

Pension Plan Structures before and after the Pension Protection Act of 2006

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Abstract

The Pension Protection Act of 2006 (PPA) included provisions designed to enhance defined contribution plans—such as new protections for automatic enrollment and less stringent nondiscrimination safe harbor rules. This study analyzes the extent to which pension plan structures changed after the PPA. Our results show that autoenrollment rates, employer maximum contribution rates, default contribution rates, and the likelihood of meeting the safe harbor requirements all increased after the PPA. Difference-in-difference regressions suggest that the PPA did not directly affect autoenrollment, but did reduce default contribution rates and the chances of employers meeting the new safe harbor requirements.

Executive Summary

The Pension Protection Act of 2006 (PPA) is the most recent comprehensive reform of the nation's private pension law system. Although the main driver of the PPA was to strengthen traditional defined benefit (DB) plans through enhanced funding rules, it also included provisions designed to enhance cash balance and defined contribution (DC) plans.

This study analyzes the extent to which DC pension plan structures changed after the PPA. Two relevant goals of the PPA were to increase the number of employees saving in DC plans and to increase the amount of their DC savings. The PPA included two primary initiatives designed to accomplish these goals—new provisions promoting automatic enrollment of employees in DC plans and an additional safe harbor rule providing relief from nondiscrimination testing requirements. In addition to the aggregate effects of the reform, we examine differences between employers that took advantage of the new plan design opportunities afforded by the PPA and those that did not, including differences in size, industry, geographic location, unionization, ratio of part-time to full-time employees, and compensation costs.

Our study uses restricted microdata from the National Compensation Survey (NCS) conducted by the U.S. Bureau of Labor Statistics (BLS). The NCS is a large nationally representative survey that collects information from establishments on occupational earnings, the incidence and costs of employer-sponsored benefits among workers, and the provisions of employer-sponsored benefit plans. Our pre-PPA data come from 2002 and 2003 and our post-PPA data come from 2012 and 2013. In our analysis, we refer to these data points as 2002 and 2012, respectively. The key findings are:

- The share of workers offered and participating in DC plans remained fairly constant between 2002 and 2012—with about 65 percent of private-sector employees offered DC plans and about 45 percent participating in their employers' plans.
- Although the types of DC plans offered changed somewhat over time, the share of workers offered 401(k) plans, the most common DC plan, increased only slightly from 65.9 percent in 2002 to 68.6 percent in 2012.

The remaining analyses focus exclusively on establishments with 401(k) plans. The descriptive analyses are weighted to describe workers with 401(k) plans. The multivariate analyses are unweighted and describe plan characteristics and establishment costs.

- Among workers with 401(k) plans, the share with an autoenrollment feature increased more than 8 times between 2002 and 2012 (from 3.9 to 32.3 percent). Although autoenrollment rates increased

for all workers in our sample, they increased as much as 22 times for the most advantaged workers (i.e., those in the financial, insurance & real estate industries, those whose employers provided both DC and DB plans, full-time workers, union workers, and high-wage workers).

- The employer maximum contribution rate—the percentage of salary the employer contributes if the worker contributes at the match ceiling—averaged 3.45 percent in 2002. It was highest for the most advantaged workers. Between 2002 and 2012, however, employer maximum contribution rates increased the most for the least advantaged workers (i.e., those in retail trade, those whose employers provided only DC plans, part-time workers, non-union workers, and low-wage workers. As a result, the average employer maximum contribution rate was 4.14 percent in 2012 and highest for the least advantaged workers.
- Average employer maximum contribution rates in 2002 were also higher for workers in plans without autoenrollment. Between 2002 and 2012, however, these increased the most for the workers in plans with autoenrollment. As a result, average employer maximum contribution rates in 2012 were higher for workers in plans with autoenrollment than for workers in plans without autoenrollment. For example, employer maximum contribution rates increased 18 percent (from 3.46 to 4.10 percent) for workers without autoenrollment and 38 percent (from 3.06 to 4.22 percent) for workers with autoenrollment.
- Among workers with autoenrollment plans, the average employee default contribution rate also increased between 2002 and 2012, but only 8 percent from 2.88 percent in 2002 to 3.10 percent in 2012. As a result, the average employer default contribution rate—the maximum employer’s contribution at the employee default contribution rate—increased only 26 percent from 1.96 percent in 2002 to 2.46 percent in 2012.
- Consequently, the share of workers in autoenrollment plans with employer maximum contribution rates of more than 3 percent increased from 29.8 percent in 2002 to 63.6 percent in 2012. However, the share with employer default contribution rates of more than 3 percent declined from 15.3 to only 12.2 percent over the same time period.
- Given the rise in autoenrollment, the increased generosity of employer maximum contribution rates, and the increased generosity of employer default contribution rates, it’s not surprising that the share of workers in plans meeting the safe harbor requirements increased between 2002 and 2012. For example, only 37.7 percent of workers in 2002 were in plans that met the old safe harbor requirement of an employer maximum contribution rate of at least 4 percent, compared with 60 percent of workers in 2012.

- Less than 1 percent of workers in 2002 were in plans that met three of the new safe harbor requirements of an employer maximum contribution rate of at least 3.5 percent, autoenrollment, and an employer default contribution rate of at least 3 percent. By 2012, the share of workers increased to 14.6 percent. While the increase between 2002 and 2012 is dramatic, our results suggest that even after the PPA, a relatively small proportion of workers were in plans meeting the safe harbor requirements. In fact, only 5.5 percent of workers in 2012 were in plans meeting all four new safe harbor requirements of an employer maximum contribution rate of at least 3.5 percent, autoenrollment, an employee default contribution rate of at least 3 percent, and an employee maximum default contribution rate of at least 6 percent.
- Controlling for time, establishment, job, and plan characteristics, we find similar results as the descriptive statistics. That is, autoenrollment rates increased and plan take-up rates declined after the PPA. At the same time, employer maximum contribution rates, default contribution rates, and the likelihood of meeting the safe harbor requirements increased.
- However, when we use difference-in-difference regression analysis to measure the causal effect of the PPA on automatic enrollment and plan take-up, we are unable to find a significant effect. We do find, however, that the PPA is associated with lower default contribution rates and a lower likelihood that employers meet the new safe harbor requirements.

Because the employee default contribution rate is significantly lower than the match ceiling in many 401(K) plans that automatically enroll employees, participants defaulting into plans cannot take full advantage of the employer match unless they opt to contribute more. However, studies consistently find that employees tend to remain at the defaults. By boosting plan participation, automatic enrollment likely increases employer costs as previously unenrolled workers receive matching retirement plan contributions. Knowing that most employees remain at the defaults, employers might respond to the surge in retirement plan costs associated with automatic enrollment by setting low employee default contribution rates.

An important limitation of our study is that the difference-in-difference approach focuses solely on the PPA provisions that supersede state payroll withholding laws. Although we find no evidence that the PPA triggered higher autoenrollment and take-up rates by superseding state payroll withholding laws, its effects through other avenues (such as the establishment of Qualified Default Investment Alternatives and Qualified Automatic Contribution Arrangements) may be significant.

Demographic trends and impending reforms suggest that Social Security will likely replace a smaller share of pre-retirement earnings than it does today, increasing the importance of employer-sponsored

retirement plans in providing adequate income. Evidence of the effect of the PPA on employer behavior provides valuable lessons for future policy reforms. Our findings have long-term implications for the retirement security of Americans. Although most 401(k) plans now have an autoescalation feature, our results suggest that even at the end of the autoescalation process, employee default contribution rates are significantly lower than what employees would need to contribute to obtain the maximum employer match possible. Thus, possible reforms should consider instituting minimum employee default contribution rates or increasing the minimum necessary to meet safe harbor requirements.

Introduction

The Pension Protection Act of 2006 (PPA) is the most recent comprehensive reform of the nation's private pension law system. Although the main driver of the PPA was to strengthen traditional defined benefit (DB) plans through enhanced funding rules, it also included provisions designed to enhance cash balance and defined contribution (DC) plans.

This study analyzes the extent to which DC pension plan structures changed after the PPA. Two relevant goals of the PPA were to increase the number of employees saving in DC plans and to increase the amount of their DC savings. The PPA included two primary initiatives designed to accomplish these goals—new provisions promoting automatic enrollment of employees in DC plans and an additional safe harbor rule providing relief from nondiscrimination testing requirements. In addition to the aggregate effects of the reform, we examine differences between employers that took advantage of the new plan design opportunities afforded by the PPA and those that did not, including differences in size, industry, geographic location, unionization, ratio of part-time to full-time employees, and compensation costs.

While previous work has explored in detail the determinants of employees' willingness to participate and save in employer-sponsored retirement plans, the literature on the employers' role is relatively limited. In addition, few known studies have specifically considered the effect of the PPA on employer behavior. Two exceptions found significant impacts of the automatic enrollment and diversification provisions in the PPA on firm behavior (Engelhardt 2011).

Given that the majority of retirement saving outside of Social Security happens in the workplace, employer decisions about whether to sponsor a plan, which type of plan to offer, and the specific provisions of the plan play an important role in workers' ultimate saving outcomes. Evidence of the effect of the PPA on employer behavior will provide valuable lessons for future policy reforms.

Background

The pension landscape in the United States has been gradually shifting as employers move away from offering their employees DB pension plans towards offering them DC plans. Between 1989 and 2014, the proportion of private-sector full-time workers participating in DB pension plans declined from 42 to 19 percent, while the share participating in DC plans increased from 40 to 52 percent (Wiatrowski 2011; Bureau of Labor Statistics 2014).

The rise in DC plans has introduced problems not typically experienced with DB pensions. In DB pensions, employees automatically become eligible to participate and to accrue benefits under rules set forth in the plan. Private-sector employers typically fund the entire cost of the plan. In DC plans, employees are provided with their own retirement savings accounts into which they may or may not be permitted to contribute. In addition, employers may or may not contribute to these accounts. Unlike DB plans that promise employees a fixed stream of retirement income based on salary and service years, the value of retirement savings accounts depend on how much is contributed and how well investments perform over time. Thus, DC plans do not guarantee future retirement benefits.

In the type of DC plan known as a money purchase plan, employers commit to a fixed contribution every year. In the type of DC plan known as a profit-sharing plan, employers choose whether they will make a contribution each year. If the profit-sharing plan has a “401(k)” feature, employees can elect to make *pre-tax* contributions to their accounts.¹ Employers also frequently provide a matching contribution to the accounts of employees who contribute to their own accounts. In addition, employers can deduct from their federal income taxes any contributions they make to employee retirement accounts.

In 401(k) savings plans, employees must decide whether or not to contribute and, historically, many employees offered 401(k)-plan coverage have chosen, actively or passively, not to participate. As a result, participation rates among private wage and salary workers in 2014 who were offered an employer retirement plan were 86 percent in DB pensions but only 70 percent in DC plans (Bureau of Labor Statistics 2014). Even among full-time workers—whose participation rates are typically higher—participation rates were 88 percent in DB pensions but only 74 percent in DC plans (Bureau of Labor Statistics 2014).

Despite the popularity of 401(k) saving plans among employers, participation by employees has been a persistent concern of policymakers. For decades, large numbers of employees have failed to take advantage of the ability to save for retirement offered by these plans. Not only are these workers not taking advantage of tax-deferred opportunities to save for retirement, but many are forfeiting money by not taking advantage of their employer’s matching contributions. Karamcheva and Sanzenbacher (2010) use the Survey of Income and Program Participation to explore some of the reasons why workers do not participate in their employers’ defined contribution plans. Some typical reasons given are “not eligible,” “cannot afford to contribute,” “do not want to tie up money,” and other reasons such

¹ Money purchase plans in the Bureau of Labor Statistics’ National Compensation Survey can also have a 401(k) feature.

as “too complicated,” and “don’t know how to invest.” Other research shows that procrastination and inertia play an important role in workers’ savings choices and that financial literacy and planning abilities vary widely among workers. Many employers wish to raise 401(k) participation rates among non-highly compensated employees (NHCEs), in part because otherwise these employees jeopardize the plan’s ability to pass the complicated nondiscrimination rules (ADP/ACP tests) that determine how much highly compensated employees (HCEs) can contribute and receive in matching contributions each year.

Recognizing early on that employee contribution rates needed to rise to ensure the success of 401(k) plans, policy analysts and policy-makers began to search for mechanisms to increase employee participation. It has long been understood that significant policy changes in the private pension system can have a critical impact on the plans offered by employers—in terms of both plan design and plan operation. One example is when the DOL issued final regulations under ERISA Section 404(c) in 1992. These regulations give employers relief from fiduciary liability if they follow specified guidelines when choosing the investment menu for their DC plans and allow participants to choose how to invest their accounts. Not surprisingly, plans in which participants direct all investments became more common over time—increasing from 75 percent of active participants in 82 percent of 401(k) plans in 2002 (first time reported) to 90 percent of active participants in 88 percent of 401(k) plans in 2012 (Department of Labor 2015, Tables E24 and E25). Another example is when the Economic Growth and Tax Relief Reconciliation Act of 2001 (EGTRRA) raised the employer deduction limit for profit-sharing plans from 15 to 25 percent of aggregate participant compensation, putting them on par with money purchase plans. The result was a major shift by employers to profit-sharing plans because 1) they did not require a fixed employer contribution, and 2) they did not have annuity features that expose employers to additional fiduciary liability. Money purchase plans declined from 77,000 in 2002 to only 11,000 in 2012 (Department of Labor 2006, Table A1; Department of Labor 2015, Table A1). Without this change, it is unlikely that 401(k) plans would dominate the DC universe the way they do today. In both these examples, policy changes significantly altered the relative rights and responsibilities of employers and employees in the DC plan system.

Pension experts considered analogous policy changes that would make enrolling in and contributing to 401(k)s easier for employees. Building on the empirical work of several researchers, one potential mechanism considered was to simplify and invert the customary plan sign-up process. Instead of requiring employees to enroll before making salary reduction contributions, employees could be initially enrolled by their employers while given an opportunity to cease participation at their request. Several studies and anecdotal accounts had suggested that automatic enrollment could succeed in

dramatically increasing 401(k) participation (Beshears et al.2009; Choi et al. 2002, 2004; Madrian and Shea 2001). Madrian and Shea (2001), for example, documented a 48 percentage point increase in 401(k) participation among newly hired employees and an 11 percentage point increase in participation overall at one large U.S. company 15 months after the adoption of automatic enrollment. The authors also noted that automatic enrollment has been particularly successful at increasing 401(k) participation among employees least likely to participate in retirement savings plans, namely those who are young, lower-paid, black, or Hispanic. Such a policy of “autoenrollment” in 401(k) plan design was initially blessed by the Internal Revenue Service in Revenue Rulings 98-30 and 2000-8. These rulings gave employers the ability to enroll employees in 401(k) plans at a stated percentage of compensation without their initial consent, provided that employees receive notice about those contributions and their rights to withdraw from the plan.

This guidance, while useful, left many legal questions unanswered for plan sponsors. For example, could employers safely adopt such a policy in states with strong anti-wage garnishment statutes? How should such automatic contributions be invested in the likely situation that many automatically-enrolled participants would fail to designate investment choices? The Department of Labor took the position that in such cases employers and other fiduciaries would not have the protection of ERISA Section 404(c) (see above discussion for description) and would therefore remain fully liable. As a result, many plan sponsors hesitated to adopt this policy change, despite the potential benefits, on Internal Revenue Service guidance alone.

The Pension Protection Act of 2006 (PPA)

The passage of the Pension Protection Act of 2006 (PPA) cleared the way for significant simplification and automation with respect to employee participation in 401(k) plans (Patterson, Veal, and Wray 2006). As a result, the PPA included a number of fiduciary and tax incentives that were designed to encourage employers to adopt various automatic provisions, including autoenrollment, in their 401(k) plans (Nessmith, Utkus, and Young 2007; Patterson, Veal, and Wray 2006; Purcell 2007). The statute includes three primary changes.

First, PPA resolved employers’ concerns about autoenrollment mechanisms violating state garnishment laws. Section 902(f) of the PPA added a new Section 514(e) to ERISA which provides that ERISA supersedes any state law that would directly or indirectly prohibit or restrict the inclusion of an “automatic contribution arrangement” to a plan. The Department of Labor was given authority to issue

regulations setting minimum standards for such arrangements. As such, employees must be given proper advance notice and 90 days to affirmatively opt out of plan participation.

