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ARTICLE

# Impact of defaults on participation in state supplemental retirement savings plans

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**Abstract**

This study examines the impact of the adoption of automatic enrollment provisions by the state of South Dakota for its supplemental retirement saving plan (SRP). In South Dakota, state and local government employees, including teachers, are covered by a defined benefit pension plan and by Social Security. Prior to the introduction of automatic enrollment, the proportion of newly hired employees who were contributing to the SRP was less than 5% in their first year of employment. After the introduction of automatic enrollment, over 90% of newly hired workers who were auto-enrolled were participating in the plan. Using a difference-in-difference approach we find that automatic enrollment changes differences in the participation rate by age, sex, and income. We also find that prior to the adoption of auto-enrollment, agencies that ultimately chose to implement this policy had higher participation rates compared to those that did not adopt auto-enrollment.

**Key words:** Public pension plans; supplemental retirement saving plans; automatic enrollment

Supplemental retirement saving plans (SRPs) are offered to most public sector employees on a voluntary basis. These plans are an optional employee benefit for public employees who are covered by a mandatory pension plan, usually a defined benefit plan. In addition, to this mandatory retirement plan, most public employees are also covered by Social Security. Typically, the state-managed pension and Social Security provide a combined retirement income for career employees that is equal to approximately 75% of their final salary. Given this level of expected retirement income, participation rates in retirement saving plans are generally quite low. The objective of this paper is to determine whether in this environment, automatic enrollment provisions increase participation in these savings plans.

Over the past two decades, a series of papers have shown the power of defaults to alter saving decisions in employer-provided retirement saving plans in the private sector. Studies have shown that automatic enrollment policies have two primary effects. First, the adoption of automatic enrollment results in a substantial increase in the proportion of employees participating in retirement saving plans. While the magnitude of the increase in the participation ranges from study to study, research generally indicates participation rises from about 60% of the workforce in traditional plans without automatic enrollment to over 90% once automatic enrollment is adopted. Second, firms adopting automatic enrollment policies must also select a default contribution rate, often 3% of salary, and this default contribution rate usually becomes the modal contribution to the plan.

In general, these studies have been conducted using administrative data for a single firm or a small set of private sector firms in which the retirement saving plan is the only employer-provided pension plan and these plans usually include employer matches to encourage participation and saving. The analysis typically focuses on the introduction of automatic enrollment to an existing 401(k) and

compares participation and contributions rate shortly before and a few months after the adoption of the policy. These are very different conditions from the supplemental plans offered by public employers. Thus, an important unanswered question is whether automatic enrollment will increase the proportion of public employees who contribute to SRPs.

The present study examines the impact of the adoption automatic enrollment provisions in a SRP by a state government, specifically the adoption of automatic enrollment by the state of South Dakota. In South Dakota, state and local government employees, including teachers, are covered by a defined benefit pension plan and by Social Security. Thus, career public employees in South Dakota can expect a lifetime annuity from these two programs of around 75% of their final salary.

Prior to the introduction of automatic enrollment, the proportion of newly hired employees who were contributing to the SRP was less than 5% in their first year of employment. After the introduction of automatic enrollment, over 90% of newly hired workers who were auto-enrolled were participating in the plan. Using administrative data provided by the South Dakota Retirement System (SDRS), we use a difference-in-difference approach to estimate the change in contribution behavior to the supplemental retirement plan.

## 1. Review of the default literature

In large measure, the focus on defaults in retirement saving plans stems from the emergence of behavior economics and the framing of choices (Benartzi and Thaler, 2004, 2013). Traditional economic theory would suggest that with freedom of choice among various options, defaults should not affect ultimate outcomes. However, limited information about the value of different distribution options and procrastination or inertia may result in defaults leading to permanent decisions.

The recent literature examining the importance of defaults in supplemental retirement savings plans begins with Madrian and Shea (2001) who analyze the 401(k) savings behavior of employees in one large corporation before and after the introduction of automatic enrollment. The employer match in the plan was 50% on the first 6% of an employee's salary before and after the change in enrollment. The 401(k) plan was the only retirement plan offered by the firm. Prior to the adoption of automatic enrollment, the participation rate in the 401(k) plan was 57%. Auto-enrollment was adopted by the firm in 1998 with a default contribution of 3% of salary. The result of automatic enrollment was that participation increased to over 80%.

Choi *et al.* (2004a, 2004b) examined the impact of automatic enrollment using data from three large corporations in different industries. Once again, the retirement saving plan is the only pension plan offered by each of the companies. This paper utilizes data over a 3-year period. Prior to the introduction of automatic enrollment, participation rates during the first year of employment tended to be less than 40%. They report that the adoption of automatic enrollment has a dramatic impact of increasing participation rates to over 85% in all three companies. Similar results are reported by Choi *et al.* (2004a).[1]

All of these papers examined firms in the private sector where the 401(k)-saving plan was the only retirement plan and where firms provided a generous employer match. Two important unanswered questions from this research is whether automatic enrollment will have a similar effect when the saving plan is supplemental to a mandatory defined benefit plan and when no additional inducement in the form of an employer match is provided. Our analysis answers both of these questions.

An exception to the focus on private sector firms is Goda *et al.* (2020) which examines federal employees and participation in the Thrift Saving Plan (TSP). In additional to being able to contribute to the optional TSP, federal employees are also covered by a defined benefit plan. This study reports a participation rate of over 90% before the adoption of automatic enrollment and a subsequent small increase in participation after its adoption. The very high pre-automatic enrollment provision is

[1]This research team has produced a series of papers with similar findings on the impact of automatic enrollment (Choi *et al.* 2005; Beshears *et al.*, 2009; Carroll *et al.*, 2009).

due to a very generous employer match and an employer contribution even if the employee contributes nothing. Thus, this study also does not provide a useful comparison for state and local plans that lack such inducements.

## 2. Adoption of automatic enrollment in South Dakota

Virtually all state and local government employees including teachers in South Dakota are covered by the SDRS and they are also covered by Social Security. SDRS is a defined benefit pension plan with a benefit formula:

Benefit = 1.55% times (final average salary) times (years for service after 2008)
plus
Benefit = 1.7% times (final average salary) times (years for service before 2008)

Individuals can retire with unreduced benefits at age 65 or if they meet the Rule of 85 requirements if the sum of the retiree's age plus years of service equal 85.[2]

Prior to the introduction of automatic enrollment, very few newly hired employees enrolled in the SRP in their first years of employment. For example, between 2005 and 2009, fewer than 3% of newly hired workers enrolled in the SRP during their first year of employment. This level of participation is much lower than found in earlier studies of private sector firms who do not offer a defined benefit plan. The proportion of South Dakota public employees who participate in the retirement saving plan is also considerably lower than the 30% of North Carolina teachers who participate in retirement saving plans. North Carolina teachers are also covered by a state-managed defined benefit plan and Social Security (Clark *et al.*, 2016a, 2016b, 2018a).[3] Similarly, a study of participation in the Utah's SRP found that less than 20% of new hires contributed to its plan (Clark *et al.*, 2016a).

