or older and have a positive RMD for the observation year. The RMD Sample excludes individuals in their second year of being RMD-constrained for the year 2000 and individuals in their first year of being RMD-constrained for the year 2013. Dollar figures are presented in inflation-adjusted 2014 dollars.

Table 3: Effect of RMD on Distribution as % of Balance

	(1)	(2)	(3)
RMD as % of Balance	0.425*	0.506**	0.536**
	(0.169)	(0.170)	(0.166)
More than 10 years older than spouse	0.008**	0.004	0.023***
	(0.003)	(0.003)	(0.003)
First Year of RMD	-0.012***	-0.012***	-0.012***
	(0.001)	(0.001)	(0.001)
Second Year of RMD	-0.000	-0.000	0.001
	(0.000)	(0.000)	(0.000)
Married		0.007***	-0.023***
		(0.001)	(0.001)
IRA Balance (Natural Log)			-0.053***
			(0.000)
Individual FE	X	X	X
Year FE	X	X	X
Age Group FE	X	X	X
N	5.34 Million	5.27 Million	5.27 Million
R^2	0.029	0.029	0.058

Individual fixed effects regressions controlling for the variables that determine an individual's RMD (age, year, first and second RMD year, and spousal age difference) and the natural log of the previous year account balance from which the RMD percentage applies. The dependent variable is IRA distribution measured as a percent of the previous year account balance. The married variable is binary, and includes both observed and imputed marital statuses. The sample includes all years from 2000 to 2013, excluding 2009. Standard errors are clustered at the individual level.

Table 4: Effect of RMD on Distributions - Natural Log Specification

	(1)	(2)	(3)
Natural Log of RMD	0.275***	0.265***	0.582***
	(0.002)	(0.002)	(0.123)
More than 10 years older than spouse	0.046	0.319***	0.175***
	(0.033)	(0.033)	(0.042)
First Year of RMD	-0.394***	-0.396***	-0.402***
	(0.011)	(0.011)	(0.011)
Second Year of RMD	0.027***	0.025***	0.018**
	(0.006)	(0.006)	(0.006)
Married		-0.360***	0.005
		(0.006)	(0.006)
IRA Balance (Natural Log)			0.335**
			(0.123)
Individual FE	X	X	X
Year FE	X	X	X
Age Group FE	X	X	X
N	5.39 Million	5.32 Million	5.27 Million
R^2	0.039	0.04	0.084

Individual fixed effects regressions controlling for the variables that determine an individual's RMD (age, year, first and second RMD year, and spousal age difference) and the natural log of the previous year account balance from which the RMD applies. The dependent variable is the natural log of IRA distributions. The married variable is binary, and includes both observed and imputed marital statuses. The sample includes all years from 2000 to 2013, excluding 2009. Standard errors are clustered at the individual level.

Table 5: Effect of RMD on Distributions - First Difference Specifications

	(1)	(2)	(3)	(4)
Δ Natural Log of RMD	0.542***	0.494***	0.608***	0.580***
	(0.004)	(0.004)	(0.004)	(0.005)
Δ Natural Log of IRA Balance	0.791***	0.784***	1.142***	0.436***
	(0.006)	(0.007)	(0.016)	(0.061)
Δ More than 10 years older than spouse	0.028	0.076	-0.712**	-0.710**
	(0.044)	(0.043)	(0.250)	(0.250)
Δ Married	0.192***	0.181***	0.265***	0.270***
	(0.009)	(0.009)	(0.048)	(0.048)
Interaction: Δ Natural Log of RMD				-0.101***
and Δ Natural Log of IRA Balance				(0.009)
Year FE	X	X		
Age Group FE	X	X		
N	4.81 Million	4.4 Million	409,980	409,980
R^2	0.216	0.163	0.071	0.071

First differences regressions controlling for changes in the variables that determine an individual's RMD (age, and spousal age difference) and the natural log of the previous year account balance from which the RMD applies. The dependent variable is the change in the natural log of IRA distributions. The married variable includes both observed and imputed marital statuses. The sample years for the regression results in column (1) includes all years from 2000 to 2013. The sample years for the regression results shown in column (2) includes all years from 2000 to 2013, excluding 2009. The sample year for the regression results shown in columns (3) and (4) is 2009. Standard errors are clustered at the individual level.

Table 6: Difference between 2009 Actual and Counterfactual Densities

Baseline Year	Age	Difference in Density at Zero	Difference in Density at RMD	2009 Density at RMD
2008	73	+0.15	-0.39	0.18
2008	74	+0.14	-0.39	0.19
2008	75	+0.14	-0.41	0.20
2008	76	+0.13	-0.42	0.19
2008	77	+0.14	-0.40	0.22
2008	78	+0.13	-0.40	0.22
2008	79	+0.12	-0.42	0.21
2008	80	+0.11	-0.41	0.19
2008	81	+0.11	-0.41	0.21
2008	82	+0.11	-0.41	0.22
2008	83	+0.10	-0.42	0.21
2008	84	+0.09	-0.41	0.21
2008	85	+0.08	-0.42	0.21

The table shows the difference in density between the 2009 actual and counterfactual densities, as estimated using the DFL method, at two points in the density of IRA distributions: zero and at the level the 2008 RMD. The density is calculated within half a percentage point of each point. To estimate the counterfactual densities, 2008 is used as the baseline year. The last column shows the 2009 density within half a percentage point of the RMD. Results are shown by age group, from age 73 to 85.

Table 7: Robustness First Difference Specifications

Δ Natural Log of RMD	0.437****
	(0.007)
Δ Natural Log of IRA Balance	0.924***
	(0.019)
Δ Married	0.444***
	(0.073)
Year FE	X
Age Group FE	X
N	149,155
R^2	0.040

First differences regressions controlling for changes in the variables that determine an individual's RMD (age) and the natural log of the previous year account balance from which the RMD applies. The dependent variable is the change in the natural log of IRA distributions. The married variable includes both observed and imputed marital statuses. The sample year for the regression results is 2009 and the sample is limited to individuals who: are age 73 or older, subject to the Uniform Lifetime RMD schedule, took a distribution at least as large as their RMD in 2008, do not have distributions measured as a percent of the previous year account balance in the top 1%. Standard errors are clustered at the individual level.

Table 8: Determinants of RMD Suspension Probability

	(1)	(2)
Age 75-79	-0.075***	-0.015***
	(0.001)	(0.002)
Age 80-84	-0.081***	-0.019***
	(0.002)	(0.002)
Age 85-89	-0.08***	-0.014***
	(0.002)	(0.003)
Age 90+	-0.044***	0.028***
	(0.004)	(0.005)
Female	0.029***	0.024***
	(0.002)	(0.002)
Married	0.074***	0.072***
	(0.002)	(0.002)
2008 IRA Balance (Natural Log)	0.018***	0.022***
	(0.000)	(0.001)
2008 Distribution - RMD (Percent)		-0.002***
		(0.000)
Observations	425,000	380,000

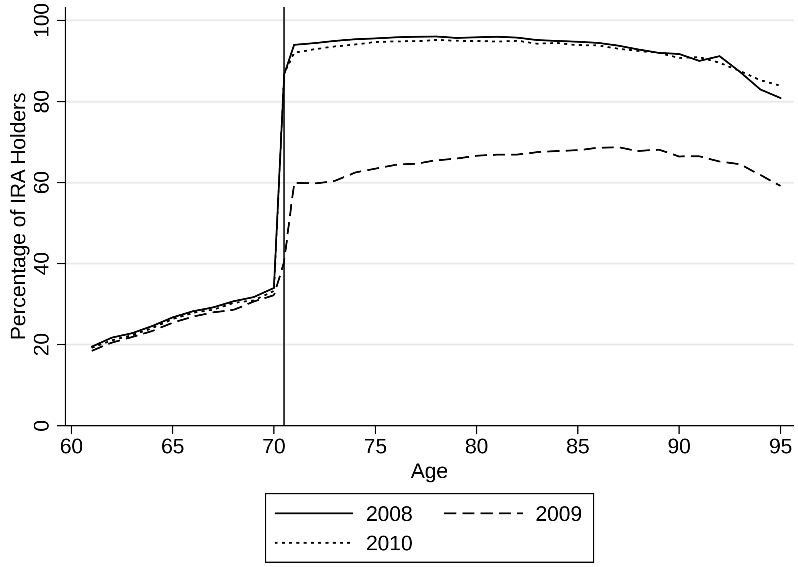
The table shows marginal effects from probit regressions where the dependent variable is an indicator equal to 1 if the individual had a positive distribution in 2008 and took a zero distribution in 2009, and equal to 0 if the individual took a distribution in 2009. The married variable is binary, and includes both observed and imputed marital statuses. Probit results are the marginal effects evaluated at the mean. The excluded age group is Age 70.5-74. Standard errors are in parentheses.