Second, PPA provided employers and other fiduciaries with relief under ERISA Section 404(c) for the default investment of participant contributions in the absence of a participant election. Under ERISA Section 404(c)(5) a new safe harbor for investment options, called Qualified Default Investment Alternatives (QDIAs), was created. The effect of this new rule is that plan sponsors and other fiduciaries are not responsible for investment losses in QDIAs if the investment options satisfy certain procedural and design requirements. While plan fiduciaries remain responsible for ensuring that a plan's investment menu otherwise satisfies ERISA's fiduciary requirements, this new rule makes it clear that fiduciaries may choose a QDIA as an investment for employee contributions, both for employees who are automatically enrolled and for other employees who fail to choose investments, and receive Section 404(c) relief. This, in effect, grants employers the same protections that participant-directed investments receive.

The third PPA change created a new safe harbor for 401(k) nondiscrimination testing for autoenrollment arrangements that meet certain standards. Under standard 401(k) rules, the amount that HCEs may contribute and receive in terms of matching contributions depends on the amount that NHCEs contribute and receive in matching contributions. These rules are found under IRC Section 401(k)(3) and IRC Section 401(m)(2) and are called the ADP/ACP tests. Prior to PPA, there was already a special safe harbor rule under IRC Section 401(k)(12) allowing employers to avoid nondiscrimination tests by providing to every NHCE either: 1) a nonelective contribution of at least 3 percent of compensation; or 2) a matching contribution of 100 percent on the first 3 percent of pay plus 50 percent of the next 2 percent of pay—for a maximum potential employer matching contribution of 4 percent of compensation (Purcell 2007). Furthermore, employers must fully and immediately vest the contributions they make. The IRS describes these plans as “safe harbor 401(k) plans” (Internal Revenue Service, 2014).

The PPA's new safe harbor is called a “Qualified Automatic Contribution Arrangement” under IRC Section 401(k)(13) and IRC Section 401(m)(12). A plan avoids ADP/ACP testing under these provisions if, for every NHCE who has been automatically enrolled in the plan, the employer makes 1) a contribution of at least 3 percent of compensation or 2) a matching contribution of 100 percent of the first 1 percent of compensation contributed plus 50 percent of contributions between 1 percent and 6 percent of compensation—for a maximum potential employer matching contribution of 3.5 percent of compensation. In addition, the plan must set the default employee contribution rate for all participants at 3 percent in the first plan year and increasing according to the following schedule: 4 percent for the

following year; 5 percent for the next year; and 6 percent for any subsequent plan year up to a maximum of 10 percent of compensation. Participants who have completed at least two years of service must also be fully vested in any employer contributions. Employers must also offer default investments and must notify participants of these actions and their right to change their contribution rate, change their investment, or opt out. Employers, of course, may design automatic contribution arrangements with different features but their plans will continue to be subject to ADP/ACP testing.

Automatic Enrollment after the PPA

Various sources point to the increasing popularity of automatic enrollment plans after the PPA. For example, Engelhardt (2011) found that post-PPA increases in 401(k) participation rates were larger in states that had required employees' written permission before employers could deduct contributions from their wages than in states that did not require written permission, suggesting that state wage-payment laws had deterred employers from adopting autoenrollment and that the relief from these requirements provided by the PPA encouraged autoenrollment.

Additionally, a Hewitt survey of large U.S. firms found that 59 percent of employers in 2010 had adopted automatic enrollment for new employees, up from 24 percent in 2006 before the PPA. Another 27 percent of firms without automatic enrollment reported that they were likely to adopt it within a year (Atchison 2010). In their annual survey of member companies, the Plan Sponsor Council of America (PSCA) reported that 46 percent of plans had an automatic enrollment feature in 2011, up from 4 percent in 1999 and 24 percent in 2006 (PSCA 2012; Soto and Butrica 2009).

The majority of plans that automatically enroll employees do this only for new hires. In the PSCA survey, 82 percent of plans with autoenrollment reported that they did not autoenroll incumbent employees (PSCA 2011). There is some evidence that employers are reluctant to "backswEEP" existing nonparticipants because of the desire to minimize employer match contributions and other plan-related costs (Andersen et al. 2001).

Data

This analysis uses restricted microdata from the National Compensation Survey (NCS) conducted by the U.S. Bureau of Labor Statistics (BLS). The NCS is a large nationally representative survey that collects information from establishments on occupational earnings, the incidence and costs of

employer-sponsored benefits among workers, and the provisions of employer-sponsored benefit plans. It covers civilian workers in private industry and state and local governments.

The NCS collects employer-level data on establishment size, region, and industry. It also collects job-level information on unionization, full-time status, occupation, and the availability of benefit plans. Additionally, the survey collects job-by-plan-level information on participation in health and retirement plans, as well as plan-level information on the detailed provisions of health and retirement plans. The detailed provisions of retirement plans collected include plan type, match structure, match rates, employer contributions, automatic enrollment and other automatic provisions, vesting requirements, default contributions, and investment options. Many of these variables are important for studying the effects of PPA provisions. Finally, the NCS has information on job-level employer costs, including wages and salaries and a variety of employee benefit categories, such as paid leave, health insurance, and retirement.

Sampling in the NCS is establishment-based, but several jobs are sampled within each establishment. Furthermore, many jobs and establishments can share the same pension plan if they are covered by the same union agreement or if they are part of the same large firm.

Not only are the NCS microdata available for a number of years before and after PPA, but they also have two clear advantages over proprietary plan-level data or household survey data. First, the NCS is a large nationally representative survey and thus allows us to extrapolate the results to the population of U.S. workers, which is typically not possible with plan-level data from a subsample of large firms. Second, previous literature has found that workers often give inaccurate reports of their tax-deferred plans (Dushi and Honig 2008). Because the NCS is an employer survey, it provides us with more accurate information on the specific plan characteristics, which are further supplemented with information from actual plan brochures.

This analysis examines cross-sections of data before and after the PPA. Our pre-PPA data come from two rotation groups: one for which plan brochures were collected in 2002Q1 through 2002Q4 and another for which plan brochures were collected in 2003Q1 through 2003Q4. Because autoenrollment was much less prevalent in these data, we combine them and refer to them as 2002. Our post-PPA data come from a rotation group for which plan brochures were collected in 2012Q3 through 2013Q2. In our analysis, we refer to these data as 2012.

We restrict our analysis to private-sector establishments. The 2002 starting sample includes 33,868 plan-job observations and the 2012 starting sample includes 12,698 observations (see table A1). After dropping duplicate observations, we have a sample representing all private industry

workers—33,599 plan-job observations for 2002 and 12,620 plan-job observations for 2012.² We then drop establishments without plans and those without any DC cost information to create a sample representing private industry workers with DC plans—25,174 plan-job observations for 2002 and 9,229 plan-job observations for 2012.

For our analysis of workers with 401(k) plans, the sample restrictions are driven by the availability of detailed information on plan characteristics. Our sample includes only 401(k) plans in which employers match contributions, as these are the only types of plans for which BLS collects information on both the automatic enrollment provision and the match structure.³ We exclude zero-match plans from our sample because the BLS does not consider these plans to provide employee benefits and therefore does not collect data about their plan features. We select only single-employer 401(k) plans and drop those plans with missing match rate information or missing autoenrollment information.⁴ Our final sample of workers in 401(k) plans with a match includes 11,694 establishment-job observations for 2002 (representing 3,859 unique plans and 2,690 unique establishments) and 5,120 establishment-job observations for 2012 (representing 1,459 unique plans and 1,178 unique establishments).

When we examine automatic enrollment, match rates, and other plan-level provisions, our unit of observation is the plan; when we examine compensation, which is at the job-level, and establishment-level characteristics, our unit of analysis is the establishment.⁵ Our key variables of interest are the terms by which employers match employee contributions, an autoenrollment indicator, the employee default contribution rate in autoenrollment plans, and indicators that the plan meets the old and new safe harbor rules, as well as DC costs and other compensation cost variables (table 1). The *employer match rate* is the percentage of each dollar of employee contributions that is matched by the employer. The *match ceiling* is the maximum percentage of pay that an employer will match. To capture the overall generosity of the plans, we also calculate an *employer maximum contribution rate* (Dworak-Fisher, 2007), which is the amount that employers contribute, as a percentage of wages, when employees contribute enough to exhaust the employer's match offer. For example, if a plan offers a 50 percent match up to 6 percent of wages that the employee contributes then the employer match rate is 50

² There are multiple observations for each establishment that are unique by plan and job.

³ Note that in the NCS data, these plans are regarded as savings & thrift plans. In this paper, we use the more current taxonomy which designates these plans as 401(k) plans.

⁴ We impute missing match rate information for as many plans as possible.

⁵ We convert job-level characteristics to establishment-level characteristics by computing a weighted average of each job-level characteristic (e.g., full-time status) within a given establishment.

percent, the match ceiling is 6 percent, and the employer maximum contribution rate is 3 percent. The NCS data also indicate whether the employer match is a flat percentage or varies—one employer match rate up to a certain level of an employee’s salary and another employer match rate on additional employee contributions. The majority of plans have flat match structures. For those with variable (tiered) match structures, we collected information from the Summary Plan Descriptions (SPDs) and coded them in the data to be able to compute an employer maximum contribution rate for both flat match and tiered match structured plans.

In plans with automatic enrollment, the *employee default contribution rate* is the share of an employee’s salary that the employer automatically diverts to the retirement plan, unless the employee chooses a different contribution rate. If the employee default contribution rate is lower than the match ceiling, then it is effectively the default percentage of pay that an employer will match if an employee does not actively make a selection. The *employer default contribution rate* is similar to the employer maximum contribution rate, but it is computed using the employee default contribution rate instead of the match ceiling—as long as the employee default contribution rate is less than the match ceiling. It is equivalent to the percent of salary that the employer would contribute if workers remained at the employee default contribution rate. Some plans with automatic enrollment also have escalating employee default contribution rates that increase with years of service. The *employee maximum default contribution rate* and *employer maximum default contribution rate* are analogous to the *employee default contribution rate* and *employer default contribution rate*, respectively, except they use the employee default contribution rate reached at the end of the escalation.

We also constructed variables indicating whether plans meet the requirements for the old and new safe harbors. Note that we do not know whether employers are actually using the safe harbors. We only know that the provisions of their plans meet some or all of the safe harbor requirements. A plan with an employer maximum contribution rate of at least 4 percent satisfies the requirement for the *old safe harbor*. A plan with an employer maximum contribution rate of at least 3.5 percent, automatic enrollment, an employee default contribution rate of at least 3 percent, and an employee maximum default contribution rate of at least 6 percent satisfies the requirements for the *new safe harbor*. In addition, we constructed variables indicating whether a plan meets various provisions of the new safe harbor requirement. The variable *new safe harbor1* equals 1 if a plan has an employer maximum contribution rate of at least 3.5 percent. The variable *new safe harbor2* equals 1 if a plan has an employer maximum contribution rate of at least 3.5 percent and autoenrollment. The variable *new safe harbor3* equals 1 if a plan has an employer maximum contribution rate of at least 3.5 percent, autoenrollment, and an employee default contribution rate of at least 3 percent. Our safe harbor variables ignore the vesting

requirements because we do not have complete data on vesting for both 2002 and 2012. Also, we ignore the nonelective contributions employers can make to satisfy safe harbor requirements since the NCS only collects data on plans with matching contributions.

Finally, *DC costs* come from the Employer Costs for Employee Compensation (ECEC) data and represent an employer's average cost per labor hour for providing DC plan(s) to its employees in a given job. We express establishment costs in constant 2014 dollars (indexed to changes in the Consumer Price Index).

Analytical Framework

To understand how firms responded to the specific incentives built into the PPA, we examine the provisions of DC plans before and after 2006 using NCS data from 2002 and 2012. We analyze the differences between plans and establishments that implemented the PPA provisions and those that did not—including their size, industry, geographic location, compensation costs, unionization, and ratio of part-time to full-time employees in the establishment. We also examine participation rates, match structure, match rates, and auto-features.

We use pooled cross-sections of data before and after the PPA. Our unit of observation is the plan for analyzing automatic enrollment, match rates, and other plan-level provisions, and the establishment for analyzing compensation and other establishment-level characteristics. Our descriptive analysis uses job-level weights to reflect the percentage of workers in the private-sector who have jobs with a DC plan of particular characteristics. Our multivariate analysis is unweighted and includes two sets of equations that we estimate using probit and OLS regression methods. In these equations, the unit of analysis, i , is the plan or establishment—depending on whether the dependent variable is at the plan-level or the establishment-level—and t is time.

The first set of equations allows us to test for changes in the popularity of various plan features and in establishment costs before and after the passage of PPA, while controlling for various establishment, job, and plan characteristics. The key coefficient of interest is β^P . The equations have the following general form:

$$y_{it} = \alpha + \beta^X X_{it} + \beta^P D_t^{PostPPA} + \epsilon_{it}$$

In these equations, y_{it} represents plan provisions or establishment costs, α is an intercept term, X_{it} represents attributes of the observed plans or establishments, $D_t^{PostPPA}$ denotes that the observation corresponds to a post-PPA year, β^X are the coefficients on the characteristics of the plans or

establishments, and β^P is the coefficient on the post-PPA dummy indicator. This coefficient tells us the relationship between y_{it} and the PPA after accounting for plan or establishment characteristics.

The second set of equations allow us to better capture the causal impact of PPA on the adoption of PPA-like plan features and on establishment costs, particularly the ones related to automatic enrollment, by using time variation in combination with state variation in payroll withholding rules to estimate a difference-in-difference type of model. This methodology is similar to the one applied in Engelhardt (2011). The intuition is that if state payroll-withholding rules constrained establishments' decisions to institute autoenrollment, then the adoption of the PPA-like plan features after 2006 should be differentially higher in states with such laws than in states without them.⁶

Soto and Butrica (2009) and Butrica and Karamcheva (2015a) found that employer maximum contribution rates and employee default contribution rates are negatively correlated with autoenrollment. They hypothesize that autoenrollment increases employer costs and employers offset these higher costs by lowering their match rates or match ceilings and setting low employee default contribution rates. If this is true and if we find that autoenrollment rates differentially increase over time in states with strict pay laws compared with states without them, then employer maximum contribution rates and employee default contribution rates should differentially decline or increase less among states with strict pay laws.

In these equations, i is the plan or establishment, s is the state, and t is time. The key coefficient of interest is β^{PS} . The equations will have the following general form:

$$y_{ist} = \alpha + \beta^X X_{ist} + \beta^P D_t^{PostPPA} + \beta^S D_s^{statelaw} + \beta^{PS} D_t^{PostPPA} D_s^{statelaw} + \varepsilon_{ist}$$

In these equations, y_{ist} represents plan provisions or establishment costs, α is an intercept term, X_{ist} represents attributes of the observed plans or establishments, $D_t^{PostPPA}$ denotes that the observation corresponds to a post-PPA year, $D_s^{statelaw}$ indicates that the observation is in a state with more restrictive payroll-withholding laws, β^X are the coefficients on the characteristics of the plans or establishments, β^P is the coefficient on the post-PPA dummy indicator, β^S is the coefficient on the state

⁶ Engelhardt (2011) obtained results suggesting that state wage-deduction laws deterred autoenrollment. Specifically, the author found that 401(k) participation increased after the PPA by 9.7 percentage points more for states with wage-deduction laws than those without. He also found that 401(k) participation was differentially higher in states with larger penalties for wage-deduction violations, further evidence that these laws deterred automatic enrollment. If it is the case that some employers did not institute automatic enrollment because they feared being sued even though their states did not have payroll-withholding laws, then we would expect these "control" employers to be more similar to the "treatment" employers—in which case, Engelhardt (2011) would not have found significant differences in 401(k) participation rates between the groups. For this reason, we feel confident that the treatment is appropriate for our analysis.

payroll-withholding dummy indicator, and β^{PS} is the coefficient on the interaction of the two dummy indicators. This coefficient tells us the differential impact of the PPA on y_{ist} for plans or establishments in states with strict payroll-withholding laws compared with those without (i.e., the difference-in-difference).