Leaders of the SDRS were concerned that the current benefit options might not provide a sufficient retirement income for some employees and that if benefits from the mandatory plan were curtailed, individuals might not reach their desired retirement income. With the support of the SDRS, the state legislature in 2009 enacted legislation that allowed, but did not require, each government agency that participated in the SDRS and the SRP to institute automatic enrollment for all newly hired employees.[4] This legislation did not provide for an employer match to the employee contributions.

While virtually all primary defined benefit and defined contribution public sector plans automatically cover all full-time employees, the SDRS was one of the first major public sector retirement systems, along with the Employees Retirement System of Texas, to implement automatic enrollment for their supplemental savings plan. The adoption of the automatic enrollment policy by an agency requires that this policy be applied to all of the agency's newly hired employees. Once the automatic enrollment policy is adopted, all permanent full-time employees hired on or after a determined date are automatically enrolled in the SRP at a default contribution of $25 per month (about 1% of the mean salary of South Dakota public employees). This default contribution rate is much lower than is typically associated with automatic enrollment policies in the private sector.

The initial contributions to the SRP are placed in a money market account, for first 90 days after which time funds are transferred to an age-appropriate target-date fund. The participant can allocate these contributions to other investment options anytime during this 90-day window as well. Once automatically enrolled in the SRP, the participant has the option to increase contributions up to IRS maximum limits, move current and future contributions to other investment options, and within the first 90

[2]Details of the SDRS pension are described in the member handbook of the system which can be accessed at http://www.sdrs.sd.gov/docs/ClassAFoundationMemberHandbook.pdf

[3]North Carolina state employees are eligible to contribute to state-managed 401(k) and 457 plans. Teachers are also offered the opportunity to contribute to local-managed 403(b) plans (Clark *et al.*, 2018a)

[4]Clark *et al.* (2018b) provide a detailed description of the automatic enrollment provisions and the process by which this policy was adopted and introduced.

days of being automatically enrolled, opt-out of the SRP and receive a refund of all contributions. Once this 90-day window has passed, future contributions can be stopped, i.e. the employee can opt-out of the SRP; however, the participant cannot receive a refund of initial contributions unless they are eligible for a one-time, in-service distribution under IRS rules, are separated from service, or retire.

The introduction of automatic enrollment by South Dakota provides the opportunity to estimate the impact of automatic enrollment provisions in an environment that is much different from previous studies. There are three major differences between the South Dakota case and that of earlier studies. First, public employees in South Dakota are also covered by a defined benefit plan that provides employees with 20–30 years of service with a life annuity of 30–50% of final earnings. Since the workers are also covered by Social Security, most career public employees in South Dakota will have a retirement income of about 75% of their final salary in the form of life annuities from SDRS and Social Security without contributing to the SRP. Second, the SRP does not provide any employer matching contributions so there is a more limited enticement to contribute to this tax-deferred saving plan compare to private sector 401(k) plans that have been the focus of previous studies. Third, the default contribution is considerably lower than that used by most employers in other studies so that the monetary need to opt-out is much less for the South Dakota employees.

In terms of their impact on participation in the saving plan, these differences will have conflicting effects on the probability of contributing to the saving plan. The relatively high expected retirement income should dampen the need for additional saving for retirement. The lack of an employer match should also lower the likelihood that employees will contribute to the plan. These two effects are likely the dominant reason that we find low participation rates in the saving plan prior to the introduction of automatic enrollment. In contrast, the relatively low default contribution rate may be one of the main reasons that relatively few individuals opt-out of the plan after being automatically enrolled. The main research question we examine is whether automatic enrollment has the same powerful impact on participation rates for public sector workers covered by a defined benefit pension plan and a retirement saving plan that provides no employer matching contributions.

## 3. Changes in participation and contribution rates in response to the adoption of automatic enrollment

To determine how public employees who are also covered by a defined benefit plan respond to automatic enrollment in a supplemental retirement plan, we obtained administrative records from SDRS on all public employees in South Dakota who were hired between 2005 and 2016. Using these data, we are able to determine enrollment and contribution rates for all new hires in the first year of employment and the subsequent participation rates between the hire date and 2016. A unique aspect of this analysis is that we are able to observe contributions for a number of years after employment for both those hired before and after the introduction of automatic enrollment. Since not all public agencies adopted automatic enrollment, we also observe participation and contributions for individuals hired in the same year for those automatically enrolled and those employed in agencies that did not adopt auto-enrollment. The data on annual contributions, account balances, and annual salary is reported over fiscal years. Our analysis covers new hires in SDRS and who has access to the SRP. Between 2005 and 2016, 53,047 new employees were hired by government agencies in South Dakota.

### *3.1 Participation rate soars with adoption of automatic enrollment*

From the administrative data, we observe the year each employee was hired and whether they contributed to the SRP in that first year as measured by contributions at the end of the fiscal year, these trends are shown in Figure 1.[5] The number of new hires ranges between 3,000 and 6,000 every year. The solid

[5]The number of new hires each year and the proportion that contribute to the SRP are shown in online Appendix Table A.1.

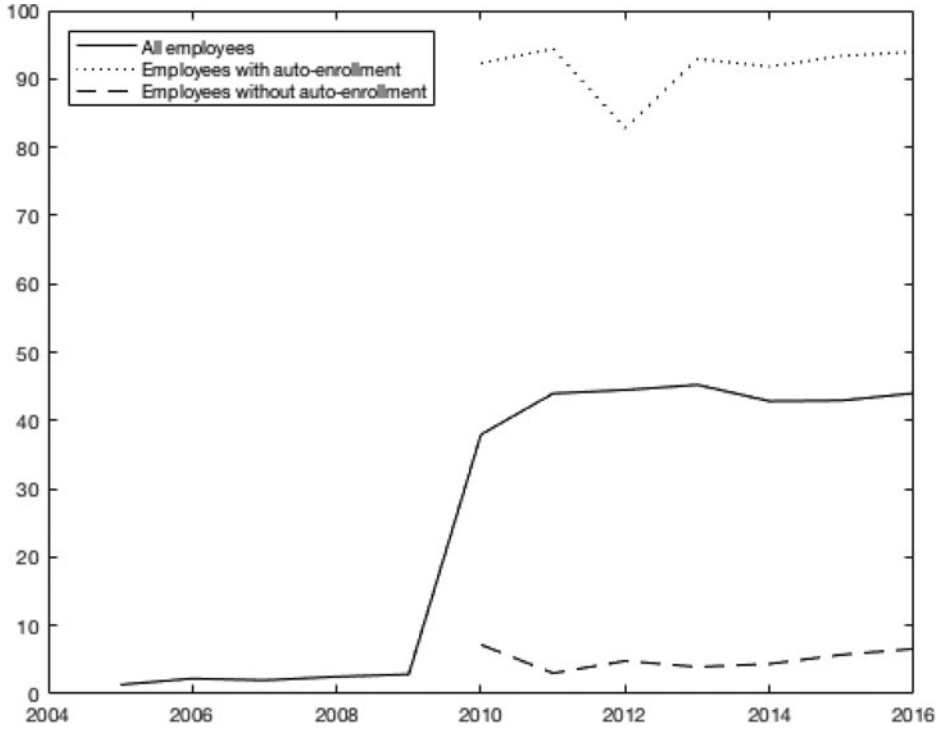


**Figure 1.** Participation Rate in Supplement Retirement Saving Plan in their first year.

line indicates the participation rate for all newly hired public employees in each year. The participation rate in the SRP for individuals hired between 2005 and 2009 was less than 3% in each year. It is important to note that this low participation rate is much lower than that was found in other studies prior to the adoption of automatic enrollment in both the public and private sectors. Thus, it would appear that given the expectation of lifetime annuities from both the SDRS and Social Security, most public employees in South Dakota decided that it was not in their self-interest to make contributions to a retirement saving plan.