Table 9: Comparing Tax Units with Distributions Near and Beyond the RMD Threshold

	Near RMD Threshold		Beyond RMD Threshold	
	Single	Married	Single	Married
Adj. Gross Income	54,575 [Med.=32,499]	104,056 [Med.=64,392]	47,430 [Med.=27,484]	85,746 [Med.=51,990]
Business Income	4,082 [Med.=0]	10,032 [Med.=0]	2,057 [Med.=0]	982 [Med.=0]
Social Security	16,949 [Med.=17,070]	28,585 [Med.=28,375]	16,904 [Med.=16,977]	28,188 [Med.=27,979]
Capital Gains	-2,903 [Med.=0]	1,118 [Med.=0]	-1,331 [Med.=0]	842 [Med.=0]
Interest and Dividends	15,131 [Med.=4,929]	22,970 [Med.=6,732]	9,021 [Med.=2,309]	14,825 [Med.=3,824]
Taxable Pensions	15,590 [Med.=8,830]	25,128 [Med.=16,758]	12,331 [Med.=5,798]	20,273 [Med.=12,272]
Taxable IRA Dist.	7,012 [Med.=2,619]	13,132 [Med.=5,186]	12,535 [Med.=5,537]	17,574 [Med.=8,111]
AGI − Taxable IRAs	47,563 [Med.=27,349]	90,924 [Med.=53,617]	34,895 [Med.=18,772]	68,172 [Med.=38,321]
Trad. IRA Balances	135,990 [Med.=51,478]	152,670 [Med.=46,870]	107,760 [Med.=39,106]	142,820 [Med.=40,360]
Observations	842,548	1,573,963	645,272	1,101,556

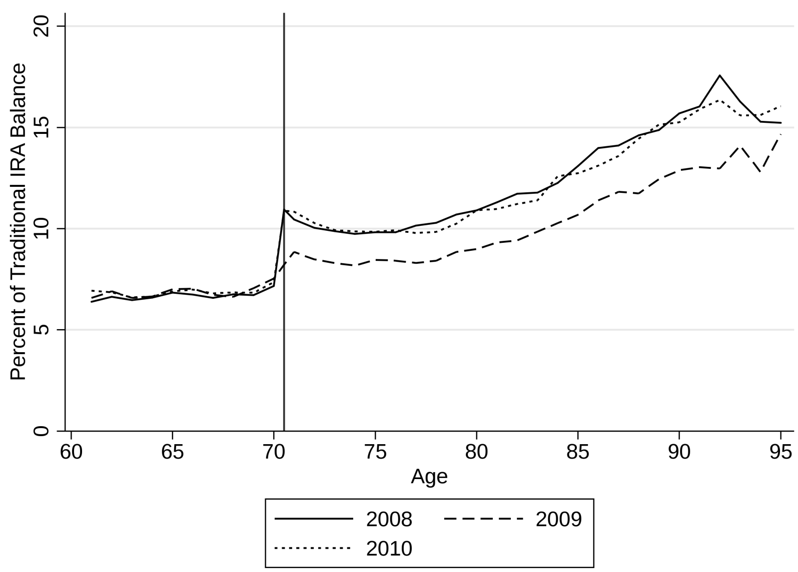
Averages are presented, with median in brackets below. Comparison is limited to those filing Form 1040 with a positive normal IRA distribution. "Near" the RMD threshold is defined as being within 0.5 percentage points of the threshold in absolute value. Tax year 2009 is excluded as RMD rules were suspended in that year. Business income is comprised of gross profit or loss reported on Form 1040 Schedules C, E, and F. Interest and dividends include taxable and tax-exempt interest, and ordinary and qualified dividends. Social Security is taken from Form 1099-SSA, and represents gross retirement benefits. Capital gains are the sum of short-term and long-term capital gains from Schedule D. All dollar amounts are adjusted to 2014 levels.

Figure 2: Percentage of IRA Holders with Any Distribution (2008-2010)



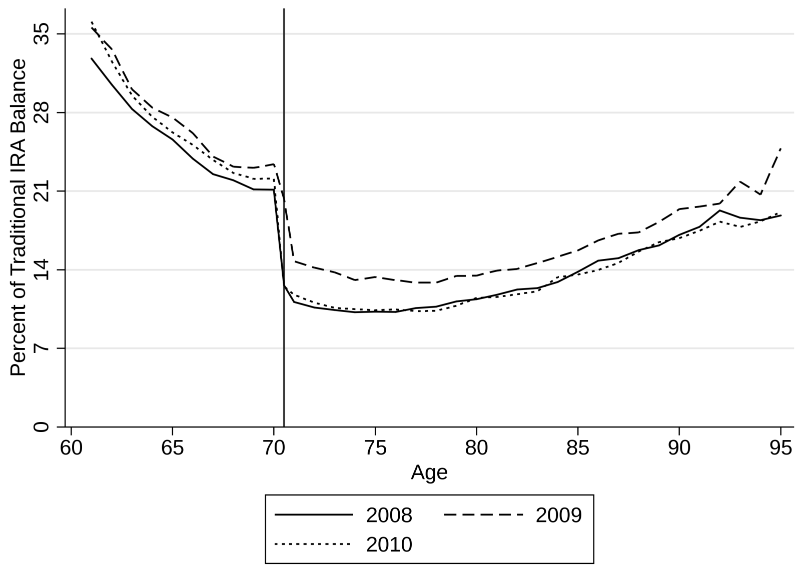
The figure shows the percentage of individuals, among those with a positive Traditional IRA balance at the end of the previous year, who take a distribution from their Traditional IRAs. The underlying data are derived from a five percent random sample of individuals with Traditional IRAs.

Figure 3: Average Normal Distributions from Traditional IRAs (2008-2010)



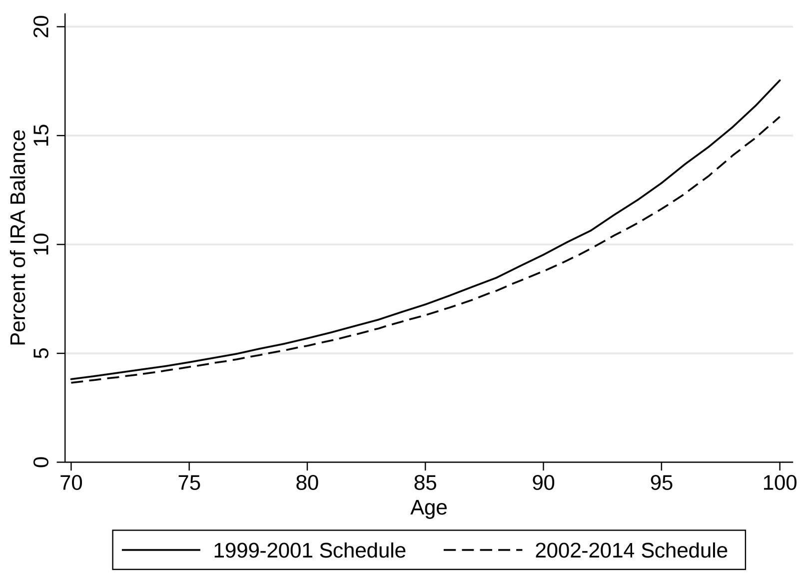
The figure shows the average size of normal distributions from Traditional IRAs, measured as a percentage of the account balance at the beginning of the year, by age group from 2008 to 2010. The underlying data are derived from a five percent random sample of individuals with Traditional IRAs and are limited to those with a positive Traditional IRA balance at the beginning of the year. Note that individuals who took zero distributions are included in the calculations.