As in the standard difference-in-difference analysis, the key assumption is that the average change in the outcome variable in the comparison group represents the counterfactual change in the treatment group, if there were no treatment—also known as *common trend assumption*. In our specific case, this assumes that the trend in the outcome variables pre-and post-2006 would have been the same for both the untreated group (i.e., plans and establishments in states with lenient payroll-withholding laws) and the treated group (i.e., plans and establishments in states with strict payroll-withholding laws), if the reform had not taken place. This assumption could be potentially violated if the treatment changes the composition of the treated group.

We identify states with strict payroll withholding laws as those states that require employers to obtain workers' written permission before withholding money from their paychecks and fine employers that violate the law. Using this criterion, there are 18 states with strict payroll withholding laws.

Results

The share of workers offered DC plans as well as the share participating in DC plans remained fairly constant between 2002 and 2012—with about 65 percent of private-sector employees being offered DC plans and about 45 percent participating in their employers' plans (figure 1). Still, DC plans have changed somewhat over time (figure 2). Money purchase plans, which require a fixed employer contribution but no employee contribution, increased in prevalence, while deferred profit sharing plans declined in prevalence. The share of workers with 401(k) plans, the most common DC plan, increased slightly from 65.9 percent in 2002 to 68.6 percent in 2012.

Changes in 401(k) Plan Provisions over Time

Focusing on 401(k) plans, we find that the share of workers with an autoenrollment feature increased from 3.9 percent in 2002 to 32.3 percent in 2012 (table 2). While the likelihood of having an autoenrollment plan increased over time for all workers, the workers most likely to see autoenrollment instituted into their plans were those in financial, insurance, & real estate industries, manufacturing industries, large establishments, unions, and those located in the West census division. For example,

among workers at establishments with 2,500 or more employees, only 2.7 percent were in plans with autoenrollment in 2002. By 2012, this share increased to 36.7 percent.

Despite the large increase in autoenrollment rates over time, overall take-up rates declined slightly among workers offered plans—from 68.8 percent in 2002 to 66.9 percent in 2012 (table 3). However, this result is driven by workers without autoenrollment plans. Their take-up rates declined from 68.6 to 63.4 percent (figure 3). Take-up rates for workers with autoenrollment plans were significantly higher than for workers without autoenrollment, and they remained fairly constant over the time period.

The biggest declines in take-up rates were for those working in manufacturing, very small establishments, and part-time jobs (see table 3). Take-up rates also declined dramatically for union workers, low-wage workers, and workers in the Northeast census division. Take-up rates did increase slightly for workers in agriculture, mining & construction and financial, insurance & real estate industries, those in mid-size establishments, and those working for employers in the West census division.

The average employer maximum contribution rate—the percentage of salary the employer contributes if the worker contributes up to the match ceiling—increased between 2002 and 2012 for all workers, but by different magnitudes (table 4). In 2002, match rates were highest among the most advantaged workers in 401(k) plans—those in the financial, insurance & real estate industries, full-time workers, union workers, and high-wage workers.

Between 2002 and 2012, the average employer maximum contribution rate increased 20 percent overall from 3.45 to 4.14 percent. Match rates increased the most for workers in wholesale trade industries, retail industries, and mid-size establishments. For example, the average employer maximum contribution rate for workers at establishments with 100 to 499 employees increased from 3.54 to 4.53 percent—an increase of 28 percent. Part-time workers, low-wage workers, midwestern workers, and southern workers also experienced larger increases in employer maximum contribution rates than their counterparts. For example, the average employer maximum contribution rate for low-wage workers increased from 3.24 to 4.31 percent—an increase of 33 percent. As a result, the average employer maximum contribution rate for low-wage workers relative to higher wage workers went from being the lowest in 2002 to being the highest in 2012.

So while autoenrollment rates increased over time more for the most advantaged workers (see table 2), average employer maximum contribution rates increased less for these workers than for disadvantaged workers—even as the characteristics of workers in 401(k) plans remained fairly constant over time (see table A2). This finding is somewhat consistent with Soto and Butrica (2009) and Butrica

and Karamcheva (2015a) who found a negative correlation between automatic enrollment and employer maximum match rates. By 2012, employer maximum contribution rates were highest among the least advantaged workers—those in retail trade, part-time workers, non-union workers, and low-wage workers.

Over time, the distribution of employer maximum contribution rates rose on average and became more dispersed (figure 4). The share of workers in plans with employer maximum contribution rates of 3 percent or less declined from 57.5 to 37.9 percent. In contrast, the share of workers in plans with employer maximum contribution rates of more than 5 percent increased from 12.8 to 33 percent—more evidence that employers became more generous after the PPA.

Next we look more carefully at the relationship between autoenrollment and plan provisions (table 5). Consistent with the findings of Soto and Butrica (2009) and Butrica and Karamcheva (2015a), the average employer maximum contribution rate in 2002 was lower for workers with autoenrollment than for those without. While the employer maximum contribution rate increased between 2002 and 2012 for all workers, it increased most dramatically for those with autoenrollment. Average employer maximum contribution rates increased 38 percent for workers with autoenrollment—from 3.06 to 4.22 percent—compared with only 18 percent for those without autoenrollment—from 3.46 to 4.10 percent. As a result, the average employer maximum contribution rate in 2012 was slightly higher for workers with autoenrollment than for those without.

Interestingly, the distribution of employer maximum contribution rates for workers in plans with and without autoenrollment differed dramatically in 2002 (figure 5). For example, the share of workers in plans with employer maximum contribution rates of 3 percent or less was only 57 percent among those without autoenrollment, but 70.3 percent among those with autoenrollment. Over time, employer maximum contribution rates became more generous for both workers with and without autoenrollment, but especially for those with autoenrollment. Consequently, the distribution of employer maximum contribution rates became more similar over time for the two groups of workers. By 2012, the share of workers in plans with employer maximum contribution rates of 3 percent or less was only around 40 percent for both workers with and without autoenrollment plans.

While the maximum rates that employers contributed to their employees' plans became more generous over time, so did the contribution rates into which employees were defaulted (for those who didn't choose their own contribution rate). Among workers with automatic enrollment plans, the average employee default contribution rate increased 8 percent from 2.88 percent in 2002 to 3.10 percent in 2012 (see table 5), and the distribution of employee default contribution rates became

slightly more dispersed (figure 6). Still, the share of workers in plans with low employee default contribution rates remained the same and high in both 2002 and 2012—with four out of five workers in plans that set employee default contribution rates at only 3 percent or less.

Comparing matching provisions side-by-side with default contribution rates highlights the finding that, on average, workers defaulted into autoenrollment 401(k) plans have contribution rates at which they cannot take full advantage of their employer match unless they opt to contribute more. Figure 7 shows in 2012 that the average employee default contribution of 3.10 percent was well below the average match ceiling of 5.10 percent—the employee contribution rate needed for the maximum employer contribution rate. Even at the top of the autoescalation path, the average employee maximum default contribution rate of 4.53 percent was lower than the match ceiling. One can also see this by comparing the employer maximum contribution rate with the employer default contribution rate (the employer matching contribution rate for employees contributing the default contribution rate). Although the employer default contribution rate increased from 1.96 to 2.46 percent between 2002 and 2012, it was still less than 60 percent of the employer maximum contribution rate in 2012. Even at full escalation, the average employer maximum default contribution rate was only 3.07 percent in 2012—well below the employer maximum contribution rate.

Figure 8 makes this same point with the distribution of workers in autoenrollment plans by the plan employer maximum contribution rate, employer default contribution rate, and employer maximum default contribution rate. The figure shows that most workers were eligible for a higher employer contribution rate than they may have been defaulted into. In 2002, for example, 29.8 percent of workers were in plans with an employer maximum contribution rate of more than 3 percent of pay; however, only 15.2 percent of workers had an employer default contribution rate within that same range. Not only was the pattern the same in 2012, but the gap between the employer maximum match rate and the employer default contribution rate increased dramatically over time. In 2012, for example, 63.6 percent of workers were in plans with an employer maximum contribution rate of more than 3 percent of pay; however, only 12.2 percent of workers had an employer default contribution rate within that same range. Even with autoescalation, only 33 percent of workers had an employer maximum default contribution rate of more than 3 percent. On the one hand, our results on matching contribution provisions suggest that employer plans have become more generous over time. For example, the share of workers in autoenrollment 401(k) plans with an employer maximum contribution rate of more than 5 percent of pay increased from only 7.7 percent in 2002 to 30.8 percent in 2012 (see figure 5). On the other hand, our results on default contribution provisions show that they have not increased nearly as much, nor are they nearly as generous as matching contribution provisions. In 2012, for example, only

2.1 percent of workers had an employer default contribution rate of more than 5 percent and only 13.8 percent of workers had an employer maximum default contribution rate of more than 5 percent. Thus, employers in our sample are defaulting their workers at a contribution rate at which workers cannot take full advantage of the employer match unless they opt to contribute more. Butrica and Karamcheva (2015a) suggest employers might be doing this to offset the higher costs of employer matching contributions that come with higher participation rates of autoenrollment. By setting employer default contribution rates lower than employer maximum contribution rates, employers can contribute to the accounts of more workers without necessarily increasing their costs.

Given the rise in autoenrollment, the increased generosity of employer maximum contribution rates, and the increased generosity of employee default contribution rates, it's not surprising that the share of workers in plans meeting the safe harbor requirements increased between 2002 and 2012 (table 6). For example, only 37.7 percent of workers in 2002 were in plans that met the old safe harbor requirement of an employer maximum contribution rate of at least 4 percent, compared with 60 percent of workers in 2012. Only 1.2 percent of workers in 2002 were in plans that met the new safe harbor requirements of an employer maximum contribution rate of at least 3.5 percent and autoenrollment (new safe harbor²). By 2012, this increased to 20.6 percent of workers. Less than 1 percent of workers in 2002 were in plans that met the new safe harbor requirements of an employer maximum contribution rate of at least 3.5 percent, autoenrollment, and an employer default contribution rate of at least 3 percent (new safe harbor³). By 2012, the share of workers increased to 14.6 percent. While the increase between 2002 and 2012 is dramatic, our results suggest that even after the PPA, a relatively small proportion of workers were in plans meeting the safe harbor requirements. In fact, only 5.5 percent of workers in 2012 were in plans meeting the new safe harbor requirements of an employer maximum contribution rate of at least 3.5 percent, autoenrollment, an employee default contribution rate of at least 3 percent, and an employee maximum default contribution rate of at least 6 percent.

The pattern described above is even more dramatic for just those workers in autoenrollment 401(k) plans. Among these workers, the share that met the old safe harbor requirement increased from 28.4 percent in 2002 to 60.5 percent in 2012, the share meeting the new safe harbor¹ requirements increased from 29.7 to 63.6 percent, and the share meeting the new safe harbor³ requirements increased from 23 to 45.1 percent. That is, even among those in autoenrollment plans, less than half of workers in 2012 had plans with employer maximum contribution rates of at least 3.5 percent and employee default contribution rates of at least 3 percent. Furthermore, only one in six workers in 2012 (16.9 percent) had plans meeting the full set of new safe harbor requirements—employer maximum

contribution rates of at least 3.5 percent, employee default contribution rates of at least 3 percent, and employer maximum default contribution rates of at least 6 percent.

Changes in Establishment Costs over Time

Average DC costs among establishments with 401(k) plans increased 20 percent between 2002 and 2012—from 93 cents to \$1.11 per labor hour (table 7). In contrast, average non-DC costs increased only 2 percent over the same time period—from \$35.32 to \$35.88 per labor hour. DC costs were significantly higher in both years for establishments with autoenrollment than for those without autoenrollment plans; however, DC costs increased significantly more over time for establishments with autoenrollment plans than for those without these plans. For example, DC costs increased 17 percent from \$1.15 in 2002 to \$1.34 in 2012 for establishments with autoenrollment plans, but only 9 percent from 92 cents in 2002 to \$1.01 in 2012 for establishments without autoenrollment plans.

Regressions of Change over Time

Next, we examined changes in plan provisions over time by estimating a set of regressions that included a dummy variable for post-PPA (i.e., year=2012), as well as indicators for industry, establishment size, share of union workers, share of full-time workers, wage, and region. Table 8 reports the coefficient on post-PPA for each of the regressions. (The full set of regression results are reported in tables A3 through A9.) The results are generally consistent with the descriptive results in tables 5, 6, and 7.⁷ Autoenrollment rates, employer maximum contribution rates, employee default contribution rates, and employer default contribution rates all increased after the PPA, even after controlling for establishment, job, and other plan characteristics. Plan take-up rates declined after the PPA.

The likelihood of a plan meeting the old safe harbor requirement increased after the PPA. Not surprisingly, since the new safe harbor¹ is identical to the old safe harbor but with lower thresholds, we also find evidence that the likelihood of a plan meeting the new safe harbor¹ requirements increased after the PPA. Finally, there is evidence that plans were also more likely to meet the requirements of the new safe harbor² and new safe harbor³ after the PPA.

⁷ Unlike the descriptive results in tables 5, 6, and 7, the regression results in table 8 are unweighted.

We also examined changes in establishment costs over time by estimating a set of regressions that included a dummy variable for post-PPA, as well as establishment size, share of union workers, share of full-time workers, wage, and region. Consistent with the descriptive results, we find that total costs, DC costs, and non-DC costs all increased after the PPA, even after we control for establishment, job, and plan characteristics (bottom panel).

Changes in Plan Provisions over Time by State Pay Laws

The results in the previous section are consistent with the PPA having had a positive effect on automatic enrollment, employer maximum contribution rates, and employee default contribution rates. However, causality is difficult to establish. Even with the controls in our multivariate regressions, there are many omitted variables that could have played a role in the secular trends underlying our results.

We further explore causality by following the approach of Englehardt (2011) and measuring the differential impact of the PPA on employers in different states. In particular, we exploit the fact that different states had different payroll withholding laws prior to the passage of the PPA. As described earlier, one of the key avenues by which the PPA may have affected the design of 401(k) plans is by superseding these state laws. To the extent that this is the most impactful mechanism by which the PPA affected plan design, we can identify this effect by comparing changes in 401(k) provisions between 2002 and 2012 for establishments in states with strict payroll laws and establishments in states without strict pay laws. This is the basis for the difference-in-difference strategy we employ.

We first consider these differential trends without multivariate controls. In table 9, we examine plan provisions among workers in 401(k) plans by state payroll withholding laws and year. In 2002, workers in states with strict payroll withholding laws had autoenrollment rates that were 11 percent lower and take-up rates that were 3 percent lower than their counterparts in states without strict pay laws—suggesting that payroll withholding laws may have deterred states from adopting automatic enrollment. Yet, the average employer maximum contribution rate was 4 percent higher and the average employee default contribution rate was 16 percent higher for workers in states with strict pay laws than for those without. This cross-sectional evidence is consistent with the findings of Soto and Butrica (2009) and Butrica and Karamcheva (2015a) who found that employer maximum contribution rates and employee default contribution rates are negatively correlated with autoenrollment. Consistent with the finding that the average employer maximum contribution rate is higher for workers in states with strict pay laws than for workers in states without strict pay laws, we find that workers

were significantly more likely to have plans meeting the old and new safe harbor requirements if they were in states with strict pay laws. Among workers in states with strict pay laws, for example, 41.5 percent had plans that met the old safe harbor and 45.1 percent had plans meeting the new safe harbor¹. Among workers in states without strict pay laws, in contrast, only 33.7 percent had plans meeting the old safe harbor and 39.5 had plans meeting the new safe harbor¹.

Between 2002 and 2012, the share of workers in plans with autoenrollment increased in states with and without strict payroll withholding laws. However, automatic enrollment increased significantly more in states with strict payroll withholding laws. This outcome is consistent with Engelhardt (2011) whose findings led him to surmise that prior to the PPA, state wage-payment laws deterred employers from adopting autoenrollment. However, the finding that led to this conclusion in Engelhardt (2011) was that 401(k) participation increased more in states with payroll withholding laws. Although our study finds that overall take-up rates declined over time (see table 3), like Engelhardt (2011), we find a difference in the take-up trends between workers in states with and without strict pay laws. In particular, we find that the decline in 401(k) take-up is concentrated among workers in states without strict pay laws (see table 9).