The introduction of automatic enrollment into the SRP produced a dramatic change in savings outcomes. After the new law went into effect, participation rates in the SRP for all new hires jumped from less than 3% to over 40%. This dramatic increase actually understates the impact of the adoption of automatic enrollment. The dotted line in Figure 1 indicates the fraction of individuals hired after 2009 who were automatically enrolled in the SRP and who remained in the plan during their first year of employment rose to over 90% (except for individuals hired in 2012) following the introduction of the new policy. In comparison, the percent of individuals who enrolled in the SRP and were not subject to automatic enroll remained less than 8% in every year (the hashed line in Figure 1). The ability to compare same year contribution rates for South Dakota employees with and without automatic enrollment allows us to control for time-variant market conditions in a manner that has not been available to other studies. Thus, the adoption of automatic enrollment appears to have increased participation by approximately 40% for all South Dakota employees with the option of contributing to the SRP; however, the initial participation rate for those at agencies that adopted auto-enrollment exceeds the rate for agencies that do not have auto-enrollment by 85 percentage points.

It is interesting to note that the participation rate of 90% with automatic enrollment observed in South Dakota is very similar to the participation rate found in studies of private sector firms that do not provide their employees with a defined benefit plan and whose 401(k) plans offer employer

matches. The low rate of opting out of the SRP supports the finding of earlier studies that inertia plays a substantial role in the effect of automatic enrollment. In addition, the low opt-out rate in South Dakota may also be influenced by the relatively low default contribution rate of only $25 per month or about 1%; did the new employees even notice the modest reduction in their take home pay due to the default contribution? The change in participation rates in South Dakota indicate that even when employees have relatively high replacement rates from a defined benefit pension plan and Social Security automatic enrollment in a retirement saving plan produces participation rates of 90%.

### 3.2 Contribution rate settles around the default contribution

Table 1 shows the median contribution rates for workers who enrolled in the SRP in their first year of employment ranged between 2%and 3.5% of annual salary prior to the introduction of automatic enrollment.[6] As noted earlier, the default contribution rate for those automatically enrolled is only $25 per month. The average annual salary for all new hires during this period is $31,907, implying a default contribution rate for workers earning the mean salary for public employees equal to about 1% of annual earnings. The effect of this rather low default contribution rate is shown in the post 2009 years when median contribution rates fell substantially to approximately 1% of annual salary. One should note that these participants include individuals who would have contributed to the SRP without automatic enrollment plus those who would have not participated without automatic enrollment.

These data support earlier findings that contribution rates after the introduction of automatic enrollment tend to cluster around the default contribution rate. An interesting observation is that the contribution rate to the SRP plan fell even for those who were not subject to automatic enrollment. This latter decline may be due to peer effects or the idea that the state has endorsed the low default contribution rate as the optimal saving level.

### 3.3 Are there lasting effects of automatic enrollment?

In order to determine the long-range impact of automatic enrollment on participation in retirement saving plans, one needs several years of employment data to see whether participation rates with automatic enrollment decline over time. Similarly, one needs to determine if participation rates rise over time without automatic enrollment. If rates decline relative to the year of hire rates for those automatically enrolled and rise for those without automatic enrollment, then limiting the analysis of the year of hire rates would overstate the positive impact of adopting automatic enrollment. To examine these issues, we once again sort the observations by year of employment and whether the employer adopted automatic enrollment and then calculate the proportion of individuals by hire year who are contributing to the SRP for each year between year of hire and 2016. Participation rates between hire date and 2016 for those with and without automatic enrollment are shown in Table 2 by year of hire.

The proportion of workers contributing to the SRP among those automatically enrolled steadily declines with additional years of employment[7]. For those hired in 2010 who were auto-enrolled, the participation rate fell from 92.3% in the year of hire to 80.5% in 2016. Similarly, for those hired in 2011, the year of the employment rate was 94.4% and this rate declined to 84.8% in 2016. Thus, the proportion of individuals contributing to the SRP who were auto-enrolled fell by about 10% points after 5 years. In contrast, the participation rates for those not automatically enrolled rise with years of service so that the positive effect of automatic enrollment on participation in the SRP declines

[6]Rollovers from other tax qualified saving plans into the SRP were not distinguished from annual contributions to the SRP. To avoid having large rollovers influencing our analysis, we capped total contributions to the SRP at the legal limit for each year.

[7]For every cohort the decline in the first 2 years after hire, when it is within our sample, is statistically significant at the 10% level using a basic equality of means test.

**Table 1.** Median contribution rate to SRP as percent of annual salary in each year conditional on participation

| Fiscal year of hire | Number of new hires auto-enrolled who participate | Number of new hires, not auto-enrolled who participate | Contribution rate | Contribution rate for individuals who were automatically enrolled in the SRP | Contribution rate for those not automatically enrolled in the SRP |
|---|---|---|---|---|---|
| 2005 | N/A | 42 | 3.51 | N/A | 3.51 |
| 2006 | N/A | 78 | 3.35 | N/A | 3.35 |
| 2007 | N/A | 75 | 3.78 | N/A | 3.78 |
| 2008 | N/A | 101 | 3.23 | N/A | 3.23 |
| 2009 | N/A | 113 | 2.01 | N/A | 2.01 |
| 2010 | 1113 | 153 | 0.99 | 1.01 | 0.57 |
| 2011 | 1416 | 56 | 0.96 | 0.95 | 1.47 |
| 2012 | 1761 | 99 | 1.00 | 1.00 | 0.98 |
| 2013 | 2023 | 99 | 0.97 | 0.97 | 1.06 |
| 2014 | 2002 | 122 | 0.94 | 0.94 | 0.95 |
| 2015 | 2177 | 181 | 0.88 | 0.88 | 0.66 |
| 2016 | 2393 | 224 | 0.86 | 0.86 | 0.80 |

This table reports the median contribution rate to the SRP in the first year of hire for different cohorts. The median contribution rate is computed as the median of the employee's annual contribution divided by her/his annual compensation, using only employees who participate in the SRP. Using a Wilcoxon rank sum test for equal medians for each group, at the 1% significance level we can reject the hypothesis that the medians are constant over time for the years 2010–2016.