Figure 4: Average Normal Distributions from Traditional IRAs, Conditional on a Positive Distribution (2008-2010)



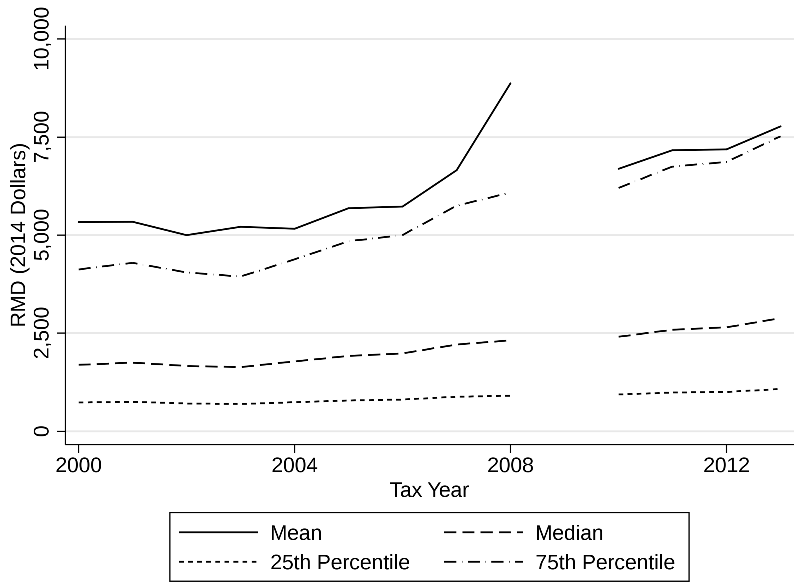
The figure shows the average size of distributions from Traditional IRAs, measured as a percentage of the account balance at the beginning of the year, by age group from 2008 to 2010. The underlying data are derived from a five percent random sample of individuals with Traditional IRAs and are limited to those with a positive Traditional IRA balance at the beginning of the year. Note that individuals who took zero distributions are excluded from the calculations.

Figure 5: Change in Uniform RMD Schedule



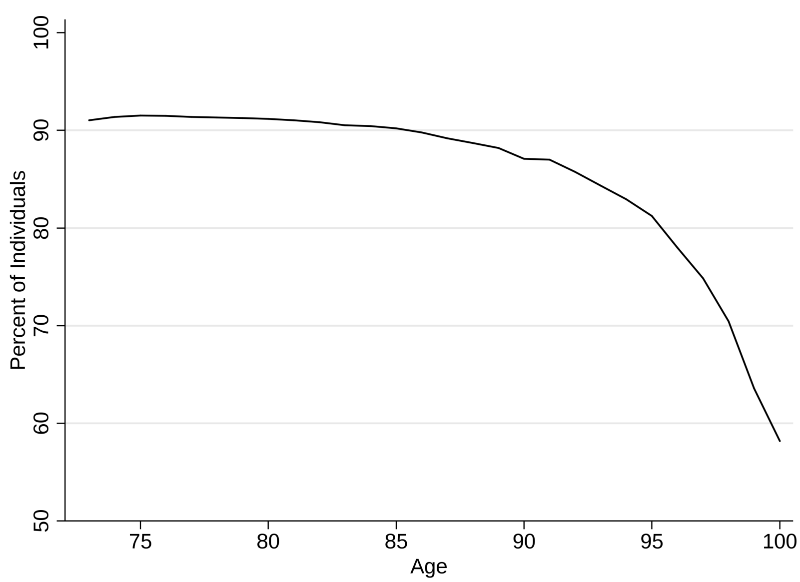
The figure shows the Required Minimum Distribution (RMD), measured as the percent of the IRA account balance that must be withdrawn, for ages 70 to 100 for the years 1999-2014. The schedule changed in 2002. Note that the schedule did not apply in 2009, as the RMD rules were temporarily suspended.

Figure 6: Required Minimum Distributions



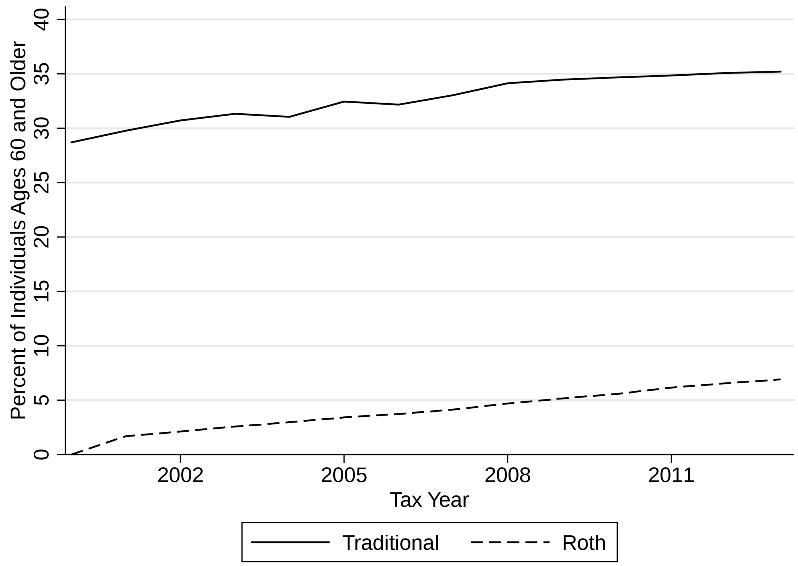
The figure displays statistics on Required Minimum Distributions from 2000 to 2013, excluding 2009 (when the RMD rules were suspended). The underlying data are derived from a five percent random sample of individuals subject to RMD rules. Dollars are adjusted to 2014 levels.

Figure 7: Percent of Individuals that Satisfy the RMD (2000-2013)



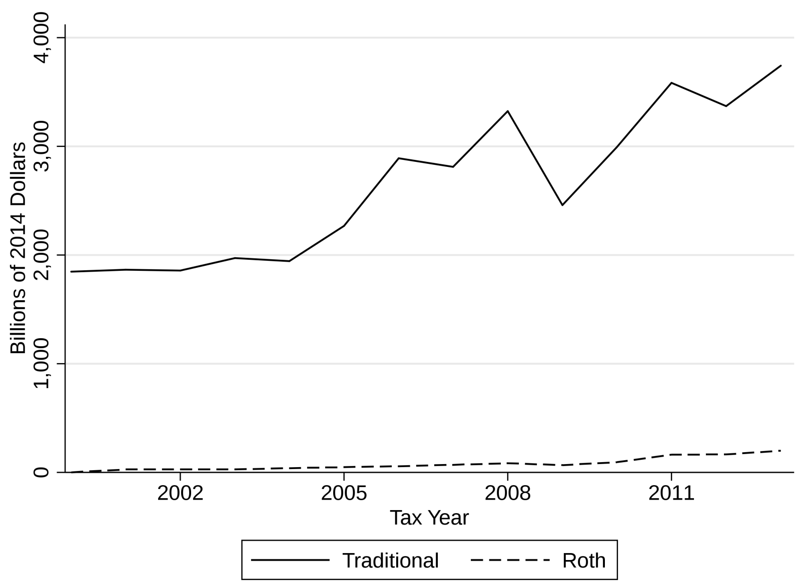
The figure shows the percentage of individuals who satisfy their RMD by age group during 2000 to 2013. The underlying data are derived from a five percent random sample of individuals with Traditional IRAs who are subject to the RMD rules.

Figure 8: Percentage of Individuals Ages 60 and Older with an IRA



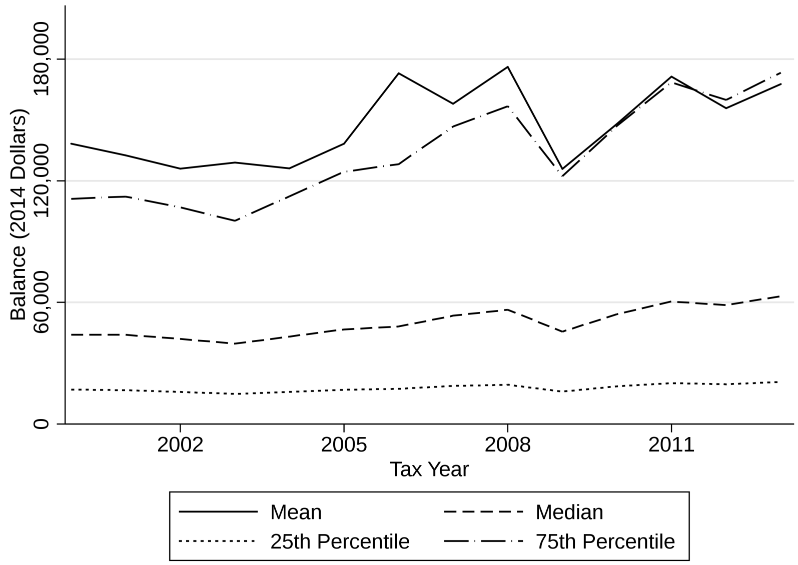
The figure shows the percentage of individuals ages 60 and older with a positive balance in Traditional and Roth IRAs from 2000 to 2013. Note that some individuals have both types of accounts. The underlying data are derived from a five percent random sample of individuals who have a tax form reported to the IRS at some point during 1999 to 2014.