Between 2002 and 2012, the average employer maximum contribution rate increased for all workers; however, it increased less for those in states with strict pay laws than for those without. As a result, in 2012 there was no statistically significant difference in employer maximum contribution rates between workers in states with and without strict pay laws. The average employee default contribution rate, which in 2002 was higher for workers in states with strict pay laws than for those without, declined 3 percent for workers in states with strict payroll laws (from 3.12 to 3.02 percent), but increased 21 percent for workers in states without strict payroll laws (from 2.62 to 3.18 percent). As a result, in 2012 the employee default contribution rates was lower (by 5 percent) for workers in states with strict pay laws than for those without strict pay laws. The employee maximum default contribution rate, which is the employee default contribution rate at the end of the autoescalation process, was also lower (by 6 percent) for workers in states with strict pay laws than for those without. To the extent that autoenrollment increases employer costs and employers offset these higher costs by lowering their match rates or match ceilings and setting low employee default contribution rates, as autoenrollment rates increase over time, employer maximum contribution rates and employee default contribution rates will decline or increase less.

Finally, the share of workers with plans meeting the old and new safe harbors increased over time for all workers; however, it increased less for workers in states with strict payroll withholding laws. For workers in states with strict pay laws, those with plans meeting the old safe harbor increased from 41.5

to 61.5 percent between 2002 and 2012—an increase of 48 percent. For workers in states without strict pay laws, those with plans meeting the old safe harbor increased from 33.7 to 58.6 percent between 2002 and 2012—an increase of 74 percent.

These results suggest that the PPA may have contributed to an increase in the automatic enrollment and take-up rates, but also to a decline in the employee default contribution rate. Furthermore, the PPA may have diminished increases in the employer maximum contribution rate and the share of workers in plans meeting the safe harbor requirements.

Changes in Establishment Costs over Time by State Pay Laws

We also examined the costs for establishments with 401(k) plans by state payroll withholding laws and year (table 10). In 2002, establishments in states with strict payroll withholding laws had total costs, DC costs, and non-DC costs that were 9 percent higher than establishments in states without strict pay laws. Between 2002 and 2012, total costs, DC costs, and non-DC costs increased in states with and without strict payroll withholding laws; however, they increased significantly more in states with strict payroll withholding laws.

Difference-in-Difference Regressions

To build on the evidence shown in tables 9 and 10, we estimated difference-in-difference regressions of the form presented in the analytical framework section above, where the post-PPA dummy variable is interacted with a dummy variable indicating whether or not a state had strict payroll withholding laws. The regressions also included controls for establishment and job characteristics, as well as (non-interacted) dummies for post-PAA and state payroll laws.⁸

Table 11 reports the coefficients on the post-PPA dummy, strict pay law dummy, and interaction of these two dummy variables for each of the various regressions. (The full set of regression results are reported in tables A10 through A16.) As in tables 9 and 10, many of the post-PPA coefficients are statistically significant, suggesting that the dependent variables differ pre- and post-PPA. Most of the strict pay law coefficients are not statistically significant—suggesting that the dependent variables do

⁸ Unlike the descriptive results in tables 9 and 10, the regression results in table 11 are unweighted.

not differ between states with and without strict payroll withholding laws. Exceptions are the employee and employer default contribution rates. For example, the employee default contribution rate and employer default contribution rate are higher in states with strict pay laws than in those without.

The coefficient of particular interest is on the interaction term. This coefficient tells us the differential impact of the PPA on plan provisions for plans in states with strict payroll-withholding laws compared with those without. If the PPA's superseding of state payroll laws caused an increase in the incidence of autoenrollment provisions, we would expect the coefficients to be positive when autoenrollment is the dependent variable (see first row) and when take-up is the dependent variable (see second row). Instead, the coefficients are negative and not statistically different from zero. Thus, the multivariate analysis does not support the descriptive analysis in table 9 showing that autoenrollment rates increased more and take-up rates declined less for workers in states with strict pay laws than for those in states without strict pay laws.

In the other regressions, the coefficient on the interaction term is also negative, which suggests that plan provisions increased less over time for those in states with strict pay laws than for those in states without—even after controlling for other characteristics. This result is consistent with many of the descriptive results in table 9. For example, the employer maximum contribution rate increased less pre- and post-PPA for plans with strict pay laws than for those without. In addition, the likelihood of meeting the conditions for the new safe harbors increased less over time for plans in states with strict pay laws than for those without. However, the only coefficients that are statistically different from zero are for the employee default contribution rate, employer default contribution rate, and new safe harbor³. For example, the employee default contribution rate and employer default contribution rate increased less over time for plans in states with strict pay laws than for those in states without strict pay laws. Again, these results are consistent with the descriptive results in table 9.

Finally, we consider establishment costs (bottom panel). We find that total costs, DC costs, and non-DC costs were all higher after the PPA than before the PPA—even after controlling for other characteristics. We also find that each of these costs was higher in states with strict pay laws than in those without. Finally, the coefficient on the interaction term is not statistically significant for any of the costs.

Discussion

The Pension Protection Act of 2006 (PPA) included provisions designed to enhance defined contribution plans—such as new protections for automatic enrollment and less stringent nondiscrimination safe harbor rules.

Most pension-related research has focused on individuals' behavior—whether workers participate in 401(k)s, how much they contribute, and how they make investment choices. Even the discussion surrounding automatic enrollment has focused on how it benefits employees by increasing their pension coverage and ultimately their retirement savings. Comparatively little is known about employer decisions regarding retirement plans, and even less is known about the effect of the PPA on employer behavior. Yet employer actions surrounding these plans substantially affect future retirement security. This study fills that gap in the literature by analyzing the extent to which pension plan structures changed after the PPA.

Our results show that autoenrollment rates, employer maximum contribution rates, default contribution rates, and the likelihood of meeting the safe harbor requirements were all higher after the PPA, even when we control for establishment, job, and plan characteristics and changes over time in those characteristics. However, when we use difference-in-difference regression analysis to measure the causal effect of the PPA on automatic enrollment and plan take-up, we are unable to find a significant effect. We do find, however, that the PPA is associated with lower default contribution rates and a lower likelihood that employers meet the new safe harbor requirements

These results are consistent with Butrica and Karamcheva (2015a) who found that 401(k) employee default contribution rates were significantly lower than employer maximum contribution rates—meaning that employees could not take full advantage of the employer match unless they opted to contribute more. By boosting plan participation, automatic enrollment likely increases employer costs as previously unenrolled workers receive matching retirement plan contributions. Employers might respond to the surge in retirement plan costs associated with automatic enrollment by setting low employee default contribution rates.

Studies have shown that automatically enrolled employees tend to remain with the default options in their plan. Madrian and Shea (2001) show that, at least in the short term, only a small fraction of automatically enrolled 401(k) participants elect a contribution rate or asset allocation that differs from the company-specified default. A Vanguard study finds that automatic enrollment leads to lower plan contribution rates, as participants who would have voluntarily saved at a higher rate remain at the

lower employee default contribution rates (Nessmith, Utkus, and Young 2007). Butrica and Karamcheva (2015b) analyze the relationship between automatic enrollment and DC contributions using data from the Health and Retirement Study (HRS), a nationally representative survey of older adults. They also find that employee contribution amounts and contribution rates are on average lower among those who report having been automatically enrolled compared with those who were given a choice to enroll. A possible explanation for this finding is that workers are being defaulted into 401(k) plans at low employee default contribution rates.

An important limitation of our study is that the difference-in-difference approach focuses solely on the PPA provisions that supersede state payroll withholding laws. Although we find no evidence that the PPA triggered higher autoenrollment and take-up rates by superseding state payroll withholding laws, its effects through other avenues (such as the establishment of Qualified Default Investment Alternatives and Qualified Automatic Contribution Arrangements) may be significant.

Demographic trends and impending reforms suggest that Social Security will likely replace a smaller share of pre-retirement earnings than it does today, increasing the importance of employer-sponsored retirement plans in providing adequate income. Evidence of the effect of the PPA on employer behavior provides valuable lessons for future policy reforms. Our findings have long-term implications for the retirement security of Americans. Although most 401(k) plans now have an autoescalation feature, our results suggest that even at the end of the autoescalation process, employee default contribution rates are significantly lower than employer maximum contribution rates. Thus, possible reforms should consider instituting minimum employee default contribution rates or increasing the minimum necessary to meet safe harbor requirements.

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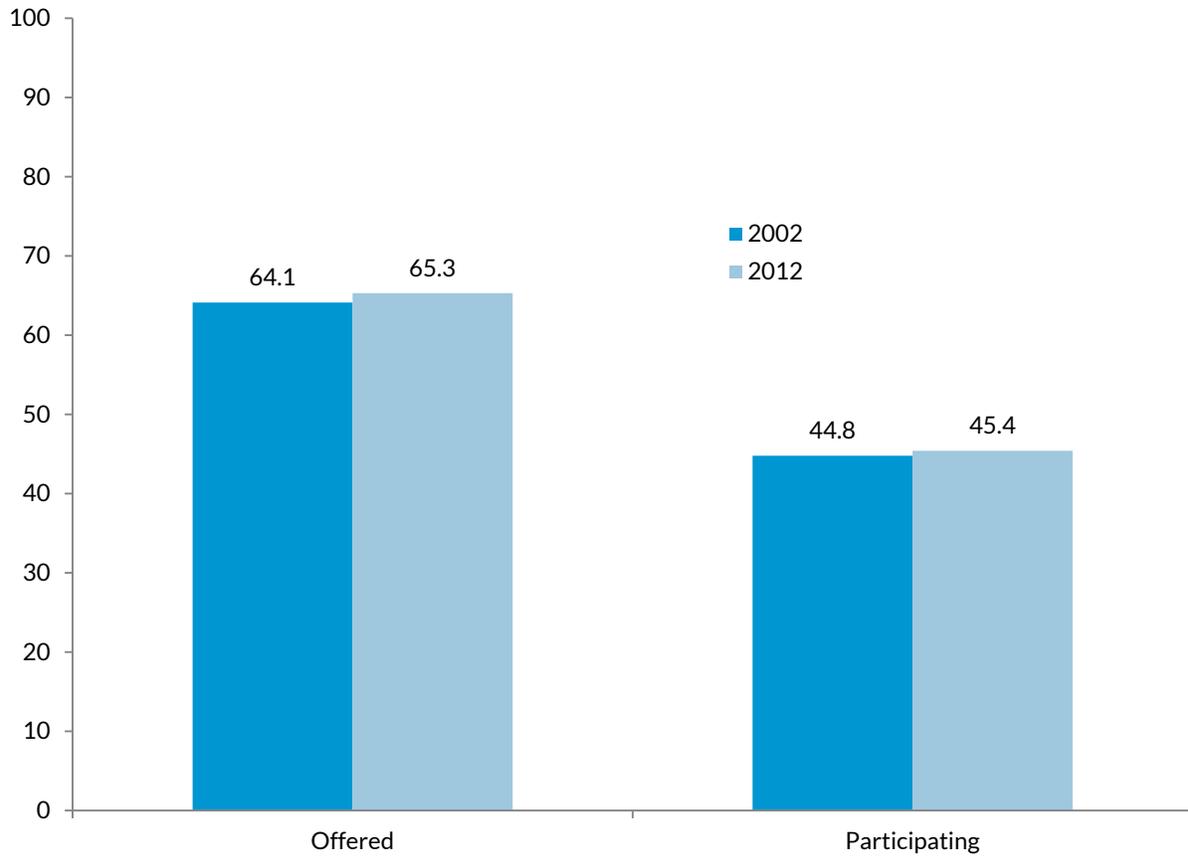
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Figures and Tables

FIGURE 1

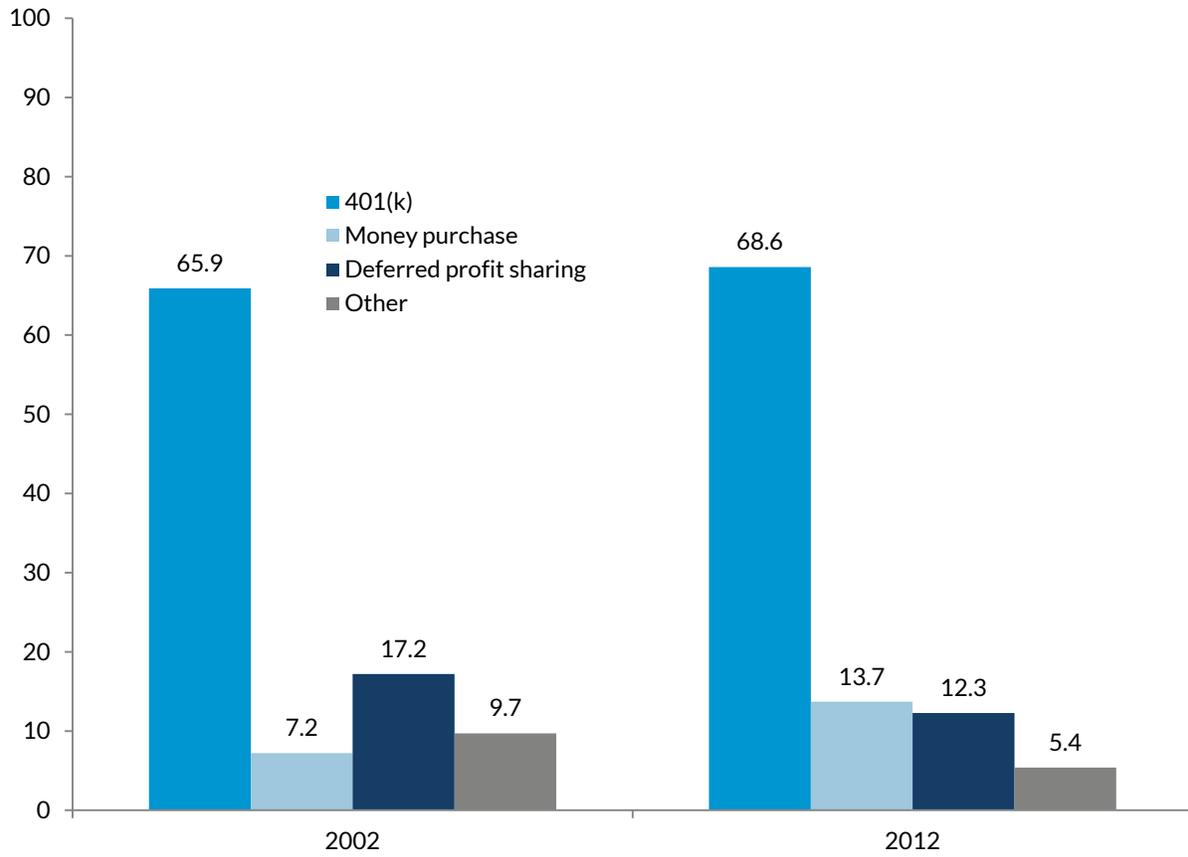
Percentage of Workers Offered and Participating in Defined Contribution Plans in 2002 and 2012



Source: National Compensation Survey.