**Table 2.** Participation rate by year of hire with and without automatic enrollment

| Year of hire | | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2005 | | 1.33 | 2.16 | 3.11 | 4.42 | 6.18 | 7.60 | 7.90 | 8.01 | 8.29 | 9.70 | 10.88 | 11.71 |
| 2006 | | | 2.24 | 3.72 | 4.44 | 6.17 | 7.44 | 7.86 | 8.00 | 8.15 | 9.34 | 9.98 | 10.82 |
| 2007 | | | | 1.99 | 3.59 | 5.06 | 6.86 | 7.51 | 8.52 | 8.87 | 10.08 | 11.56 | 12.83 |
| 2008 | | | | | 2.51 | 3.74 | 5.78 | 6.47 | 6.95 | 7.70 | 8.75 | 9.59 | 11.02 |
| 2009 | | | | | | 2.86 | 4.55 | 5.55 | 6.29 | 7.05 | 8.11 | 9.42 | 10.86 |
| 2010 | | | | | | | 37.96 | 35.99 | 35.24 | 34.28 | 35.09 | 35.47 | 35.51 |
| | With auto | | | | | | 92.29 | 86.57 | 84.04 | 82.28 | 81.87 | 80.90 | 80.50 |
| | w/o auto | | | | | | 7.19 | 6.25 | 7.12 | 8.01 | 9.50 | 10.57 | 11.46 |
| 2011 | | | | | | | | 43.95 | 40.83 | 39.18 | 40.14 | 39.58 | 39.19 |
| | With auto | | | | | | | 94.40 | 87.89 | 86.07 | 86.01 | 85.41 | 84.81 |
| | w/o auto | | | | | | | 3.03 | 2.99 | 3.47 | 5.63 | 6.27 | 7.06 |
| 2012 | | | | | | | | | 44.47 | 42.19 | 41.39 | 41.84 | 42.06 |
| | With auto | | | | | | | | 82.75 | 77.33 | 73.93 | 73.26 | 71.90 |
| | w/o auto | | | | | | | | 4.82 | 4.10 | 6.06 | 7.65 | 8.73 |
| 2013 | | | | | | | | | | 45.23 | 43.97 | 43.40 | 42.74 |
| | With auto | | | | | | | | | 92.93 | 89.01 | 87.54 | 86.46 |
| | w/o auto | | | | | | | | | 3.94 | 4.49 | 5.75 | 6.82 |
| 2014 | | | | | | | | | | | 42.83 | 42.53 | 41.58 |
| | With auto | | | | | | | | | | 91.79 | 89.40 | 87.38 |
| | w/o auto | | | | | | | | | | 4.39 | 4.28 | 5.22 |
| 2015 | | | | | | | | | | | | 42.93 | 41.85 |
| | With auto | | | | | | | | | | | 93.35 | 91.14 |
| | w/o auto | | | | | | | | | | | 5.73 | 4.54 |
| 2016 | | | | | | | | | | | | | 43.99 |
| | With auto | | | | | | | | | | | | 93.95 |
| | w/o auto | | | | | | | | | | | | 6.58 |

over time with increased tenure. For example, for those not automatically enrolled and hired in 2010, the participation rate increased from 7.2% in 2010 to 11.5% in 2016. In each year of hire, the proportion of those not auto-enrolled who were contributing to the SRP rose by about four percentage points after 5 years.

Once again, these findings are consistent with earlier studies that find that participation rates in traditional opt-in savings plans rise with increases in tenure while participation in plans with opt-out provisions tend to decline gradually over time. Despite these trends indicating a narrowing of the

differences in participation the difference in participation rates for those subject to automatic enrollment and those who are not is still very significant several years after employment. This analysis shows that the adoption of automatic enrollment substantially increased participation in the SRP by South Dakotan public employees.

### 3.4 Comparing agencies with and without automatic enrollment

An important question in this analysis is whether employees in agencies that adopted automatic enrollment differ significantly from those agencies that chose not to institute automatic enrollment. To examine the potential that differences across agencies are affecting changes in participation rates, we examine the participation rates between 2005 and 2009 in agencies that ultimately did and did not adopt automatic enrollment along with the mean characteristics in the two groups of government agencies.

The results presented in Tables 3 and 4 suggest that employees in agencies that adopted auto-enrollment differ from those hired by agencies that did not adopt automatic enrollment. In Table 3, we report the fraction of new hires per year who participate in the SRP, before the introduction of automatic enrollment, and then splitting the sample according to whether or not the hiring agencies will eventually adopt automatic enrollment once it becomes available. We see that new hires in agencies who will, later on, adopt auto-enrollment are, for 4 out of the 5 years, more than twice as likely to participate in the SRP. At a 5% significance level, we can reject the hypothesis that these rates are equal for any given year using a basic equality of means test. Overall, the participation rates are low and the largest gap, 4.5% versus 1.67%, is just before the introduction of automatic enrollment.

To further assess how employees differ depending on whether the hiring agencies eventually adopt automatic enrollment, we report in Table 4 the sample means for the different employee characteristics. Specifically, we look at age at hire, sex, and salary. Furthermore, we compute sample averages for new hires through the whole sample, and separately for the years 2005–2009 and 2010–2016. These sample averages are computed for all new hires in Column 1, new hires by agencies who eventually adopt automatic enrollment in Column 2, new hires by agencies who never adopted automatic enrollment in Column 3. A simple equality of means test strongly rejects the hypothesis that the means for agencies adopting or not automatic enrollment are equal. Economically, some of these differences are small. For example, the differences in age at hire are at most 1 year. The biggest differences can be seen for sex and salary. For pre and post automatic enrollment, new hires by agencies who eventually adopt automatic enrollment are about 10% more likely to be male and the salary is about $6,000 higher.

These results suggest that there are differences in the employees of agencies who adopt automatic enrollment compared to those by agencies who do not. They tend to be slightly more likely to be male and have a higher salary. Before the introduction of automatic enrollment, they were also more likely to participate in the SRP. This suggests that in the more formal regression analysis below for the decision to participate in the SRP, we want to control for these factors: age at hire, sex, salary, whether the agency eventually adopts auto-enrollment, and whether the employee was automatically enrolled. While the participation rates and worker characteristics are statistically significantly different between the two groups of agencies, the magnitudes are relatively small and are unlikely to affect the large post-reform differences in the proportion of new hires who contribute to the SRP in the first year of retirement.

As for differences in the agencies that adopt the automatic enrollment versus those who do not, the administrative data indicates that those who adopt tend to have more employees. The average number of new hires from 2005 to 2016 for agencies that adopt is 124 (standard deviation 331) compared to 91 (standard deviation 238) for agencies that do not adopt automatic enrollment. The online appendix contains the list of agencies separated into those who adopt and those who do not. Notable differences are (i) state agencies tend to adopt automatic-enrollment, (ii) a majority of school districts did not adopt but the South Dakota university system did. We do no discern any geographical pattern.