Figure 9: Estimated Total Assets Held in IRAs by Individuals Ages 60 and Older



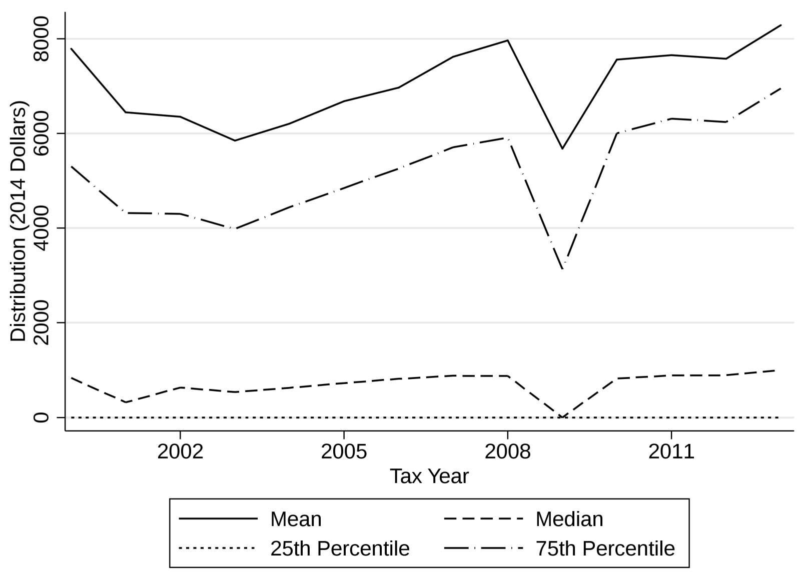
The figure shows the estimated amount of assets held in IRAs by the population of individuals ages 60 and older. The underlying data are derived from a five percent random sample of individuals from 2000 to 2013. Dollars are adjusted to 2014 levels.

Figure 10: Balances of Traditional IRAs Held by Individuals Ages 60 and Older



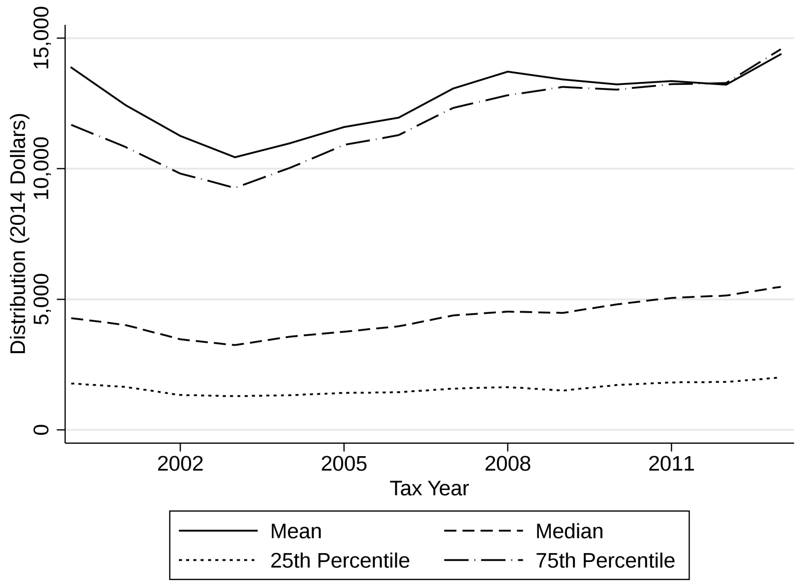
The figure displays statistics on Traditional IRA balances among individuals ages 60 and older who have a nonzero Traditional IRA balance. The underlying data are derived from a five percent random sample of individuals from 2000 to 2013. Dollars are adjusted to 2014 levels.

Figure 11: Normal Distributions from Traditional IRAs



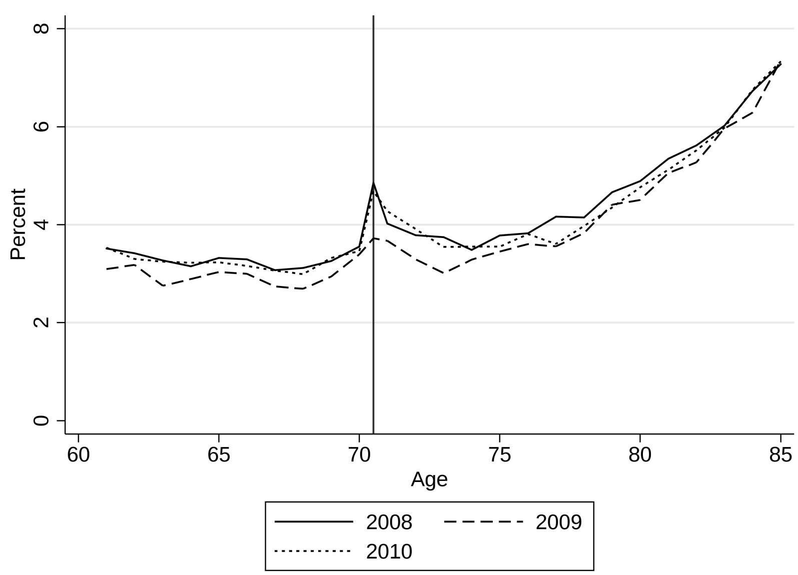
The figure displays statistics on normal distributions from Traditional IRAs among individuals ages 60 and older who have a nonzero Traditional IRA balance. The underlying data are derived from a five percent random sample of individuals from 2000 to 2013. Dollars are adjusted to 2014 levels.

Figure 12: Normal Distributions from Traditional IRAs, Conditional on a Positive Distribution



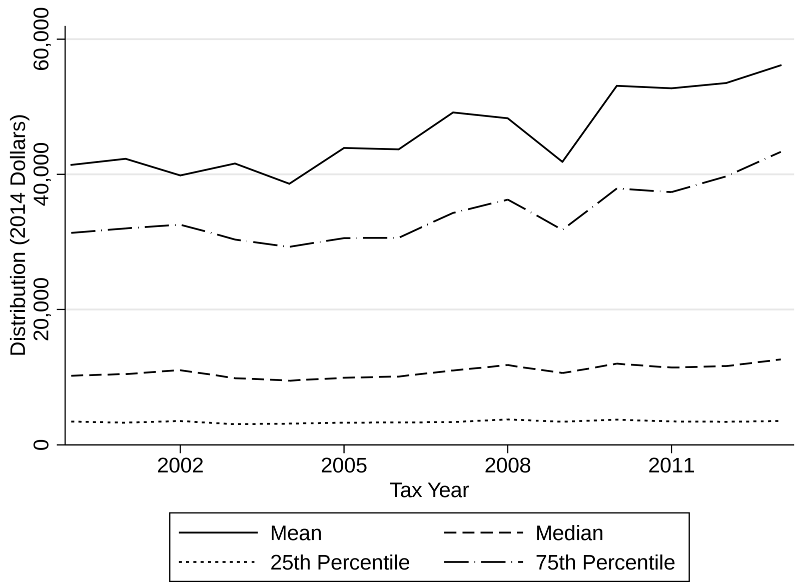
The figure displays statistics on normal distributions from Traditional IRAs among individuals ages 60 and older who take a nonzero normal distribution from a Traditional IRA. The underlying data are derived from a five percent random sample of individuals from 2000 to 2013. Dollars are adjusted to 2014 levels.

Figure 13: Percentage of IRA Holders Who Take a Total Distribution (2008-2010)



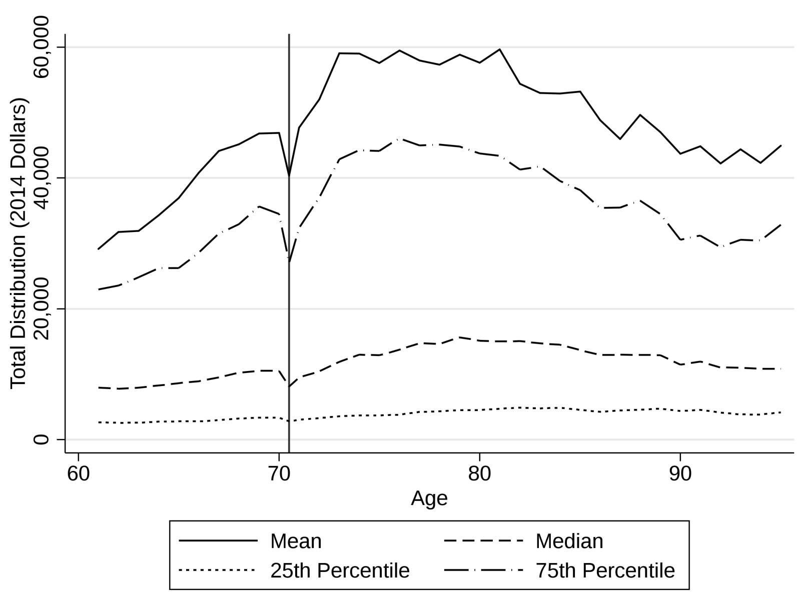
The figure shows the the percentage of individuals with a nonzero Traditional IRA balance that take a total distribution. Total distributions represent individuals withdrawing all assets from their IRAs. The underlying data are derived from a five percent random sample of individuals from 2008 to 2010.