FIGURE 2

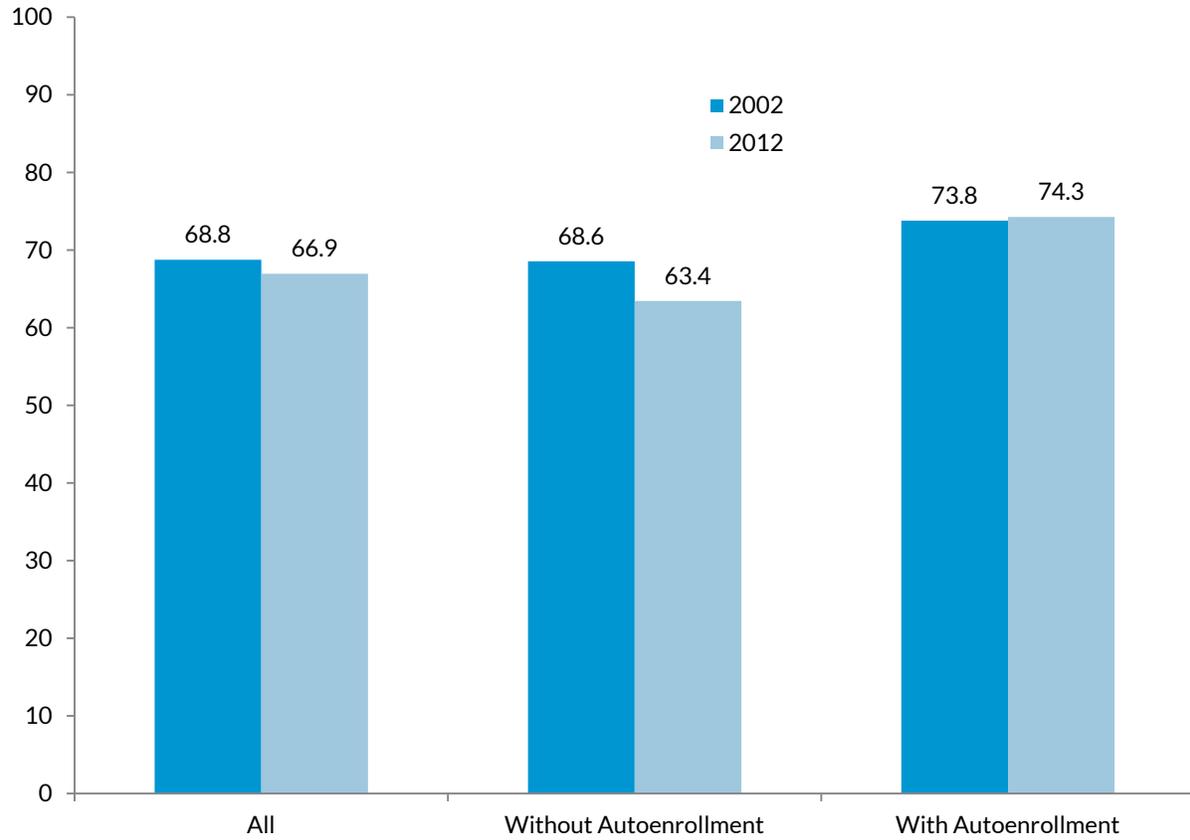
Distribution of Workers among Defined Contribution Plans Offered in 2002 and 2012



Source: National Compensation Survey.

FIGURE 3

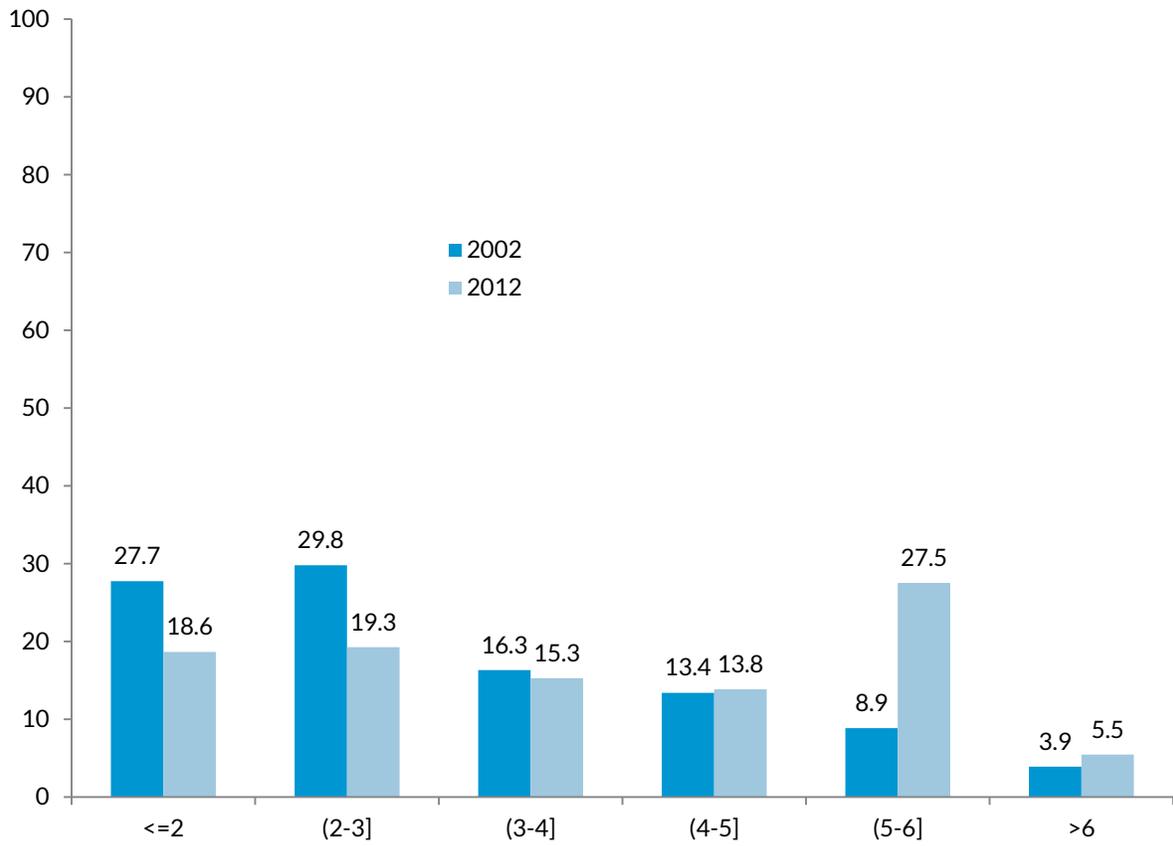
Percentage of Workers Participating in 401(k) Plans among Those Offered by Automatic Enrollment, 2002 and 2012



Source: National Compensation Survey.

FIGURE 4

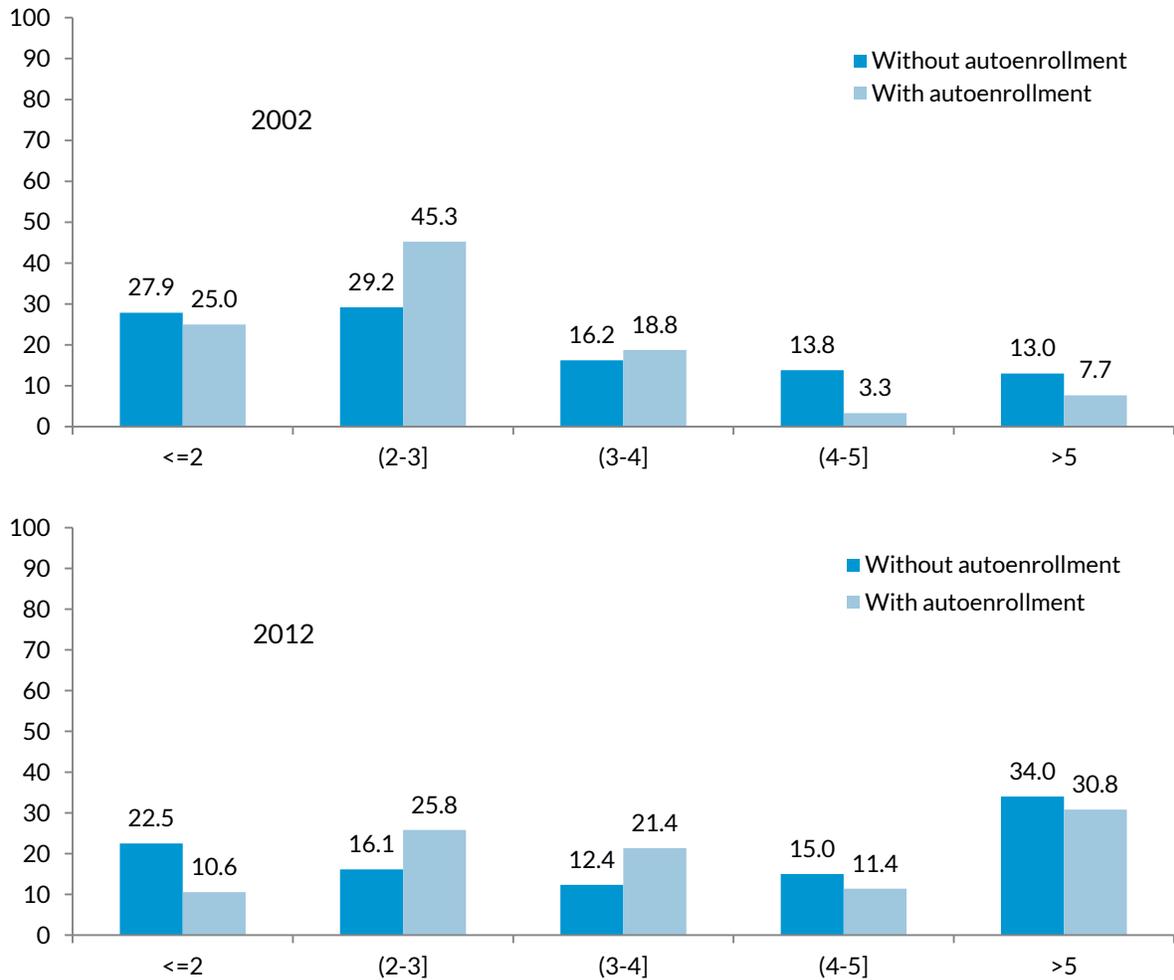
Distribution of Workers in 401(k) Plans by Employer Maximum Contribution Rates, 2002 and 2012



Source: National Compensation Survey.

FIGURE 5

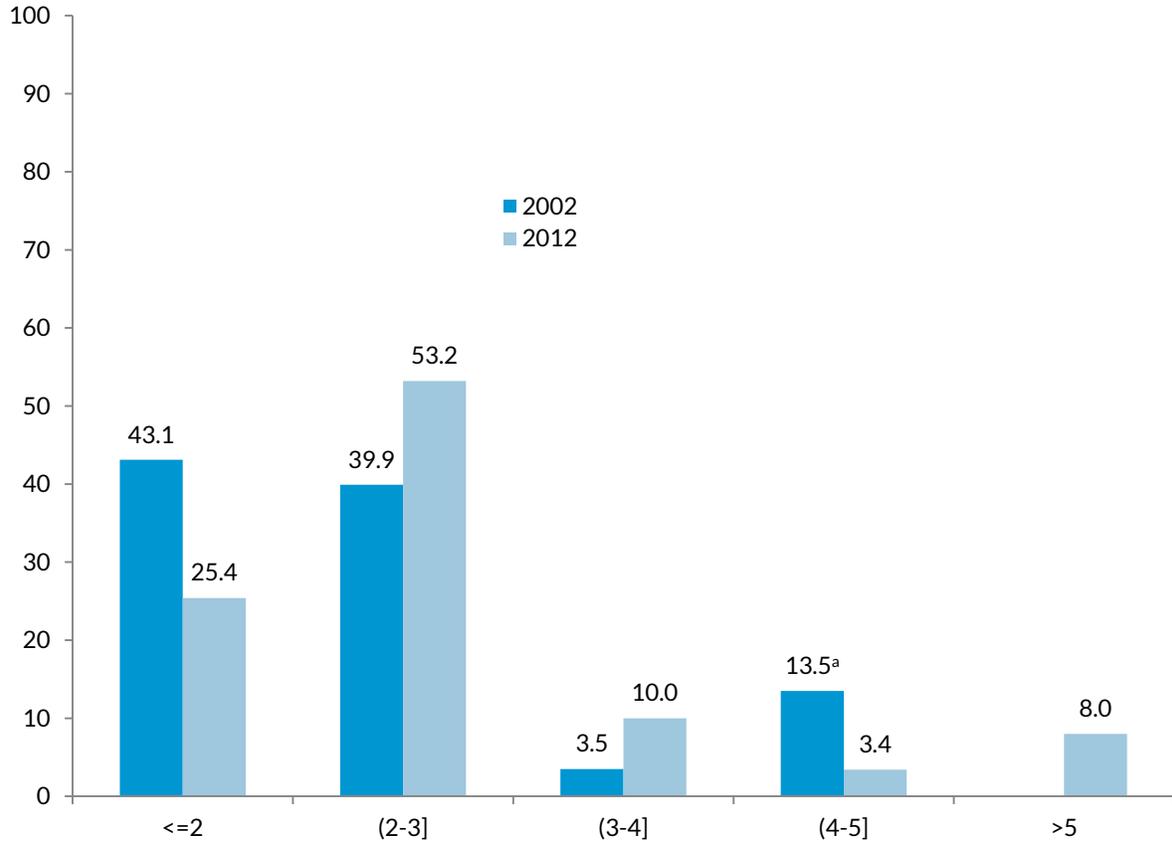
Distribution of Workers in 401(k) Plans by Employer Maximum Contribution Rates and Automatic Enrollment, 2002 and 2012



Source: National Compensation Survey.

FIGURE 6

Distribution of Workers in Automatic Enrollment 401(k) Plans by Employee Default Contribution Rates, 2002 and 2012

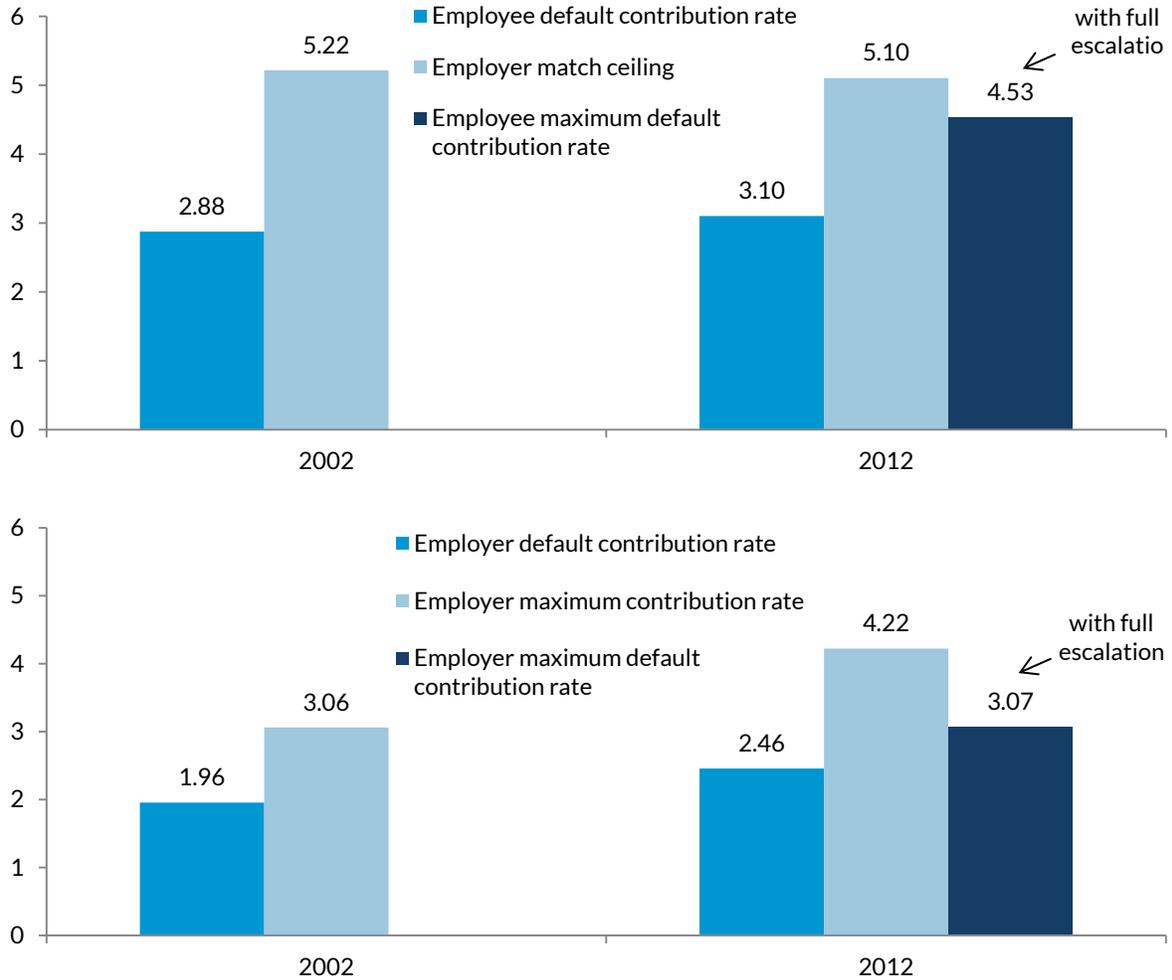


Source: National Compensation Survey.