**Table 3.** Participation rate in SRP in the year of hire: agency eventually adopts auto with enrollment

| Fiscal year of hire | Number of hires who were not auto-enrolled and employer never adopted (1) | Number of hires who were not auto-enrolled and employer eventually adopted (2) | Percent of hires not auto-enrolled and employer never adopted who are in the SRP (3) | Percent of hires not auto-enrolled and employer eventually adopted who are in the SRP (4) |
|---|---|---|---|---|
| 2005 | 1642 | 1508 | 0.85 | 1.86** |
| 2006 | 1671 | 1812 | 1.43 | 2.99*** |
| 2007 | 2036 | 1734 | 1.47 | 2.60** |
| 2008 | 2188 | 1832 | 1.65 | 3.55*** |
| 2009 | 2281 | 1667 | 1.67 | 4.50*** |

This table reports the participation rate in the SRP in the first year of employment for different year of hire cohorts before the introduction of auto-enrollment. The results are separated between employers who eventually do auto-enrollment (number of hires in Column 1, participation rate in SRP in column 3) and employers who never do auto-enrollment (number of hires in Column 2, participation rate in SRP in column 4). The participation rate is computed as the number of individuals hired in a given fiscal year, with positive earnings in the designated year, and who made positive contributions divided by the number of individuals who were hired in this fiscal year and who had positive annual earnings in their first year. The symbols *, ** and *** means that the difference between the value in column 3 is statistically different than the corresponding value in Column 4 at the 10%, 5%, and 1% significance level, respectively.

**Table 4.** Sample means of employee characteristics: agency eventually adopts auto-enrollment

| | All employees (1) | Only employees from employers who eventually joined auto-enrollment (2) | Only employees from employers who never joined auto-enrollment (3) |
|---|---|---|---|
| Age at hire | | | |
| Full sample | 36.80 | 36.42 | 37.12*** |
| 2005–2009 | 37.88 | 37.30 | 38.37*** |
| 2010–2016 | 36.17 | 35.92 | 36.39*** |
| Male | | | |
| Full sample | 38.47% | 44.14% | 33.58%*** |
| Before 2010 | 39.04% | 45.20% | 33.72%*** |
| 2010 and after | 38.14% | 43.54% | 33.49%*** |
| Salary | | | |
| Full sample | $28,972 | $32,291 | $26,112*** |
| Before 2010 | $26,489 | $29,478 | $23,904*** |
| 2010 and after | $30,399 | $33,913 | $27,377*** |

This table reports the sample average of the different regressors employed in the regression analysis. Column 1 reports values computed for the complete sample. Columns 2 and 3 respectively split the sample into new hires by employers who eventually do auto-enrollment or never do auto-enrollment. The symbols *, ** and *** means that the difference between the value in Column 3 is statistically different than the corresponding value in column 2 at the 10%, 5%, and 1% significance level, respectively.

## 4. Regression analysis

The richness of the administrative data from South Dakota allows us to examine several conclusions reported in earlier studies in more detail. In the following analysis, we estimate participation rates using probit models in a difference-in-difference approach. Specifically, we start by estimating the probability of new hires making contributions to the SRP in their first year of employment whether they were automatically enrolled in the SRP or whether the new employee was not automatically enrolled. A unique aspect of this analysis is that in the automatic enrollment years, some government agencies adopted automatic enrollment and others did not. Thus, we are able to examine participation decisions for individuals hired by agencies that ultimately adopted automatic enrollment before and after this policy was established – this is the type of comparison in previous studies. However, we are also able to compare participation decisions for the same year when some agencies adopted automatic enrollment and others did not, thus controlling for year effects which is not done in other studies.

As with other studies that use administrative data, we have limited information about the personal characteristics of new hires. The data provided by the SDRS include the age of employees when first

employed (measured in years), whether the employee is a female or male, the annual salary (measured in thousands of dollars), the specific state agencies that employed the individual, whether the employee was auto-enrolled in the SRP, and when the employer adopted auto-enrollment if it ever did. Using these data, we estimate participation decisions in various contexts.

The probit models have the following difference-in-difference specification that enables us to compare differences across three policy states: agencies that never adopted automatic enrollment, agencies that ultimately adopt automatic enrollment but have yet to do so, and agencies that have adopted automatic enrollment so that all new hires are automatically enrolled in the SRP. We include a set of dichotomous variables for the different years in our sample and we interact these year dummies with two dichotomous variables to capture the effect of the different automatic enrollment policies. The first variable is equal to one if the agency hiring an employee adopts the automatic enrollment policy in subsequent years but when the employee was hired the agency had not yet adopted automatic enrollment, equal to zero otherwise ($\boldsymbol{I}_1$). The second variable is equal to one if the agency has adopted automatic enrollment and thus, the new employee was automatically enrolled into the SRP, equal to zero if not ($\boldsymbol{I}_2$). We can then measure the impact of the treatment (an agency adopting the automatic enrollment policy in some future year and an employee being automatically enrolled since the agency had adopted automatic enrollment) over the sample period. Specifically, we estimate differences in the participation rates in the SRP across agencies who have not yet adopted automatic enrollment compared to agencies that never adopt automatic enrollment based on whether the agency ultimately adopts this policy. In addition, the methodology illustrates differences in participation rates for individuals hired by agencies that adopt automatic enrollment before and after the policy was implemented.

### 4.1 Participation in SRP in first year of employment

Using the complete sample of all 50,333 employees hired over the years 2005–2016 who are recorded as having a non-zero salary, we estimate the probability that an employee participates in the SRP in the year of hire. The results are reported in Table 5. Columns 1 and 2 report results for a model that include the following explanatory variables: age at hire, a dichotomous variable equal to one if the employee is a male and zero if not, and annual salary measured in thousands of dollars in first year of employment. As mentioned above, we also include year dummies (leaving out a dummy for fiscal year 2005) and interactions between the year dummies and the dichotomous variables for whether or not the employer ever adopted the automatic enrollment policy ($\boldsymbol{I}_1$) and whether or not the employee was automatically enrolled ($\boldsymbol{I}_2$).

More specifically, we interact $I_1$ with the year dummies 2006–2009 and a single dummy variable equal to one for the years 2010–2016, while we interact $I_2$ with the year dummies 2010–2016. Since no employees could be automatically enrolled before 2010, we do not interact $I_2$ with year dummies before 2010. Because there is a small number of employees in later years (2010–2016) that are hired by agencies that will eventually adopt automatic enrollment but are not automatically enrolled when hired, we only interact $I_1$ with a single year dummy covering all the years 2010–2016 instead of allowing the impact of $I_1$ to vary across all these years. Columns 3 and 4 of Table 5 present results for a model where we further include interactions of the regressors (age at hire, male, salary) with the dichotomous variables $I_1$ and $I_2$.

Starting with the model without interactions, Column 1 of Table 5 reports the marginal effects evaluated at the mean of the sample and Column 2 reports the standard errors of the partial effects[8]. We can see that the marginal effects for age at hire and male do not have a statistically significant impact and their impacts are small; being a male increases the probability of participating by 0.63 percentage point while being 10 years older increases the probability of participation by about 0.1 percentage

[8]The standard errors are computed with the Delta method. For an explanation of the Delta method, see Lemma 2.5 in Hayashi (2000).