Figure 14: Total Distributions from Traditional IRAs



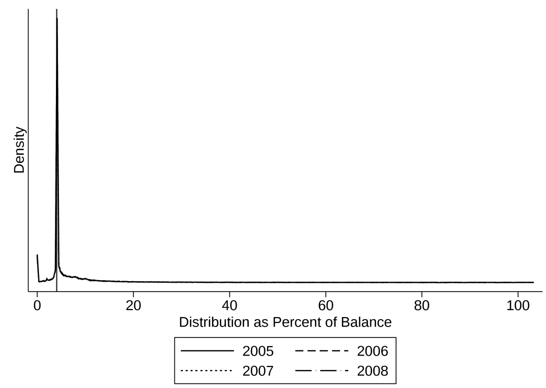
The figure displays statistics on total distributions – those distributions which take their IRA balances to zero – from Traditional IRAs among individuals ages 60 and older who take a total distribution from a Traditional IRA. The underlying data are derived from a five percent random sample of individuals from 2000 to 2013. Dollars are adjusted to 2014 levels.

Figure 15: Total Distributions (2000-2013)

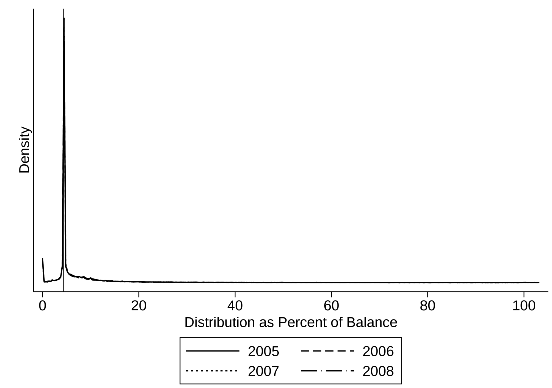


The figure displays statistics on total distributions from Traditional IRAs. The underlying data are derived from a five percent random sample of individuals who take a total distribution from their Traditional IRA during 2000 to 2013.

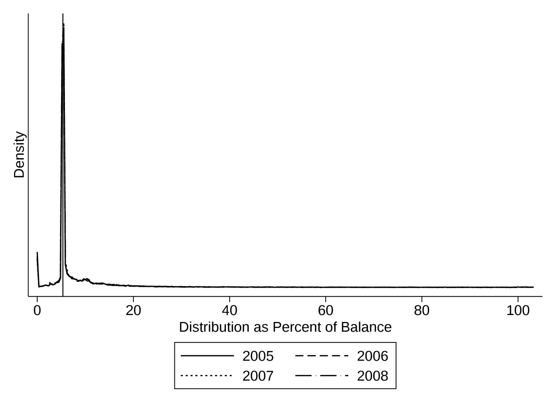
Figure 16: Normal Distributions for Different Age Groups (2005-2008)



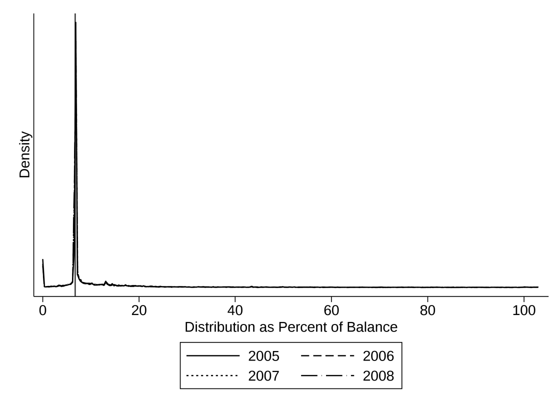
(a) 73-Year Olds



(b) 75-Year Olds



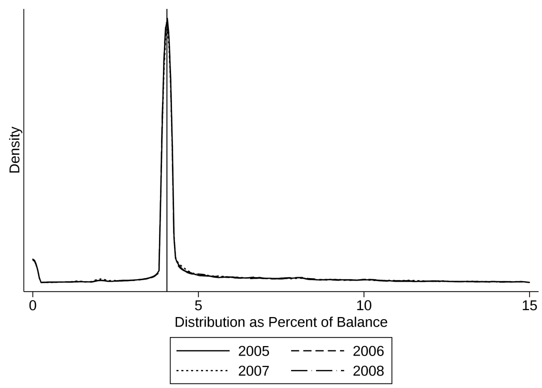
(c) 80-Year Olds



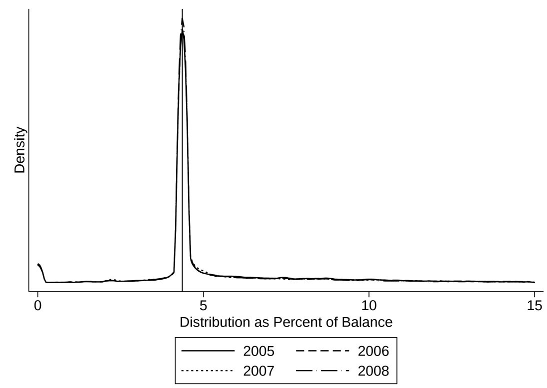
(d) 85-Year Olds

The figure shows the densities of normal distributions taken by 73-, 75-, 80-, and 85-year olds from their Traditional IRAs. The vertical line represents the RMD associated with the Uniform Lifetime Table. The underlying data are derived from a five percent random sample of individuals subject to RMD rules from 2005 to 2008. The top one percent of distributions (measured as a percentage of balances) have been dropped. Note that the same information is presented in Figure 17, except there is truncated to only show distributions less than or equal to 15% of IRA balances.

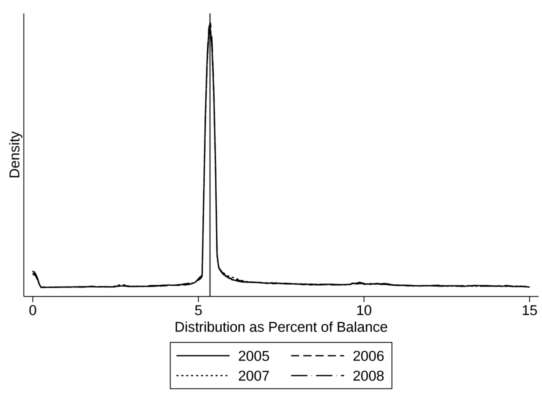
Figure 17: Normal Distributions for Different Age Groups (2005-2008)



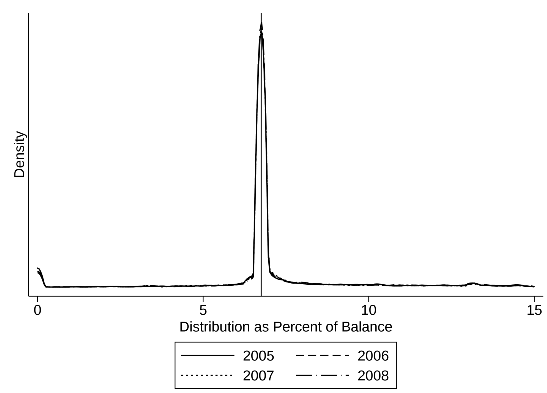
(a) 73-Year Olds



(b) 75-Year Olds



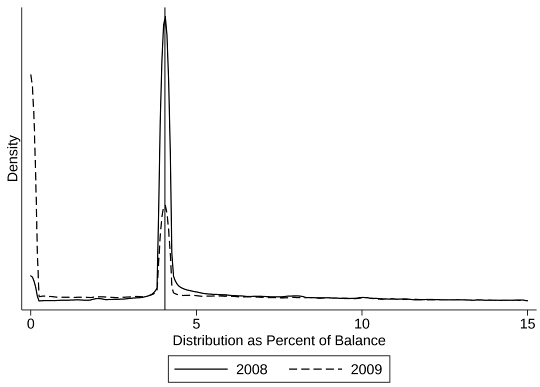
(c) 80-Year Olds



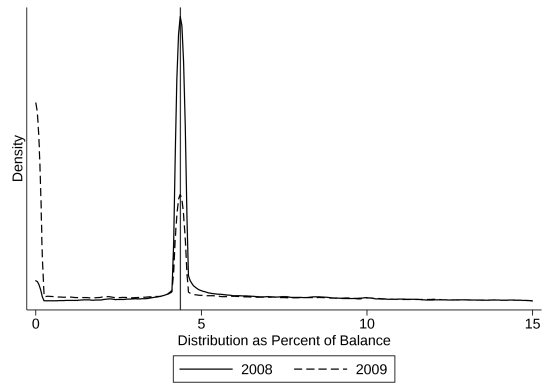
(d) 85-Year Olds

The figure shows the densities of normal distributions taken by 73-, 75-, 80-, and 85-year olds from their Traditional IRAs. The vertical line represents the RMD associated with the Uniform Lifetime Table. The underlying data are derived from a five percent random sample of individuals subject to RMD rules from 2005 to 2008. The top one percent of distributions (measured as a percentage of balances) have been dropped. Note that this figure is the same as Figure 16, except it is truncated to only show distributions less than or equal to 15% of IRA balances.