Note: ^aIn 2002, this represents the share of workers in plans with employee default contribution rates of more than 4 percent. Disclosure rules prohibit showing more detail because there are too few observations.

FIGURE 7

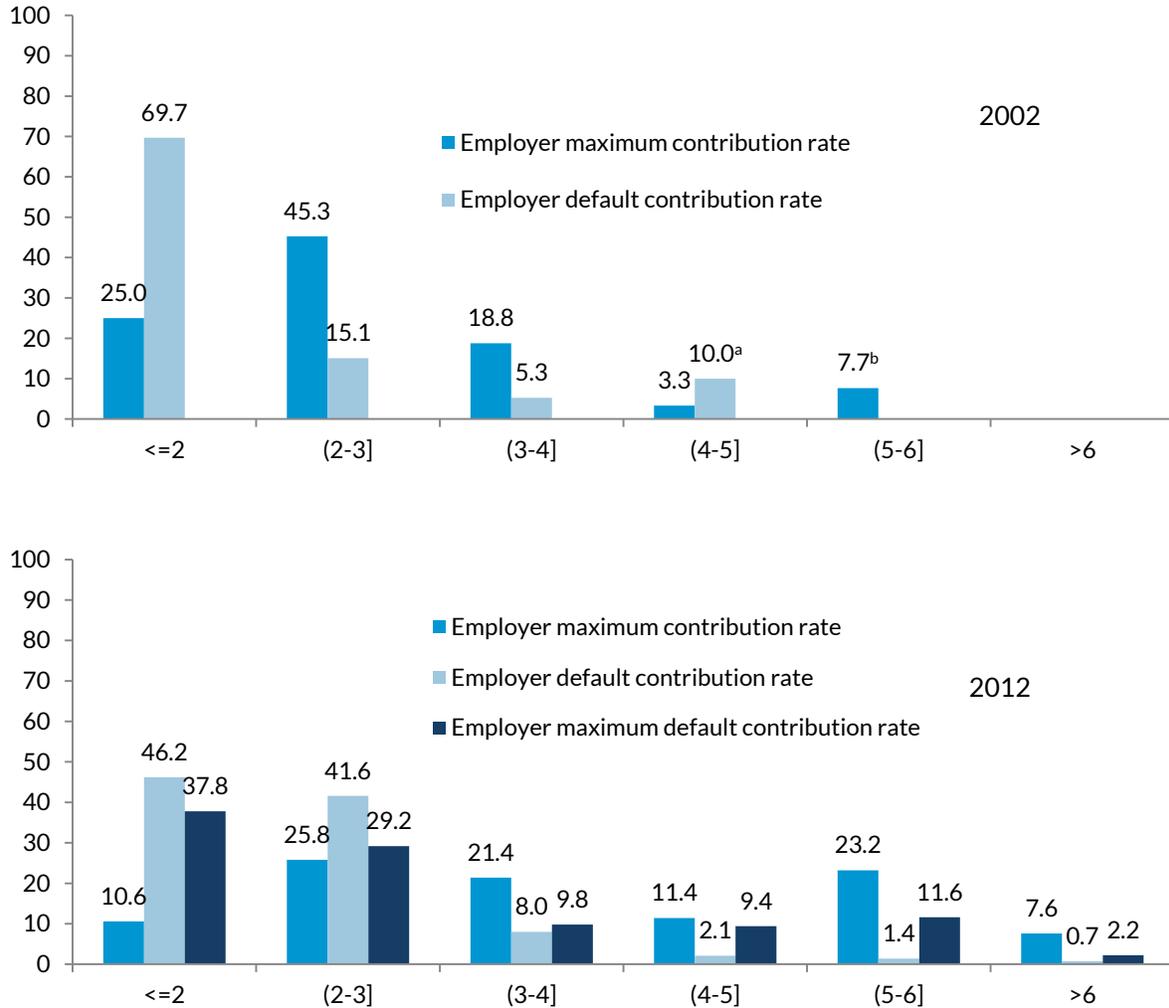
Average Default Contribution Rates Compared with Matching Provisions for Workers in Autoenrollment 401(k) Plans, 2002 and 2012



Source: National Compensation Survey.

FIGURE 8

Distribution of Workers in Automatic Enrollment 401(k) Plans by Employer Maximum and Default Contribution Rates, 2002 and 2012



Source: National Compensation Survey.

Note: ^aThis represents the share of workers in plans with employer default contribution rates of more than 4 percent.

^bThis represents the share of workers in plans with employer maximum contribution rates of more than 5 percent.

TABLE 1

Variable Definitions

Generosity Measure	Definition
Employer match rate	Percentage of each dollar of employee contributions that is matched (e.g., 50 cents on the dollar or 50 percent).
Match ceiling	Limit on the percentage of employee contributions that is matched (e.g., employee's contribution is matched up to 6 percent of pay).
Employer maximum contribution rate	Maximum employer's contribution as a percentage of salary. Alternatively, the percentage of salary the employer would contribute if the employee contributed at the match ceiling. This is computed as: (employer match rate*match ceiling).
Employee default contribution rate	In plans with automatic enrollment, the default employee contribution percentage.
Employer default contribution rate	This is computed as: (employer match rate*minimum(match ceiling, employee default contribution rate)).
Employee maximum default contribution rate	In plans with automatic enrollment, the default employee contribution percentage at the end of the escalation process.
Employer maximum default contribution rate	This is computed as: (employer match rate*minimum(match ceiling, employee maximum default contribution rate)).

TABLE 2

Percentage of Workers in 401(k) Plans with Automatic Enrollment, by Establishment Characteristics and Year

	2002		2012		Diff.
	Mean	Std. err.	Mean	Std. err.	
All	3.9	0.2	32.3	0.7	***
Industry					
Agriculture, mining & construction	12.0	1.9	22.5	3.2	***
Manufacturing	5.3	0.0	51.6	0.0	
Transportation & public utilities	7.9	1.1	43.6	3.4	***
Wholesale trade	7.1	1.1	53.4	3.3	***
Retail trade	1.8	0.4	15.0	1.3	***
Financial, insurance & real estate	2.1	0.3	45.8	1.3	***
Other services	3.0	0.3	25.9	1.1	***
Size					
< 50	3.2	0.5	20.4	1.5	***
50-99	3.9	0.7	22.8	1.8	***
100-499	4.8	0.4	36.6	1.1	***
500-2,499	3.6	0.3	41.6	1.4	***
2,500+	2.7	0.3	36.7	2.0	***
Employment Status					
Full-time	3.9	0.2	35.0	0.7	***
Part-time	3.7	0.6	14.4	1.6	***
Union Status					
Union	2.6	0.5	30.5	2.8	***
Non-union	4.0	0.2	32.4	0.7	***
Wages (tercile)					
Bottom	2.5	0.4	14.2	1.2	***
Middle	4.0	0.3	34.1	1.1	***
Top	4.4	0.3	38.8	1.0	***
Region					
Northeast	5.1	0.5	34.8	1.5	***
Midwest	4.3	0.4	31.7	1.3	***
South	3.4	0.3	29.4	1.0	***
West	3.0	0.4	36.6	1.6	***
# Establishment-jobs	11,694		5,120		

Source: National Compensation Survey.

Note: Statistical significance of difference in means between 2002 and 2012 is denoted by * p < .10, ** p < .05, and *** p < .01.

TABLE 3

Percentage of Workers Participating in 401(k) Plans among Those Offered, by Establishment Characteristics and Year

	2002		2012		Diff.
	Mean	Std. err.	Mean	Std. err.	
All	68.8	0.3	66.9	0.4	***
Industry					
Agriculture, mining & construction	71.3	2.0	75.2	2.1	
Manufacturing	74.1	0.7	64.5	1.2	***
Transportation & public utilities	71.3	1.3	65.8	2.1	**
Wholesale trade	78.6	1.2	73.7	1.9	**
Retail trade	58.6	0.9	57.2	1.1	
Financial, insurance & real estate	74.7	0.6	78.2	0.6	***
Other services	66.7	0.5	66.6	0.8	
Size					
< 50	71.1	1.0	61.2	1.3	***
50-99	60.0	1.4	62.5	1.5	
100-499	66.9	0.5	68.0	0.7	
500-2,499	70.0	0.5	71.5	0.8	
2,500+	74.6	0.5	73.6	1.0	
Employment Status					
Full-time	71.1	0.3	70.3	0.4	
Part-time	50.4	1.1	44.1	1.4	***
Union Status					
Union	76.9	1.0	67.7	1.9	***
Non-union	68.1	0.3	66.9	0.4	**
Wages (tercile)					
Bottom	53.7	0.8	48.1	1.1	***
Middle	66.9	0.5	65.1	0.7	**
Top	77.7	0.4	76.9	0.5	
Region					
Northeast	76.5	0.7	68.6	1.0	***
Midwest	69.9	0.6	64.7	0.9	***
South	63.6	0.5	64.5	0.7	
West	69.4	0.7	73.3	1.0	***
# Establishment-jobs	11,694		5,120		

Source: National Compensation Survey.

Note: Statistical significance of difference in means between 2002 and 2012 is denoted by * p < .10, ** p < .05, and *** p < .01.

TABLE 4

Average Employer Maximum Contribution Rate among Workers in 401(k) Plans, by Establishment Characteristics and Year

	2002		2012		Diff.
	Mean	Std. err.	Mean	Std. err.	
All	3.45	0.02	4.14	0.03	***
Industry					
Agriculture, mining & construction	3.00	0.09	3.54	0.12	***
Manufacturing	3.61	0.07	4.36	0.06	
Transportation & public utilities	3.26	0.08	4.05	0.13	***
Wholesale trade	2.91	0.06	4.27	0.10	***
Retail trade	3.50	0.04	4.87	0.06	***
Financial, insurance & real estate	4.04	0.03	4.56	0.06	***
Other services	3.31	0.03	3.77	0.04	***
Size					
< 50	3.42	0.06	4.15	0.06	***
50-99	2.98	0.05	3.43	0.08	***
100-499	3.54	0.04	4.53	0.04	***
500-2,499	3.47	0.03	4.04	0.05	***
2,500+	3.48	0.04	3.56	0.07	
Employment Status					
Full-time	3.45	0.02	4.11	0.03	***
Part-time	3.40	0.04	4.35	0.08	***
Union Status					
Union	3.72	0.05	3.85	0.10	
Non-union	3.42	0.02	4.16	0.03	***
Wages (tercile)					
Bottom	3.24	0.04	4.31	0.07	***
Middle	3.35	0.03	4.13	0.04	***
Top	3.62	0.03	4.07	0.04	***
Region					
Northeast	3.70	0.05	3.93	0.07	***
Midwest	3.12	0.03	4.00	0.05	***
South	3.35	0.03	4.18	0.04	***
West	3.83	0.04	4.43	0.05	***
# Establishment-jobs	11,694		5,120		

Source: National Compensation Survey.

Note: Statistical significance of difference in means between 2002 and 2012 is denoted by * p < .10, ** p < .05, and *** p < .01.

TABLE 5

Average Plan Provisions among Workers in 401(k) Plans, by Automatic Enrollment and Year

	Without autoenrollment			With autoenrollment		
	2002	2012	Diff.	2002	2012	Diff.
Employer match rate	70.79 (0.34)	80.45 (0.53)	***	63.98 (1.28)	83.59 (0.65)	***
Match ceiling	5.20 (0.02)	4.93 (0.03)	***	5.22 (0.10)	5.10 (0.04)	
Employer maximum contribution rate	3.46 (0.02)	4.10 (0.03)	***	3.06 (0.06)	4.22 (0.04)	***
Employee default contribution rate				2.88 (0.05)	3.10 (0.03)	***
Employer default contribution rate				1.96 (0.07)	2.46 (0.03)	***
Employee maximum default contribution rate					4.53 (0.06)	
Employer maximum default contribution rate					3.07 (0.04)	
# Establishment-jobs	11,193	3,269		501	1,851	

Source: National Compensation Survey.

Notes: Standard errors are in parentheses. Statistical significance of difference in means between 2002 and 2012 is denoted by * $p < .10$, ** $p < .05$, and *** $p < .01$.

TABLE 6

Share of Workers in 401(k) Plans Meeting the Safe Harbor Requirements, by Automatic Enrollment and Year

	All plans			Autoenrollment plans		
	2002	2012	Diff.	2002	2012	Diff.
Old safe harbor	37.7 (0.4)	60.0 (0.7)	***	28.4 (2.0)	60.5 (1.1)	***
New safe harbor1	42.3 (0.5)	62.1 (0.7)	***	29.7 (2.0)	63.6 (1.1)	***
New safe harbor2	1.2 (0.1)	20.6 (0.6)	***	29.7 (2.0)	63.6 (1.1)	***
New safe harbor3	0.9 (0.1)	14.6 (0.5)	***	23.0 (1.9)	45.1 (1.2)	***
New safe harbor	N/A	5.5 (0.3)	N/A	N/A	16.9 (0.9)	N/A
# Establishment-jobs	11,694	5,120		501	1,851	

Source: National Compensation Survey.

Notes: Information on automatic escalation is not collected in 2002 and cannot be used to look at the new safe harbor in 2002. Standard errors are in parentheses. Statistical significance of difference in means between 2002 and 2012 is denoted by * $p < .10$, ** $p < .05$, and *** $p < .01$.

TABLE 7

Average Costs for Establishments with 401(k) Plans, by Automatic Enrollment and Year

	All plans			Without automatic enrollment			With automatic enrollment		
	2002	2012	Diff.	2002	2012	Diff.	2002	2012	Diff.
Total costs	36.25 (0.43)	36.99 (0.61)		36.07 (0.45)	35.31 (0.75)		40.91 (1.60)	40.65 (1.05)	
DC costs	0.93 (0.02)	1.11 (0.03)	***	0.92 (0.02)	1.01 (0.03)	**	1.15 (0.07)	1.34 (0.06)	**
Non-DC costs	35.32 (0.43)	35.88 (0.59)		35.15 (0.44)	34.31 (0.72)		39.76 (1.55)	39.30 (1.00)	
# Establishments	2,690	1,178		2,579	778		111	400	

Source: National Compensation Survey.

Note: Establishment costs are expressed in constant 2014 dollars and represent costs per labor hour. Standard errors are in parentheses. Statistical significance of difference in means between 2002 and 2012 is denoted by

* p < .10, ** p < .05, and *** p < .01.

TABLE 8

Regression Coefficients on Post-PPA Dummy Variables

Dependent variable	Plans	
	Coeff.	Std. err.
Autoenrollment rate	1.481***	0.069
Take-up rate	-1.503*	0.891
Employer match rate	9.478***	1.922
Match ceiling	-0.025	0.080
Employer maximum contribution rate	0.688***	0.102
Employee default contribution rate ^a	0.199***	0.115
Employer default contribution rate ^a	0.429***	0.187
Old safe harbor	0.631***	0.069
New safe harbor1	0.567***	0.067
New safe harbor2 ^a	0.993***	0.151
New safe harbor3 ^a	0.642***	0.156
# Plans	5,318	

Dependent variable	Establishments	
	Coeff.	Std. Err.
Total costs	3.222***	0.736
DC costs	0.261***	0.026
Non-DC costs	2.963***	0.710
# Establishments	3,807	

Source: National Compensation Survey.

Notes: Significance is denoted by * $p < .10$, ** $p < .05$, and *** $p < .01$.

^aThese regressions were estimated on only autoenrollment plans.