**Table 5.** Probit model for individual participation in the SRP in year of hire

| | No interaction terms | | Interaction terms | |
|---|---|---|---|---|
| | Partial effects (1) | PE std. errors (2) | Partial effects (3) | PE std. errors (4) |
| Age at hire | 0.01 | 0.02 | 0.13*** | 0.03 |
| Age at hire*$I_1$ | | | 0.16*** | 0.05 |
| Age at hire* $I_2$ | | | −0.34*** | 0.04 |
| Male | 0.63 | 0.50 | 2.47*** | 0.77 |
| Male*$I_1$ | | | −2.89** | 1.46 |
| Male* $I_2$ | | | −4.20*** | 1.08 |
| Salary | 0.20*** | 0.01 | 0.40*** | 0.02 |
| Salary*$I_1$ | | | 0.01 | 0.02 |
| Salary* $I_2$ | | | −0.54*** | 0.02 |
| Year dummy 2006 | 0.15 | 2.59 | 0.27 | 2.88 |
| Year dummy 2007 | 0.13 | 2.44 | 0.22 | 2.77 |
| Year dummy 2008 | 0.31 | 2.32 | 0.32 | 2.60 |
| Year dummy 2009 | 0.27 | 2.29 | 0.27 | 2.62 |
| Year dummy 2010 | 2.47 | 2.20 | 1.26 | 2.48 |
| Year dummy 2011 | 1.12 | 2.15 | 0.78 | 2.44 |
| Year dummy 2012 | 2.77 | 1.97 | 1.65 | 2.31 |
| Year dummy 2013 | 1.94 | 1.95 | 1.23 | 2.28 |
| Year dummy 2014 | 2.40 | 1.89 | 1.44 | 2.23 |
| Year dummy 2015 | 3.93** | 1.81 | 2.23 | 2.17 |
| Year dummy 2016 | 4.81*** | 1.77 | 2.74 | 2.13 |
| Year dummy 2006*$I_1$ | 1.20 | 2.58 | 0.01 | 3.16 |
| Year dummy 2007*$I_1$ | 0.97 | 2.49 | −0.00 | 3.22 |
| Year dummy 2008*$I_1$ | 1.38 | 2.23 | 0.05 | 2.94 |
| Year dummy 2009*$I_1$ | 2.15 | 2.17 | 0.22 | 2.91 |
| Year dummy 2010–2016*$I_1$ | 8.86*** | 1.71 | 2.13 | 2.45 |
| Year dummy 2010*$I_2$ | 82.53*** | 2.13 | 95.07*** | 2.74 |
| Year dummy 2011*$I_2$ | 89.61*** | 2.18 | 97.36*** | 2.79 |
| Year dummy 2012*$I_2$ | 65.44*** | 1.59 | 87.14*** | 2.42 |
| Year dummy 2013*$I_2$ | 84.80*** | 1.77 | 95.61*** | 2.49 |
| Year dummy 2014*$I_2$ | 81.30*** | 1.67 | 94.42*** | 2.42 |
| Year dummy 2015*$I_2$ | 79.97*** | 1.61 | 93.99*** | 2.37 |
| Year dummy 2016*$I_2$ | 79.13*** | 1.58 | 93.70*** | 2.36 |

The variable $I_1$ is a dichotomous variable equal to one if the employer ever adopted the automatic enrollment policy and the employee has not been automatically enrolled, equal to zero otherwise. The variable $I_2$ is a dichotomous variable equal to one if the employee was automatically enrolled into the SRP, equal to zero otherwise. Statistical significance: 10% (*), 5% (**), and 1% (***). The number of observations is 50,333. The fraction of individuals hired between 2005 and 2006 who participate in the SRP is 28.27%. The standard errors of the partial effects are calculated with the Delta method[9]. The p-value for the likelihood ratio test of the null hypothesis that the six interaction parameters other than the year dummies are zero is less than 1%.

point, holding everything else constant. Salary has a statistically significant impact indicating that a $10,000 higher initial salary increase the probability of participation by 2.0 percentage points.

Looking at the year dummies, we see that overall as we move away from the year 2005 the probability of participation in the year of hire increases for employees hired by an agency that never adopted automatic enrollment, with new hires in 2016 being 4.81 percentage points more likely to participate than new hires in 2005. The impact of being hired by an agency that adopts automatic enrollment in subsequent years on hires that are not automatically enrolled is shown by looking at the interaction with the year dummies 2006–2009 (before the introduction of automatic enrollment by the SD government). We see that new hires by these agencies were 0.97–2.15 percentage points more likely to participate in SRP than new hires by agencies that never adopted automatic enrollment. During the years where the agency could have adopted automatic enrollment (2010–2016), the impact of being hired by an agency that will ultimately adopt automatic enrollment increases to 8.86 percentage points and is now statistically significant. The impact of an employee being automatically enrolled

[9]For an explanation of the Delta method, see Lemma 2.5 in Hayashi (2000).

on the probability of participating is shown by the interaction of $I_2$ and the year dummies. The marginal effects show that all else being equal, being automatically enrolled has a very large impact on the probability of participation, increasing it by 65–89 percentage points.

Table 5, Column 3 reports the results for the model where the regressors interact with the $I_1$ (employer ultimately automatically enrollment but the employee was not automatically enrolled) and $I_2$ (employee automatically enrolled) dummies. This allows the impact of the regressors to vary based on the type of agency (whether it is the type to adopt automatic enrollment) and whether the employee was automatically enrolled once the agency adopted auto-enrollment. For new hires by agencies that never adopt automatic enrollment, the three regressors have a statistically significant impact and their impacts are amplified compared to Column 1 (model with no such interactions). Increasing age at hire by 10 years increases the probability of participation by 1.3 percentage points. Males are 2.47 percentage points more likely to participate than female hires. Increasing the starting salary by $10,000 increases the probability of participation by 4 percentage points. If the new hires are by agencies that will eventually adopt automatic enrollment but have not yet, the three above impacts become respectively of 2.9, −0.4, and 4.1 percentage points (combine marginal effects of each variable with the marginal effect of the variable interacted with $I_1$).

A clear pattern emerges when we next consider new hires that were automatically enrolled. The estimates for the regressors with the interaction $I_2$ are negative, moving in the opposite direction, if not canceling, the impact for new hires that were not auto-enrolled. The impact of being 10 years older is now a decrease of 0.21 percentage points (0.13–0.34 = −0.021) and a decrease for being male −1.73 percentage points (2.47–4.20 = −1.73) in the probability of participation in the SRP, respectively. Increasing the starting salary by $10,000 for automatically enrolled employees reduces the probability of participation by 1.4 percentage points (0.40–0.54 = −0.14). The p-value for a likelihood ratio test of the hypothesis that the six interaction terms of the three regressors are zero is well below 1% so we can reject it at the usual significance levels.