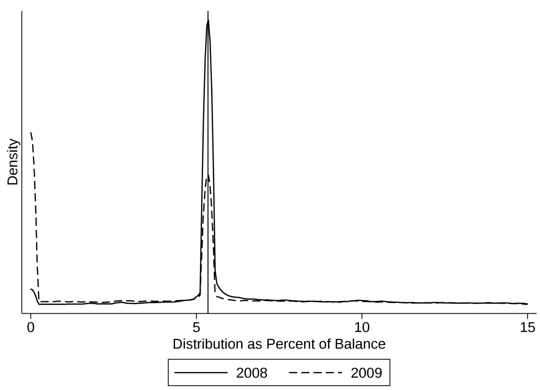
Figure 18: Normal Distributions for Different Age Groups (2008-2009)



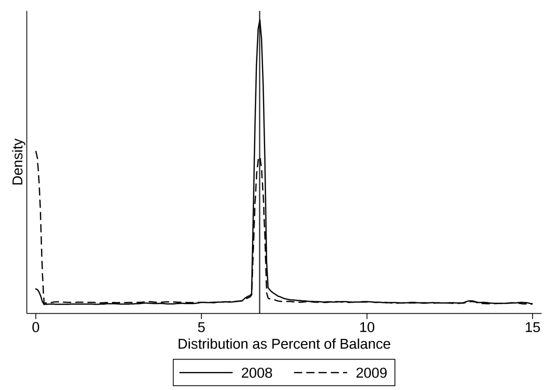
(a) 73-Year Olds



(b) 75-Year Olds



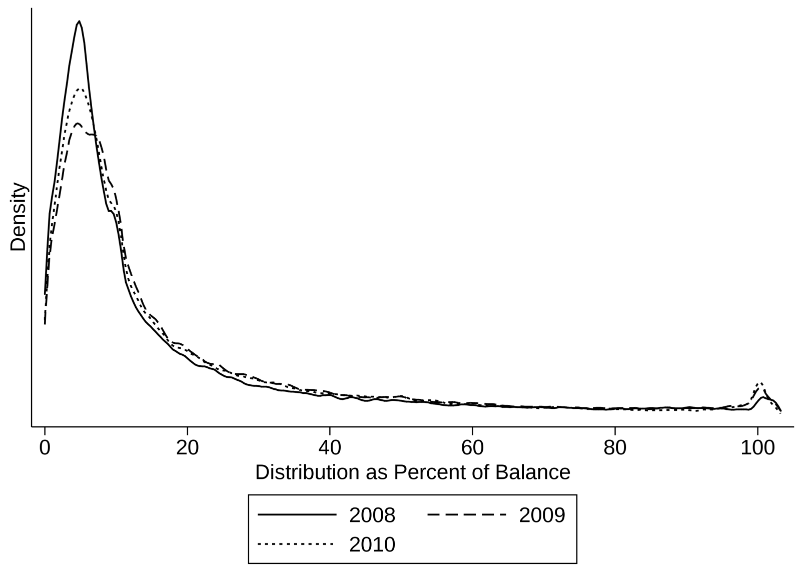
(c) 80-Year Olds



(d) 85-Year Olds

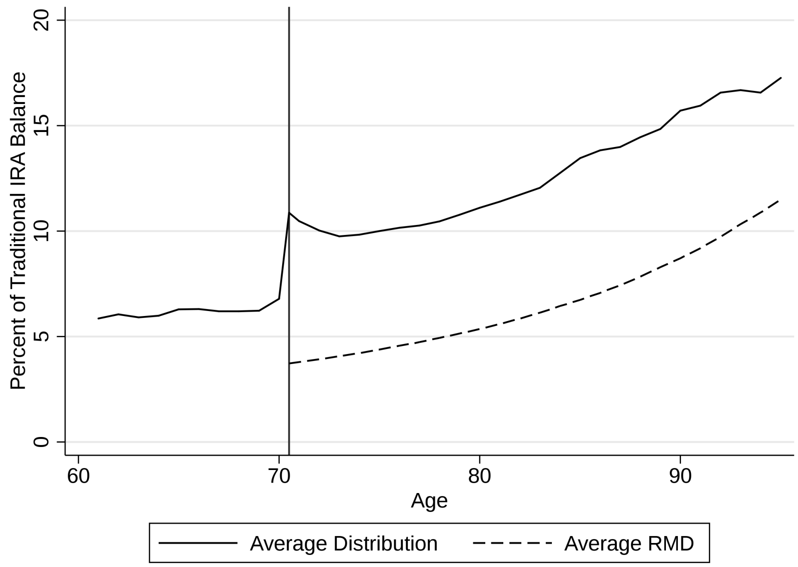
The figure shows the densities of normal distributions taken by 73-, 75-, 80-, and 85-year olds from their Traditional IRAs. The vertical line represents the RMD associated with the Uniform Lifetime Table. The underlying data are derived from a five percent random sample of individuals subject to RMD rules from 2005 to 2008. The top one percent of distributions (measured as a percentage of balances) have been dropped. Note that in 2009 the RMD rules were temporarily suspended.

Figure 19: IRA Distributions for Individuals Ages 60 to 69, Conditional on a Positive Distribution (2008-2010)



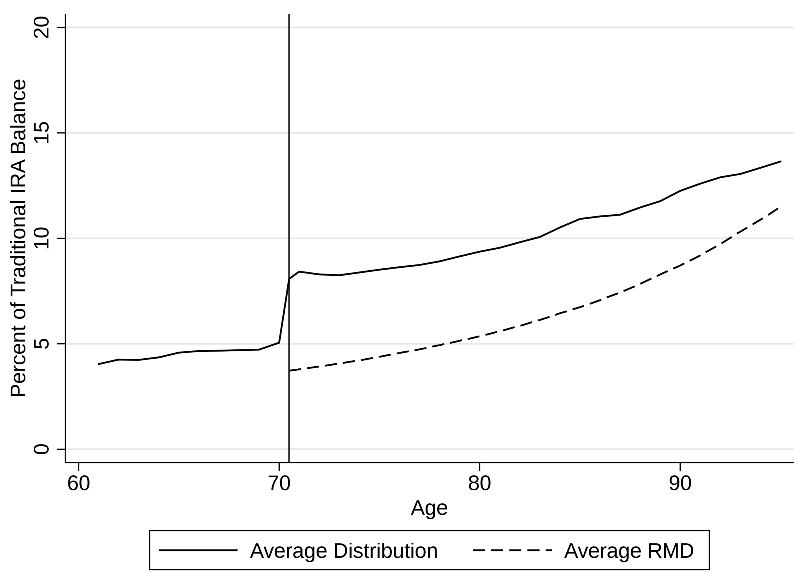
The figure shows the densities of Traditional IRA distributions, measured as a percent of the account balance in the previous year, among individuals ages 60 to 69 who take a positive distributions during 2008 to 2010. The underlying data are derived from a five percent random sample of individuals with a nonzero Traditional IRA balance at the beginning of the year.