TABLE 9

Plan Provisions among Workers in 401(k) Plans, by State Pay Laws and Year

	No strict pay laws			Strict pay laws			Difference-in-Difference	
	2002	2012	Diff.	2002	2012	Diff.	Abs.	%
Autoenrollment rate	4.1 (0.3)	31.6 (0.9)	27.6***	3.7 (0.3)	33.1 (1.0)	29.4***	1.8	49.8%
Take-up rate	69.8 (0.4)	66.2 (0.6)	-3.6***	67.8 (0.5)	67.8 (0.6)	0.0	3.6	5.3%
Employer match rate	69.39 (0.41)	80.84 (0.61)	11.45***	71.64 (0.53)	82.14 (0.55)	10.50***	-0.96	-1.3%
Match ceiling	5.12 (0.03)	4.97 (0.03)	-0.15***	5.29 (0.03)	4.99 (0.04)	-0.30***	-0.15	-2.9%
Employer maximum contribution rate	3.37 (0.03)	4.11 (0.04)	0.74***	3.52 (0.03)	4.17 (0.04)	0.64***	-0.10	-2.8%
Employee default contribution rate	2.62 (0.06)	3.18 (0.04)	0.56***	3.12 (0.08)	3.02 (0.04)	-0.10	-0.66	-21.1%
Employer default contribution rate	1.72 (0.09)	2.44 (0.04)	0.73***	2.19 (0.10)	2.47 (0.04)	0.28***	-0.44	-20.2%
Employee maximum contribution rate		4.66 (0.08)			4.39 (0.09)			
Employer maximum contribution rate		3.17 (0.06)			2.96 (0.06)			
# Establishment-jobs	6,175	2,684		5,519	2,436			

Source: National Compensation Survey.

Notes: Standard errors are in parentheses. Statistical significance of difference in means between 2002 and 2012 is denoted by * p < .10, ** p < .05, and *** p < .01.

TABLE 9 (CONTINUED)

Plan Provisions among Workers in 401(k) Plans, by State Pay Laws and Year

	No strict pay laws			Strict pay laws			Difference-in-Difference	
	2002	2012	Diff.	2002	2012	Diff.	Abs.	%
Old safe harbor	33.7 (0.6)	58.6 (1.0)	24.9***	41.5 (0.7)	61.5 (1.0)	20.0***	-4.9	-11.8%
New safe harbor1	39.5 (0.6)	60.3 (0.9)	20.8***	45.1 (0.7)	64.0 (1.0)	18.9***	-1.9	-4.2%
New safe harbor2	1.0 (0.1)	20.2 (0.8)	19.2***	1.3 (0.2)	21.0 (0.8)	19.6***	0.4	27.4%
New safe harbor3	0.8 (0.1)	14.7 (0.7)	13.9***	1.0 (0.1)	14.5 (0.7)	13.5***	-0.4	-38.9%
New safe harbor		7.0 (0.5)			3.8 (0.4)			
# Establishment-jobs	6,175	2,684		5,519	2,436			

Source: National Compensation Survey.

Notes: Standard errors are in parentheses. Statistical significance of difference in means between 2002 and 2012 is denoted by * $p < .10$, ** $p < .05$, and *** $p < .01$.

TABLE 10

Average Costs for Establishments with 401(k) Plans, by State Pay Laws and Year

	No strict pay laws			Strict pay laws			Difference-in-Difference	
	2002	2012	Diff.	2002	2012	Diff.	Abs.	%
Total costs	34.74 (0.46)	35.88 (0.84)	1.14	37.98 (0.76)	38.13 (0.90)	0.15	-0.99	-2.6%
DC costs	0.89 (0.02)	1.07 (0.04)	0.19***	0.98 (0.03)	1.15 (0.04)	0.17***	-0.01	-1.3%
Non-DC costs	33.85 (0.45)	34.81 (0.80)	0.96	37.00 (0.75)	36.98 (0.86)	-0.02	-0.98	-2.6%
# Establishments	1,435	613		1,255	565			

Source: National Compensation Survey.

Notes: Establishment costs are expressed in constant 2014 dollars and represent costs per labor hour. Standard errors are in parentheses. Statistical significance of difference in means between 2002 and 2012 is denoted by

* p < .10, ** p < .05, and *** p < .01.

TABLE 11

Regression Coefficients on Post-PPA, Strict Pay Laws, and Interaction Dummy Variables

Dependent variable	Plans					
	Post-PPA		Strict pay laws		Interaction	
	Coeff.	Std. err.	Coeff.	Std. err.	Coeff.	Std. err.
Autoenrollment rate	1.543***	0.089	0.081	0.084	-0.129	0.117
Take-up rate	-1.270	1.147	-1.550	0.943	-0.428	1.632
Employer match rate	11.959***	1.790	2.299	1.475	-5.132	3.146
Match ceiling	0.004	0.086	0.061	0.068	-0.063	0.146
Employer maximum contribution rate	0.788***	0.105	0.066	0.075	-0.206	0.172
Employee default contribution rate ^a	0.408**	0.165	0.446***	0.155	-0.396*	0.216
Employer default contribution rate ^a	0.754***	0.274	0.603**	0.274	-0.632*	0.342
Old safe harbor	0.708***	0.077	0.086	0.056	-0.158	0.109
New safe harbor1	0.624***	0.070	0.053	0.058	-0.117	0.111
New safe harbor2 ^a	1.200***	0.211	0.298	0.267	-0.416	0.280
New safe harbor3 ^a	0.912***	0.219	0.382	0.246	-0.545**	0.266
# Plans	5,318		5,318		5,318	
Dependent variable	Establishments					
	Post-PPA		Strict pay laws		Interaction	
	Coeff.	Std. err.	Coeff.	Std. err.	Coeff.	Std. err.
Total costs	4.132***	1.003	5.144***	1.470	-1.912	1.528
DC costs	0.248***	0.040	0.099**	0.046	0.026	0.058
Non-DC costs	3.886***	0.979	5.042***	1.446	-1.936	1.499
# Establishments	3,868		3,868		3,868	

Source: National Compensation Survey.

Notes: Significance is denoted by * p < .10, ** p < .05, and *** p < .01. ^aThese regressions were estimated on only autoenrollment plans.

TABLE A1

Construction of Analysis Samples for 2002 and 2012

	2002	2012
Starting sample	33,868	12,698
Minus duplicate observations	269	78
Subsample of all workers	33,599	12,620
Minus establishments without plans	7,214	2,737
Minus establishments with no DC cost data	1,211	654
Subsample of workers in DC plans	25,174	9,229
Minus multi-employer plans	781	166
Final sample of workers in 401(k) plans	11,694	5,120
Unique plans	3,859	1,459
Unique establishments	2,690	1,178

Source: National Compensation Survey.

TABLE A2

Distribution of Workers in 401(k) Plans, by Establishment Characteristics and Year

	2002		2012		Diff.
	Mean	Std. Err.	Mean	Std. Err.	
All	100.0	0.0	100.0	0.0	
Industry					
Agriculture, mining & construction	3.7	0.2	3.3	0.3	
Manufacturing	17.7	0.4	13.0	0.5	***
Transportation & public utilities	3.5	0.2	5.0	0.3	***
Wholesale trade	6.7	0.2	5.9	0.3	**
Retail trade	16.7	0.3	15.0	0.5	***
Financial, insurance & real estate	12.4	0.3	11.7	0.4	
Other services	39.3	0.5	46.2	0.7	***
Size					
< 50	22.2	0.4	22.2	0.6	
50-99	8.4	0.3	12.2	0.5	***
100-499	36.4	0.4	37.7	0.7	
500-2,499	22.6	0.4	20.0	0.6	***
2,500+	10.4	0.3	7.9	0.4	***
Employment Status					
Full-time	88.7	0.3	87.2	0.5	***
Part-time	11.3	99.7	12.8	99.5	
Union Status					
Union	7.7	0.2	6.4	0.3	***
Non-union	92.3	99.8	93.6	99.7	
Wages (tercile)					
Bottom	21.1	0.4	19.1	0.5	***
Middle	35.9	0.4	37.8	0.7	**
Top	43.0	0.5	43.1	0.7	
Region					
Northeast	18.4	0.4	17.7	0.5	
Midwest	26.6	0.4	26.0	0.6	
South	35.6	0.4	37.5	0.7	**
West	19.5	0.4	18.9	0.5	
# Establishment-jobs	11,694		5,120		

Source: National Compensation Survey.

Note: Statistical significance of difference in means between 2002 and 2012 is denoted by * p < .10, ** p < .05, and *** p < .01.

TABLE A3

Probit Regression of the Relationship between the Likelihood of Automatic Enrollment and the PPA in 401(k) Plans

	Coeff.	Std. Err.
Industry (omitted=Wholesale)		
Agriculture, mining & construction	0.005	0.229
Manufacturing	-0.046	0.127
Transportation & public utilities	-0.081	0.175
Retail trade	-0.485***	0.182
Financial, insurance & real estate	-0.166*	0.095
Other services	-0.469***	0.135
Size (omitted= <100)		
100-499	0.381***	0.080
500+	0.330***	0.080
Share of full-time workers	0.056	0.153
Share of union workers	-0.240*	0.131
Wage tercile (omitted=Bottom)		
Middle	0.210	0.136
Top	0.344**	0.134
Region (omitted=Northeast)		
Midwest	0.068	0.060
South	-0.163**	0.068
West	-0.081	0.067
Flag for imputed plan	0.109	0.067
Post-PPA	1.481**	0.069
Constant	-2.105**	0.190
Pseudo R-squared		0.243
# Plans		5,318

Source: National Compensation Survey.

Note: Statistical significance is denoted by * $p < .10$, ** $p < .05$, and *** $p < .01$.

TABLE A4

OLS Regression of the Relationship between Take-up Rates and the PPA in 401(k) Plans

	Coeff.	Std. Err.
Industry (omitted=Wholesale)		
Agriculture, mining & construction	-9.447***	2.573
Manufacturing	-6.170***	2.049
Transportation & public utilities	-5.829**	2.327
Retail trade	-7.434***	1.798
Financial, insurance & real estate	-3.183*	1.905
Other services	-10.269***	1.321
Size (omitted= <100)		
100-499	1.266	1.297
500+	2.317*	1.346
Share of full-time workers	11.806***	2.283
Share of union workers	2.558	1.686
Wage tercile (omitted=Bottom)		
Middle	7.674***	1.993
Top	17.733***	1.549
Region (omitted=Northeast)		
Midwest	-1.056	1.314
South	-3.816***	1.316
West	-1.983	1.242
Flag for imputed plan	0.605	0.814
Flag for imputed participation	-5.729***	1.287
Post-PPA	-1.503*	0.891
Constant	60.064***	2.059
Adjusted R-squared	0.113	
# Plans	5,318	

Source: National Compensation Survey.

Note: Statistical significance is denoted by * $p < .10$, ** $p < .05$, and *** $p < .01$.

TABLE A5

OLS Regression of the Relationship between Employer Match Rates, Match Ceiling, and Employer Maximum Contribution Rate and the PPA in 401(k) Plans

Dependent variable	Employer match rate		Match ceiling		Employer maximum contribution rate	
	Coeff.	Std. Err.	Coeff.	Std. Err.	Coeff.	Std. Err.
Industry (omitted=Wholesale)						
Agriculture, mining & construction	-3.791*	2.270	0.201	0.172	-0.149	0.148
Manufacturing	1.149	1.993	0.377**	0.171	0.191	0.162
Transportation & public utilities	6.057**	2.400	-0.097	0.153	0.525***	0.201
Retail trade	16.309***	1.693	0.284*	0.146	0.882***	0.123
Financial, insurance & real estate	18.523***	2.471	0.147	0.143	1.003***	0.118
Other services	6.525***	1.841	-0.357**	0.158	0.113	0.138
Size (omitted= <100)						
100-499	5.854***	1.458	0.035	0.068	0.414***	0.050
500+	5.142***	1.851	0.047	0.077	0.319***	0.068
Share of full-time workers	3.570**	1.772	0.239***	0.087	0.359***	0.093
Share of union workers	-3.388*	1.855	0.428***	0.094	0.146	0.154
Wage tercile (omitted=Bottom)						
Middle	2.121	2.037	-0.052	0.100	-0.133	0.105
Top	2.421	2.364	0.351***	0.136	0.212*	0.115
Region (omitted=Northeast)						
Midwest	-1.965	1.508	-0.153**	0.064	-0.210***	0.071
South	2.647	1.683	-0.218***	0.083	-0.019	0.064
West	7.640***	2.085	0.049	0.088	0.325***	0.074
Flag for imputed plan	-2.501*	1.432	-0.022	0.072	-0.075	0.074
Post-PPA	9.478***	1.922	-0.025	0.080	0.688***	0.102
Constant	54.805***	2.593	4.843***	0.169	2.582***	0.145
Adjusted R-squared	0.072		0.042		0.083	
# Plans	5,318		4,515		5,318	

Source: National Compensation Survey.

Note: Statistical significance is denoted by * p < .10, ** p < .05, and *** p < .01.

TABLE A6

OLS Regression of the Relationship between Default Contribution Rates and the PPA in Automatic Enrollment 401(k) Plans

Dependent variable	Employee default contribution rate		Employer default contribution rate	
	Coeff.	Std. Err.	Coeff.	Std. Err.
Industry (omitted=Wholesale)				
Agriculture, mining & construction	0.159	0.262	-0.646***	0.248
Manufacturing	-0.115	0.273	-0.014	0.286
Transportation & public utilities	-0.235	0.317	-0.286	0.279
Retail trade	-0.480*	0.253	-0.736***	0.246
Financial, insurance & real estate	0.163	0.213	0.266	0.243
Other services	-0.308	0.236	-0.290	0.286
Size (omitted= <100)				
100-499	0.142	0.135	0.319***	0.120
500+	0.407**	0.186	0.543***	0.163
Share of full-time workers	0.200	0.326	0.637***	0.203
Share of union workers	0.289	0.278	-0.019	0.223
Wage tercile (omitted=Bottom)				
Middle	0.283	0.191	0.201	0.184
Top	0.487***	0.144	0.247	0.153
Region (omitted=Northeast)				
Midwest	0.108	0.192	0.330***	0.113
South	0.092	0.177	0.414***	0.121
West	-0.004	0.187	0.384***	0.095
Flag for imputed plan	0.120	0.150	0.017	0.138
Post-PPA	0.199*	0.115	0.429**	0.187
Constant	2.323***	0.459	0.829**	0.322
Adjusted R-squared	0.052		0.111	
# Plans	590		588	

Source: National Compensation Survey.

Note: Statistical significance is denoted by * p < .10, ** p < .05, and *** p < .01.

TABLE A7

Probit Regression of the Relationship between the Likelihood of Meeting the Safe Harbor Requirements and the PPA in 401(k) Plans

Dependent variable	Old safe harbor		New safe harbor1	
	Coeff.	Std. Err.	Coeff.	Std. Err.
Industry (omitted=Wholesale)				
Agriculture, mining & construction	-0.164	0.125	-0.088	0.129
Manufacturing	0.066	0.086	0.239***	0.091
Transportation & public utilities	0.087	0.092	0.108	0.089
Retail trade	0.633***	0.100	0.901***	0.101
Financial, insurance & real estate	0.620***	0.082	0.720***	0.091
Other services	0.163*	0.085	0.206**	0.083
Size (omitted= < 100)				
100-499	0.180***	0.037	0.193***	0.038
500+	0.194***	0.052	0.148***	0.041
Share of full-time workers				
	0.222***	0.066	0.139**	0.063
Share of union workers				
	0.188**	0.087	0.235**	0.092
Wage tercile (omitted=Bottom)				
Middle	-0.008	0.077	0.027	0.083
Top	0.202***	0.065	0.249***	0.070
Region (omitted=Northeast)				
Midwest	-0.001	0.049	-0.009	0.047
South	0.132***	0.043	0.074*	0.041
West	0.345***	0.043	0.336***	0.052
Flag for imputed plan				
	-0.071	0.054	-0.075	0.053
Post-PPA				
	0.631***	0.069	0.567***	0.067
Constant				
	-1.092***	0.117	-0.972***	0.106
Pseudo R-squared				
	0.075		0.078	
# Plans				
	5,318		5,318	

Source: National Compensation Survey.

Note: Statistical significance is denoted by * p < .10, ** p < .05, and *** p < .01.