Looking at the year dummies, for agencies that never adopt automatic enrollment, there is still a slight overall increase over time in the probability of participating, peaking in 2016 where new hires are 2.74 percentage points more likely to participate than in 2005 but all these estimates are not statistically significant. The impact of an agency eventually adopting auto-enrollment but not having done so already (year dummy times $I_1$) is very small, less than a one percentage point increase before 2010, and not statistically significant for any year. For the impact of being automatically enrolled over time (interaction of year dummy and $I_2$), we see even stronger increases than in the model without interactions with the probability of participation increasing by 87–97 percentage points.

An alternative way to interpret the estimates from the probit model is to compute the predicted probabilities of participating in the SRP for different scenarios. For example, let us consider the estimates for the model with interaction terms in Table 5 and the following stylized new hire: 37 years old female earning $30,000. If this individual was hired in 2006 from an employer who never adopted automatic enrollment, the predicted probability of participating in the SRP is 1.73%, increasing to 2.89% if hired in 2011 instead. In 2006, if the employer is one who will eventually adopt automatic enrollment once it becomes available, then the probability is 3.17%. Finally, if this individual was hired in 2011 and auto-enrolled then the probability of participating in the SRP is 94.4%.

To further illustrate the impact of the automatic enrollment on participation, in Figure 2, we plot the probability of participation in the SRP in the year of hire for three different groups of new hires in each year. The probabilities are evaluated at the full-sample means reported in Table 6. The solid line is the probability for new hires by agencies who never adopt auto-enrollment. The probability stays below 10% and tracks the corresponding part of Figure 1 ('all employees' from 2005 to 2009 and 'employees without automatic enrollment' from 2010 to 2016). The dotted line is the probability of participation for new hires by an agency that will eventually adopt an automatic enrollment policy but they have not been automatically enrolled. The analysis shows that in years 2005–2009, new hires of these agencies were already a little more likely to participate in SRP than for agencies that never adopted auto-enrollment. After the introduction of the automatic enrollment policy, the

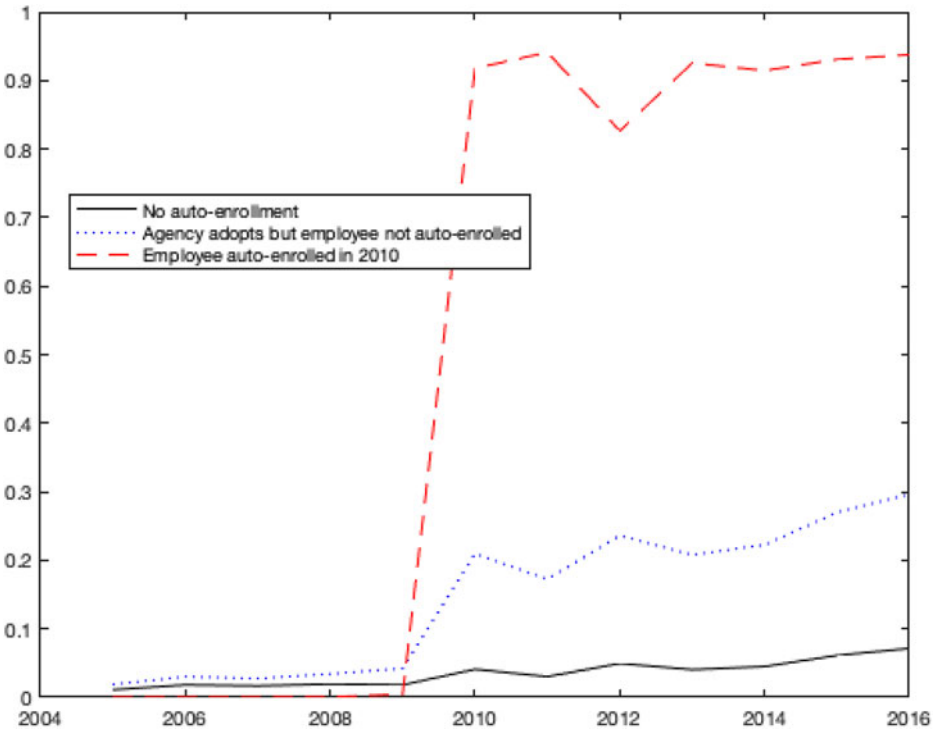


**Figure 2.** Probability of participation in the SRP for different adoption scenarios.

**Table 6.** Probit model for individual participation in the SRP 4 years after year of hire

| | No interaction terms | | Interaction terms | |
|---|---|---|---|---|
| | Partial effects (1) | PE std. errors (2) | Partial effects (3) | PE std. errors (4) |
| Age at hire | 0.07*** | 0.03 | 0.19*** | 0.04 |
| Age at hire*$I_1$ | | | −0.05 | 0.06 |
| Age at hire* $I_2$ | | | −0.43*** | 0.06 |
| Male | 2.38*** | 0.59 | 3.13*** | 0.95 |
| Male*$I_1$ | | | −1.84 | 1.37 |
| Male* $I_2$ | | | −1.14 | 1.47 |
| Salary | 0.17*** | 0.01 | 0.25*** | 0.02 |
| Salary*$I_1$ | | | −0.05* | 0.03 |
| Salary* $I_2$ | | | −0.25*** | 0.03 |
| Year dummy 2010 | −0.74 | 1.61 | −0.42 | 1.58 |
| Year dummy 2011 | −0.33 | 1.62 | −0.20 | 1.58 |
| Year dummy 2012 | −0.58 | 1.60 | −0.31 | 1.56 |
| Year dummy 2013 | −0.51 | 1.60 | −0.31 | 1.56 |
| Year dummy 2014 | 2.76 | 1.79 | 1.58 | 1.75 |
| Year dummy 2015 | 1.21 | 1.85 | 0.71 | 1.81 |
| Year dummy 2016 | 3.29* | 1.75 | 1.88 | 1.72 |
| $I_1$ | 3.07* | 1.60 | 4.26 | 2.94 |
| $I_3$ | 3.09* | 1.70 | 1.80 | 1.66 |
| Year dummy 2014*$I_2$ | 69.48*** | 1.77 | 93.24*** | 3.35 |
| Year dummy 2015*$I_2$ | 76.97*** | 1.85 | 95.06*** | 3.34 |
| Year dummy 2016*$I_2$ | 54.69*** | 1.45 | 88.54*** | 3.20 |

The variable $I_1$ is a dichotomous variable equal to one if the employer ever adopted the automatic enrollment policy but the employee was not automatically enrolled, equal to zero otherwise. The variable $I_1^A$ is a dichotomous variable equal to one if the employer is automatically enrolling new hires but the employee was not automatically enrolled, equal to zero otherwise. The variable $I_2$ is a dichotomous variable equal to one if the employee was automatically enrolled into the SRP, equal to zero otherwise. Statistical significance: 10% (*), 5% (**), and 1% (***). The number of observations is 17,089. The fraction of individuals who participate in the SRP is 18.71%. The standard errors of the partial effects are calculated with the Delta method. The p-value for the likelihood ratio test of the null hypothesis that the six interaction parameters other than the year dummies are zero is less than 1%.

probability of participation increases to between 20% and 30%. Finally, looking at the dashed line we can see that automatically enrolling new hires raises the probability of participation to more than 95%.