Figure 20: Average Normal Distributions and RMDs (2000-2013, excluding 2009)



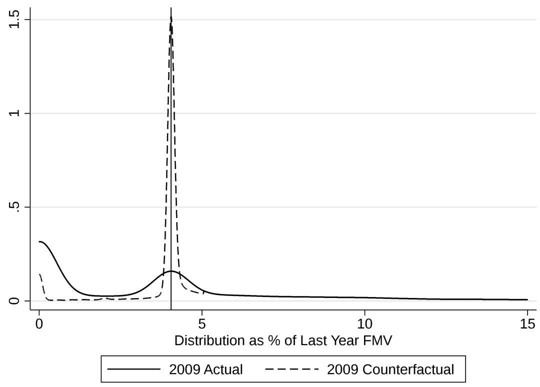
The figure shows the average size of normal distributions and Required Minimum Distributions, measured as a percentage of the account balance at the end of the previous year, from years 2000 to 2013 excluding 2009. The underlying data are derived from a five percent random sample of individuals with a nonzero Traditional IRA balance at the beginning of the year. Figure 21 displays the same information for those individuals that do not take total distributions.

Figure 21: Average Normal Distributions and RMDs, Excluding Individuals Who Take Total Distributions (2000-2013, excluding 2009)

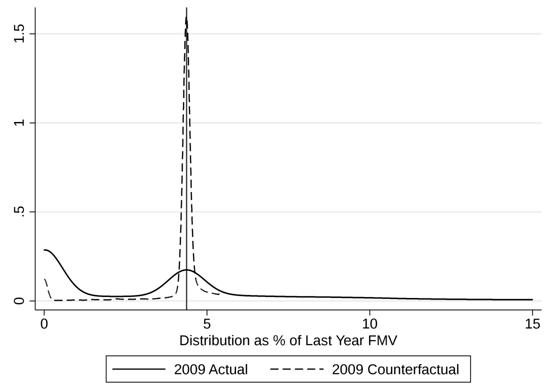


The figure shows the average size of normal distributions and Required Minimum Distributions, measured as a percentage of the account balance at the end of the previous year, from years 2000 to 2013 excluding 2009. The underlying data are derived from a five percent random sample of individuals with a nonzero Traditional IRA balance at the beginning of the year who do not take total distributions. Figure 20 displays the same information but includes those individuals that take total distributions.

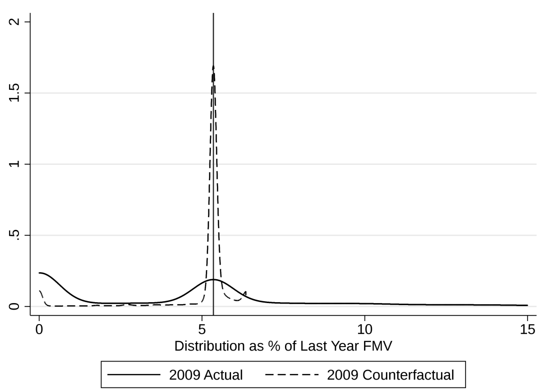
Figure 22: 2009 Counterfactual Densities for Different Age Groups



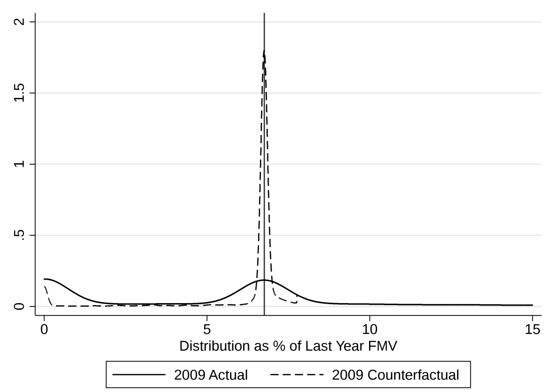
(a) 73-Year Olds



(b) 75-Year Olds



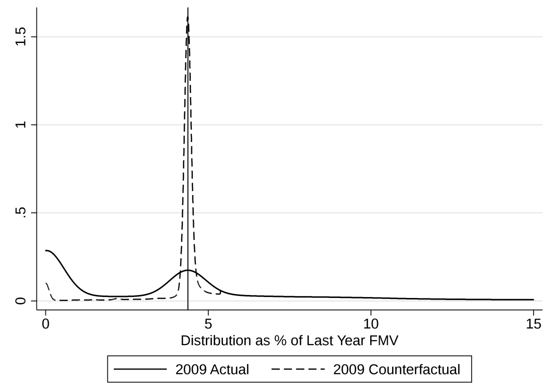
(c) 80-Year Olds



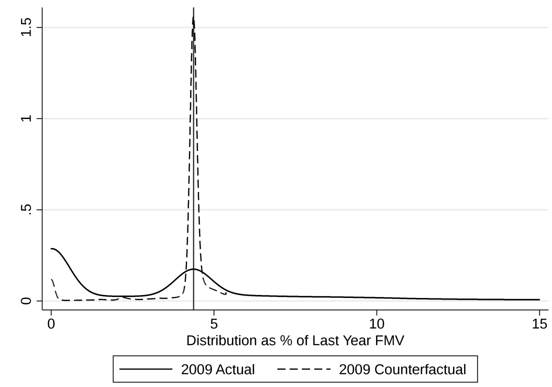
(d) 85-Year Olds

Panels show 2009 actual and counterfactual densities of IRA distributions for the following age groups: 73, 75, 80, and 85. The counterfactual densities are estimated using the methods described in DiNardo, Fortin, and Lemieux (1996) and the baseline year used to estimate the counterfactual densities is 2008. The horizontal axis is limited to distributions, measured as a percent of the account balance, that are 15 or less.

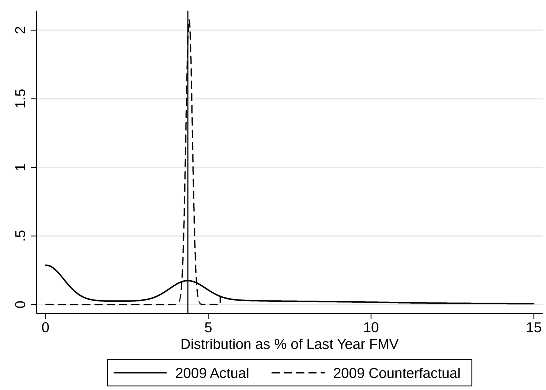
Figure 23: 2009 Counterfactual Densities with Varying Baseline Year



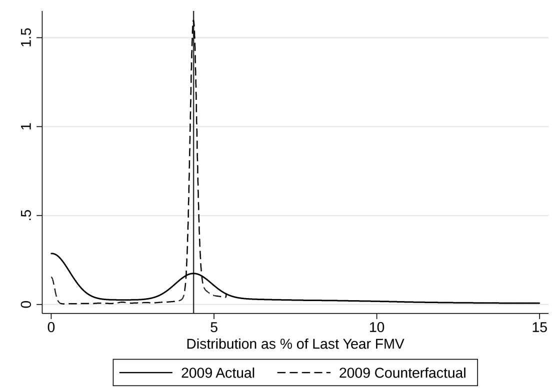
(a) 2006



(b) 2007



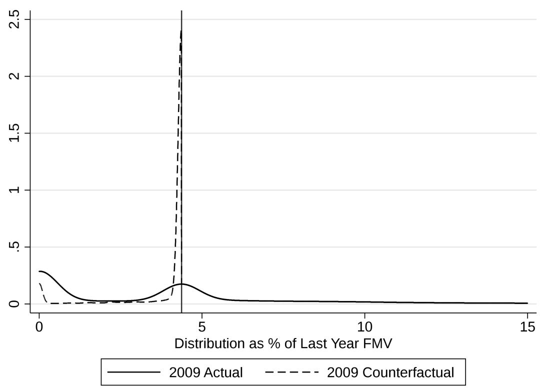
(c) 2010



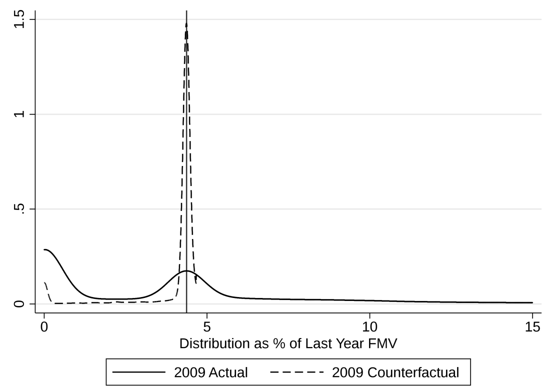
(d) 2011

Panels show 2009 actual and counterfactual densities of IRA distributions for 75-year olds. The counterfactual densities are estimated using the methods described in DiNardo, Fortin, and Lemieux (1996) and the baseline years used to estimate the counterfactual densities are 2006, 2007, 2010, and 2011. The horizontal axis is limited to distributions, measured as a percent of the account balance, that are 15 or less.