TABLE A8

Probit Regression of the Relationship between the Likelihood of Meeting the New Safe Harbor Requirements and the PPA in Automatic Enrollment 401(k) Plans

Dependent variable	New safe harbor2		New safe harbor3	
	Coeff.	Std. Err.	Coeff.	Std. Err.
Industry (omitted=Wholesale)				
Agriculture, mining & construction	-1.015***	0.298	-0.482*	0.249
Manufacturing	-0.221	0.270	0.152	0.262
Transportation & public utilities	-0.496*	0.268	0.164	0.309
Retail trade	-0.145	0.269	-0.475*	0.287
Financial, insurance & real estate	-0.278	0.255	0.148	0.226
Other services	-0.319	0.271	-0.207	0.221
Size (omitted= < 100)				
100-499	0.484***	0.138	0.337***	0.127
500+	0.345***	0.098	0.415***	0.121
Share of full-time workers				
Share of union workers	0.640**	0.250	1.464***	0.415
Share of union workers				
Share of union workers	-0.428*	0.237	-0.301	0.238
Wage tercile (omitted=Bottom)				
Middle	0.062	0.232	0.034	0.244
Top	0.192	0.250	0.225	0.191
Region (omitted=Northeast)				
Midwest	0.393***	0.133	0.715***	0.152
South	0.441***	0.139	0.602***	0.149
West	0.298**	0.135	0.357**	0.155
Flag for imputed plan				
Flag for imputed plan	-0.028	0.144	0.015	0.129
Post-PPA				
Post-PPA	0.993***	0.151	0.642***	0.156
Constant				
Constant	-1.590***	0.315	-2.900***	0.480
Pseudo R-squared		0.122	0.126	
# Plans		655	655	

Source: National Compensation Survey.

Note: Statistical significance is denoted by * $p < .10$, ** $p < .05$, and *** $p < .01$.

TABLE A9

OLS Regression of the Relationship between Establishment Costs and the PPA in 401(k) Plans

Dependent variable	Total costs		DC costs		Non-DC costs	
	Coeff.	Std. Err.	Coeff.	Std. Err.	Coeff.	Std. Err.
Industry (omitted=Wholesale)						
Agriculture, mining & construction	2.174	1.793	0.217**	0.107	1.969	1.744
Manufacturing	-1.519	1.404	-0.190***	0.067	-1.335	1.361
Transportation & public utilities	3.621*	1.990	0.083	0.104	3.542*	1.943
Retail trade	-12.370***	1.394	-0.453***	0.069	-11.916***	1.325
Financial, insurance & real estate	4.074**	1.838	0.294***	0.091	3.769**	1.778
Other services	-1.503	1.629	0.009	0.072	-1.512	1.578
Size (omitted= <100)						
100-499	-0.171	0.662	0.046	0.031	-0.209	0.646
500+	8.463***	0.987	0.358***	0.049	8.108***	0.993
Share of full-time workers	17.446***	1.281	0.534	0.054	16.891***	1.269
Share of union workers	7.230*	4.316	0.131	0.091	7.112*	4.315
Region (omitted=Northeast)						
Midwest	-6.131**	2.659	-0.220***	0.078	-5.900**	2.587
South	-7.889***	2.201	-0.212***	0.074	-7.679***	2.140
West	-2.174	3.161	-0.166*	0.092	-1.994	3.096
Flag for imputed costs	1.734**	0.812	-0.016	0.037	1.539*	0.903
Post-PPA	3.222***	0.736	0.261***	0.026	2.963***	0.710
Constant	23.245***	2.380	0.534***	0.107	22.917***	2.455
Adjusted R-squared	0.166		0.144		0.161	
# Establishments	3,868		3,868		3,868	

Source: National Compensation Survey.

Note: Statistical significance is denoted by * p < .10, ** p < .05, and *** p < .01.

TABLE A10

Probit Regression of the Relationship between the Likelihood of Automatic Enrollment and the PPA in 401(k) Plans

	Coeff.	Std. Err.
Industry (omitted=Wholesale)		
Agriculture, mining & construction	0.005	0.232
Manufacturing	-0.047	0.126
Transportation & public utilities	-0.078	0.174
Retail trade	-0.488***	0.183
Financial, insurance & real estate	-0.168*	0.096
Other services	-0.470***	0.136
Size (omitted= <100)		
100-499	0.381***	0.080
500+	0.330***	0.079
Share of full-time workers	-0.240*	0.131
Share of union workers	0.053	0.155
Wage tercile (omitted=Bottom)		
Middle	0.212	0.138
Top	0.344**	0.136
Region (omitted=Northeast)		
Midwest	0.069	0.059
South	-0.166**	0.067
West	-0.081	0.066
Flag for imputed plan	0.111*	0.066
Post-PPA	1.543***	0.089
Strict pay laws	0.081	0.084
Post-PPA*Strict pay laws	-0.129	0.117
Constant	-2.141***	0.193
Pseudo R-squared	0.243	
# Plans	5,318	

Source: National Compensation Survey.

Note: Statistical significance is denoted by * p < .10, ** p < .05, and *** p < .01.

TABLE A11

OLS Regression of the Relationship between Take-up Rates and the PPA in 401(k) Plans

	Coeff.	Std. Err.
Industry (omitted=Wholesale)		
Agriculture, mining & construction	-9.563***	2.588
Manufacturing	-6.219***	2.085
Transportation & public utilities	-5.963**	2.322
Retail trade	-7.501***	1.779
Financial, insurance & real estate	-3.199*	1.889
Other services	-10.356***	1.337
Size (omitted= <100)		
100-499	1.258	1.296
500+	2.295*	1.345
Share of full-time workers	2.616	1.689
Share of union workers	11.778***	2.275
Wage tercile (omitted=Bottom)		
Middle	7.686***	1.997
Top	17.872***	1.518
Region (omitted=Northeast)		
Midwest	-1.491	1.357
South	-3.784***	1.270
West	-1.920	1.369
Flag for imputed plan	0.610	0.814
Flag for imputed participation	-5.713***	1.283
Post-PPA	-1.270	1.147
Strict pay laws	-1.550	0.943
Post-PPA*Strict pay laws	-0.428	1.632
Constant	60.891***	2.114
Adjusted R-squared	0.117	
# Plans	5,318	

Source: National Compensation Survey.

Note: Statistical significance is denoted by * $p < .10$, ** $p < .05$, and *** $p < .01$.

TABLE A12

OLS Regression of the Relationship between Employer Match Rates, Match Ceiling, and Employer Maximum Contribution Rate and the PPA in 401(k) Plans

Dependent variable	Employer match rate		Match ceiling		Employer maximum contribution rate	
	Coeff.	Std. Err.	Coeff.	Std. Err.	Coeff.	Std. Err.
Industry (omitted=Wholesale)						
Agriculture, mining & construction	-3.847*	2.275	0.204	0.171	-0.153	0.149
Manufacturing	1.114	2.030	0.378**	0.170	0.188	0.162
Transportation & public utilities	6.187***	2.402	-0.093	0.152	0.528***	0.200
Retail trade	16.283***	1.724	0.286**	0.146	0.880***	0.124
Financial, insurance & real estate	18.471***	2.478	0.146	0.142	1.001***	0.118
Other services	6.534***	1.863	-0.354**	0.157	0.112	0.138
Size (omitted= <100)						
100-499	5.865***	1.457	0.035	0.067	0.414***	0.049
500+	5.174***	1.832	0.048	0.078	0.320***	0.067
Share of full-time workers	-3.462*	1.905	0.425***	0.095	0.144	0.156
Share of union workers	3.541**	1.777	0.240***	0.086	0.358***	0.093
Wage tercile (omitted=Bottom)						
Middle	2.148	2.062	-0.052	0.099	-0.131	0.105
Top	2.371	2.363	0.348**	0.135	0.213*	0.115
Region (omitted=Northeast)						
Midwest	-1.814	1.371	-0.142**	0.071	-0.211***	0.070
South	2.529	1.585	-0.221**	0.087	-0.023	0.066
West	7.631***	1.942	0.048	0.087	0.325***	0.075
Flag for imputed plan	-2.396*	1.404	-0.021	0.071	-0.070	0.072
Post-PPA	11.959***	1.790	0.004	0.086	0.788***	0.105
Strict pay laws	2.299	1.475	0.061	0.068	0.066	0.075
Post-PPA*Strict pay laws	-5.132	3.146	-0.063	0.146	-0.206	0.172
Constant	53.718***	2.542	4.812***	0.176	2.552***	0.144
Adjusted R-squared	0.077		0.046		0.086	
# Plans	5,318		4,515		5,318	

Source: National Compensation Survey.

Note: Statistical significance is denoted by * p < .10, ** p < .05, and *** p < .01.

TABLE A13

OLS Regression of the Relationship between Default Contribution Rates and the PPA in Automatic Enrollment 401(k) Plans

Dependent variable	Employee default contribution rate		Employer default contribution rate	
	Coeff.	Std. Err.	Coeff.	Std. Err.
Industry (omitted=Wholesale)				
Agriculture, mining & construction	0.172	0.254	-0.645***	0.246
Manufacturing	-0.111	0.264	-0.012	0.279
Transportation & public utilities	-0.236	0.314	-0.284	0.279
Retail trade	-0.530**	0.252	-0.806***	0.248
Financial, insurance & real estate	0.148	0.206	0.244	0.237
Other services	-0.311	0.233	-0.293	0.284
Size (omitted= <100)				
100-499	0.152	0.136	0.323***	0.120
500+	0.410**	0.188	0.539***	0.161
Share of full-time workers	0.298	0.270	-0.003	0.216
Share of union workers	0.196	0.325	0.623***	0.199
Wage tercile (omitted=Bottom)				
Middle	0.252	0.190	0.161	0.187
Top	0.432***	0.149	0.185	0.153
Region (omitted=Northeast)				
Midwest	0.130	0.206	0.337***	0.107
South	0.087	0.178	0.407***	0.120
West	-0.022	0.179	0.375***	0.095
Flag for imputed plan	0.097	0.152	-0.011	0.143
Post-PPA	0.408**	0.165	0.754***	0.274
Strict pay laws	0.446***	0.155	0.603**	0.274
Post-PPA*Strict pay laws	-0.396*	0.216	-0.632*	0.342
Constant	2.148***	0.466	0.605*	0.325
Adjusted R-squared	0.085		0.146	
# Plans	590		588	

Source: National Compensation Survey.

Note: Statistical significance is denoted by * p < .10, ** p < .05, and *** p < .01.

TABLE A14

Probit Regression of the Relationship between the Likelihood of Meeting the Safe Harbor Requirements and the PPA in 401(k) Plans

Dependent variable	Old safe harbor		New safe harbor1	
	Coeff.	Std. Err.	Coeff.	Std. Err.
Industry (omitted=Wholesale)				
Agriculture, mining & construction	-0.165	0.125	-0.089	0.129
Manufacturing	0.065	0.087	0.237***	0.090
Transportation & public utilities	0.092	0.092	0.110	0.089
Retail trade	0.633***	0.101	0.901***	0.101
Financial, insurance & real estate	0.618***	0.082	0.719***	0.091
Other services	0.163*	0.085	0.206**	0.083
Size (omitted= < 100)				
100-499	0.181***	0.037	0.194***	0.037
500+	0.196***	0.051	0.149***	0.040
Share of full-time workers	0.186**	0.088	0.234**	0.093
Share of union workers	0.222***	0.065	0.138**	0.063
Wage tercile (omitted=Bottom)				
Middle	-0.008	0.077	0.027	0.083
Top	0.198***	0.065	0.248***	0.070
Region (omitted=Northeast)				
Midwest	0.006	0.046	-0.006	0.046
South	0.128***	0.042	0.071*	0.041
West	0.344***	0.048	0.336***	0.055
Flag for imputed plan	-0.068	0.054	-0.072	0.053
Post-PPA	0.708***	0.077	0.624***	0.070
Strict pay laws	0.086	0.056	0.053	0.058
Post-PPA*Strict pay laws	-0.158	0.109	-0.117	0.111
Constant	-1.133***	0.111	-0.997***	0.106
Pseudo R-squared	0.076		0.078	
# Plans	5,318		5,318	

Source: National Compensation Survey.

Note: Statistical significance is denoted by * p < .10, ** p < .05, and *** p < .01.

TABLE A15

Probit Regression of the Relationship between the Likelihood of Meeting the New Safe Harbor Requirements and the PPA in Automatic Enrollment 401(k) Plans

Dependent variable	New safe harbor2		New safe harbor3	
	Coeff.	Std. Err.	Coeff.	Std. Err.
Industry (omitted=Wholesale)				
Agriculture, mining & construction	-1.009***	0.308	-0.476*	0.262
Manufacturing	-0.218	0.275	0.154	0.264
Transportation & public utilities	-0.488*	0.269	0.172	0.313
Retail trade	-0.155	0.273	-0.482*	0.287
Financial, insurance & real estate	-0.282	0.262	0.139	0.232
Other services	-0.313	0.271	-0.204	0.225
Size (omitted= < 100)				
100-499	0.475***	0.137	0.331***	0.121
500+	0.335***	0.099	0.403***	0.120
Share of full-time workers	-0.411*	0.240	-0.274	0.238
Share of union workers	0.628**	0.247	1.469***	0.423
Wage tercile (omitted=Bottom)				
Middle	0.053	0.229	0.026	0.248
Top	0.181	0.244	0.215	0.194
Region (omitted=Northeast)				
Midwest	0.377***	0.130	0.688***	0.148
South	0.436***	0.139	0.596***	0.144
West	0.309**	0.134	0.368**	0.157
Flag for imputed plan	-0.032	0.149	0.008	0.133
Post-PPA	1.200***	0.211	0.912***	0.219
Strict pay laws	0.298	0.267	0.382	0.246
Post-PPA*Strict pay laws	-0.416	0.280	-0.545**	0.266
Constant	-1.712***	0.365	-3.074***	0.506
Pseudo R-squared	0.125		0.131	
# Plans	655		655	

Source: National Compensation Survey.

Note: Statistical significance is denoted by * p < .10, ** p < .05, and *** p < .01.

TABLE A16

OLS Regression of the Relationship between Establishment Costs and the PPA in 401(k) Plans

Dependent variable	Total costs		DC costs		Non-DC costs	
	Coeff.	Std. Err.	Coeff.	Std. Err.	Coeff.	Std. Err.
Industry (omitted=Wholesale)						
Agriculture, mining & construction	2.561	1.765	0.226**	0.107	2.344	1.708
Manufacturing	-1.219	1.322	-0.184***	0.066	-1.042	1.280
Transportation & public utilities	4.059**	1.969	0.092	0.103	3.972**	1.924
Retail trade	-12.009***	1.368	-0.444***	0.068	-11.563***	1.303
Financial, insurance & real estate	4.156**	1.807	0.296***	0.090	3.849**	1.748
Other services	-1.095	1.603	0.018	0.072	-1.113	1.555
Size (omitted= <100)						
100-499	-0.167	0.642	0.046	0.030	-0.203	0.630
500+	8.475***	0.965	0.358***	0.049	8.123***	0.970
Share of full-time workers						
	6.983	4.255	0.127	0.092	6.872	4.254
Share of union workers						
	17.572***	1.345	0.536***	0.054	17.015***	1.332
Region (omitted=Northeast)						
Midwest	-4.978**	2.202	-0.192***	0.066	-4.776**	2.149
South	-8.060***	1.912	-0.215***	0.066	-7.847***	1.862
West	-2.325	2.483	-0.169**	0.072	-2.142	2.445
Flag for imputed costs						
	1.748**	0.787	-0.017	0.038	1.533*	0.858
Post-PPA						
	4.132***	1.003	0.248***	0.040	3.886***	0.979
Strict pay laws						
	5.144***	1.470	0.099**	0.046	5.042***	1.446
Post-PPA*Strict pay laws						
	-1.912	1.528	0.026	0.058	-1.936	1.499
Constant						
	20.205***	2.791	0.474***	0.107	19.957***	2.773
Adjusted R-squared						
	0.178		0.150		0.173	
# Establishments						
	3,868		3,868		3,868	

Source: National Compensation Survey.

Note: Statistical significance is denoted by * p < .10, ** p < .05, and *** p < .01.

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