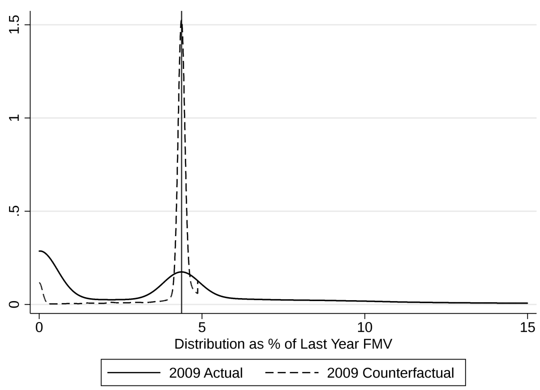
Figure 24: 2009 Counterfactual Densities with Varying RMD Threshold



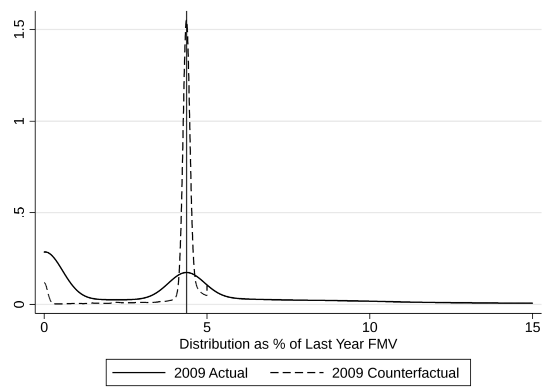
(a) Threshold 0



(b) Threshold 0.3



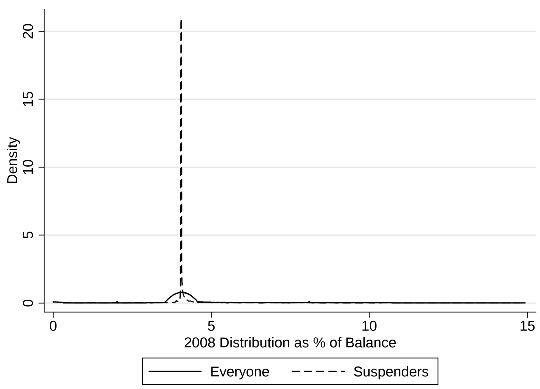
(c) Threshold 0.5



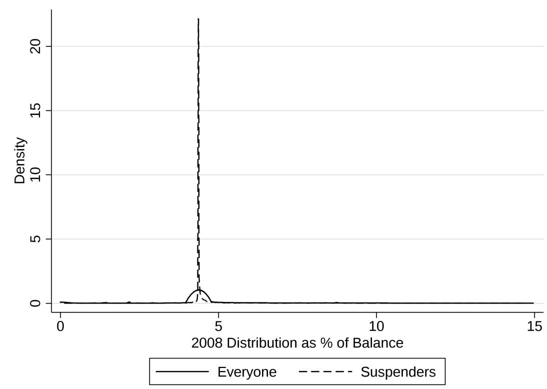
(d) Threshold 0.63

Panels show 2009 actual and counterfactual densities of IRA distributions for 75-year olds. The counterfactual densities are estimated using the methods described in DiNardo, Fortin, and Lemieux (1996) and the baseline year used to estimate the counterfactual densities is 2008. The RMD threshold is the difference between the actual RMD and the value used empirically. The horizontal axis is limited to distributions, measured as a percent of the account balance, that are 15 or less.

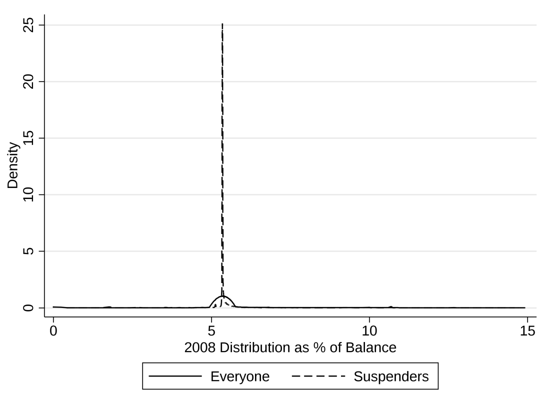
Figure 25: 2008 Distributions of 2009 Suspenders



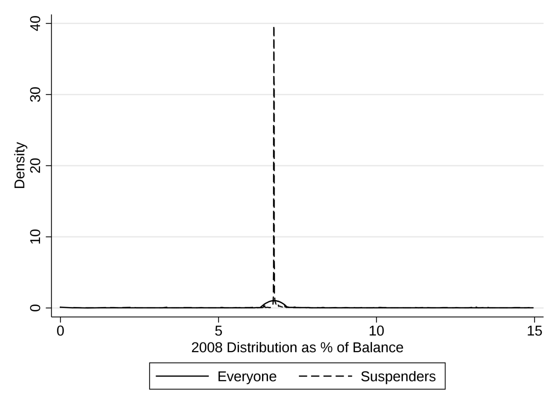
(a) 73-Year Olds



(b) 75-Year Olds



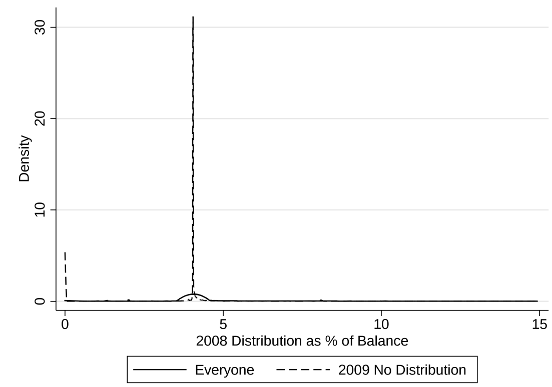
(c) 80-Year Olds



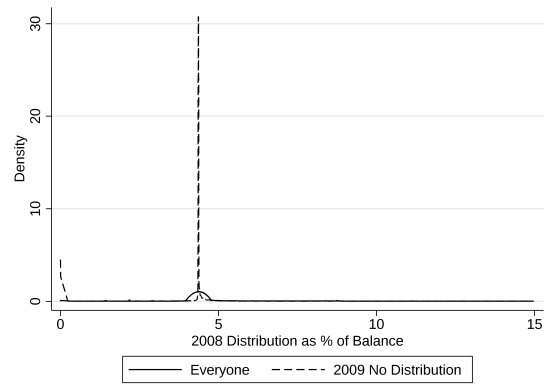
(d) 85-Year Olds

Panels show 2008 actual densities of IRA distributions across everyone and individuals who had a positive distribution in 2008 and took a zero distribution in 2009 for the following age groups: 73, 75, 80, and 85. The horizontal axis is limited to distributions, measured as a percent of the account balance, that are 15 or less.

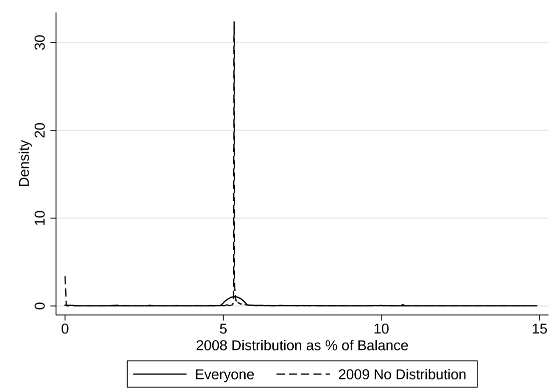
Figure 26: 2008 Distributions of 2009 Non-Distributors



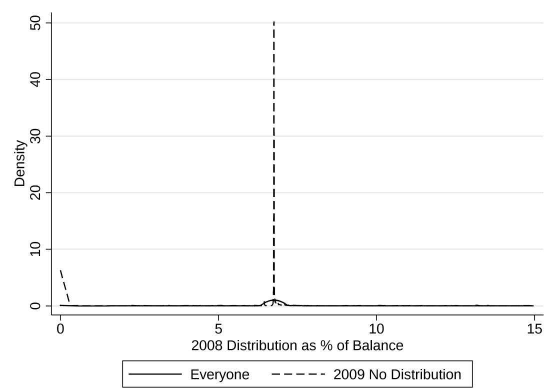
(a) 73-Year Olds



(b) 75-Year Olds



(c) 80-Year Olds



(d) 85-Year Olds

Panels show 2008 actual densities of IRA distributions across everyone and individuals who took a zero distribution in 2009 for the following age groups: 73, 75, 80, and 85. The horizontal axis is limited to distributions, measured as a percent of the account balance, that are 15 or less.