### 4.2 Participation in SRP after year of hire

Following the evolution of the participation rates as tenure increases reported in Table 2, we can use a probit model to study the participation decision for a number of years after the year of hire as we did above for the year of hire. We could study any number of years following the year of hire, up to a maximum of ten in our sample. Increasing the number of years after hire shrinks the sample size. Of the 3,150 employees hired in 2005, only 951 were still employed by their agency in 2016. Also, if we look at participation more than 4 years after the year of hire, then all the observations are in the year 2010 or later leaving us no observations before the introduction of the automatic enrollment policy. For these reasons and to have concise results, we report probit results for the participation decision 4 years after the year of hire. In this model, we include three dichotomous variables to capture the impact of automatic enrollment, $I_1$ and $I_2$ are the same indicators as described above and $I_3$ is an additional indicator which is a dichotomous variable equal to one if the employer is automatically enrolling new hires but the employee was not automatically enrolled at the time of hire, equal to zero otherwise. By looking at participation after the year of hire, $I_3$ gives another measure of the impact of the treatment on participation. Marginal effects and associated standard errors are reported in Columns 1 and 2 in Table 6 for a model with no interaction terms. Results for the model with interaction terms are in Columns 3 and 4 in Table 6.

In the model with no interaction terms, all three regressors are statistically significant at the 1% significance level and their impact is moderately important. A new hire being 10 years older, being male instead of a female, having a salary $10,000 higher will respectively increase the probability of participating in SRP by 0.7, 2.4 and 1.7 percentage points, respectively. Now that we are studying participation 4 years after the year of hire, the observations start in the year 2009 so accordingly the year dummies start in the year 2010. Only the 2016-year dummy is statistically significant at the 10% level and they do not increase over time as in the model for participation in the year of hire. The impact of being automatically enrolled ($I_2$) is again quite large, increasing the probability of participation by 54–77 percentage points.

The estimates of the dummy variables $I_1$ and $I_3$ tell an interesting story. The first says that everything else the same, hires that were not auto-enrolled but their agencies will eventually automatically enroll their new employees are 3.07 percentage points more likely to participate in SRP. The second says that if the new hire was not automatically enrolled 4 years earlier but new hires of their agencies are now being automatically enrolled, the probability of participation increases by an additional 3.09 percentage points, both effects being statistically significant at the 10% level. The latter can be seen as a peer effect from the new hires and/or a signaling effect from the employing agency.

For the model with interaction terms (Table 6, Column 3), the interaction terms involving the three regressors greatly affect the impact of these regressors on the probability of participation 4 years out. For example, employees hired by agencies who will eventually adopt automatic enrollment but have not done so, the impact of age is 0.14 percentage point per year before the introduction of auto-enrollment and becomes −0.24 percentage point when the employee is automatically enrolled. Similar effect can be seen for the male and salary regressors. The impact of $10,000 salary increase goes from a 2 percentage points increase in the probability of participation to virtually no impact once the employee is auto-enrolled. For the year dummy, the results are similar to the ones in the model without interaction terms (small, not statistically significant and no pattern over time). On the other hand, the impact of the year dummies interacted with the employee auto-enrollment dummy is stronger for the model with interaction terms than without (now 88–95 percentage points increase). What we discussed as a peer effect becomes lower, 1.8 instead of 3.09 percentage points increase in the probability of participation for employees hired without auto-enrollment during the period where new hires in their agency are being auto-enrolled.

## 5. Conclusions

There is considerable literature indicating the effectiveness of automatic enrollment policies in increasing participation in retirement saving plans. Virtually all of these studies examine private sector firms where a 401(k) plan is the only retirement plan offered by the employer. In contrast, there are no studies of the introduction of automatic enrollment by state and local governments.

In general, all public full-time employees are covered by a mandatory pension, usually a defined benefit plan. As a result, career public employees that are also covered by Social Security are likely to have a life annuity equal to 70–80% of their final salary. While government employers offer their employees the opportunity to contribute to a retirement saving plan, employees may believe that they have less of a need for additional retirement saving. In addition, the plans offered by government employers rarely have matching employer contributions so there is less of an incentive for employees to contribute to these plans.

As a result, participation rates in retirement saving plans in the public sector tend to be much lower than they are for private-sector firms. In our example, only about 5% of newly hired workers in South Dakota enrolled in the 457 plan offered to state and local employees prior to 2010. The objective of this study is to determine whether employees in South Dakota responded to the introduction of an automatic enrollment policy at the same level as private sector employees.

The key finding of this analysis is that participant rates in the retirement saving plan go from less than 5%–90% after the introduction of automatic enrollment. The richness of the data provided by the SDRS allows us to explore several interesting issues. A unique component of the data is that South Dakota allowed each government agency to adopt automatic enrollment in 2010 but the agencies were not required to adopt this policy. As a result, we can compare the change in participation over time for the same agencies before and after the introduction of auto-enroll and also compare employees hired in agencies with and without auto-enrollment in the same year. All of the comparisons indicate that the introduction of automatic enrollment yield increases in participation rates of newly hired employees of over 80%.

Another difference in the automatic enrollment policy in South Dakota is that relatively there is a low default contribution rate of $25 per month or approximately 1% of the average salary of a new employee. This low default contribution may partially explain the large response to the auto-enroll policy. The typical South Dakota employee follows the usual pattern of remaining at the default contribution.

This study shows that public employees who are covered by a defined benefit plan and Social Security tend not to contribute to a traditional opt-in retirement saving plan; however, the adoption of automatic enrollment for new employees results in a dramatic increase in the proportion of employees who participate in the plan. Across the country, state and local governments are reducing the generosity of their retirement plans. As a result, the findings from this study have important policy implications and indicate that state and local governments should consider the adoption of defaults to encourage participation in the supplement saving plans to enhance the retirement security of public employees.

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## References

**Bernartzi S and Thaler R** (2004) Save more tomorrow: using behavioral economics to increase employee saving. *Journal of Political Economy* **S1**, S164–S187.

**Bernartzi S and Thaler R** (2013) Behavioral economics and the retirement savings crisis. *Science* **339**, 1152–1153.

**Beshears, J, Choi JJ, Laibson D and Madrian BC** (2009) The importance of default options for retirement saving outcomes: Evidence from the United States. In Brown J, Liebman J and Wise D (eds), *Social Security Policy in A Changing Environment*. Chicago: University of Chicago Press, pp. 167–195.

**Carroll G, Choi J, Laibson D, Madrian B and Metrick A** (2009) Optimal defaults and active decisions. *Quarterly Journal of Economics* **124**, 1639–1674.

**Choi J, Laibson D and Madrian B** (2004a) Plan design and 401(k) savings outcomes. *National Tax Journal* **LVII**(2), 275–298.

**Choi JJ, Laibson D, Madrian BC and Metrick A** (2004b) For better or for worse: Default effects and 401 (k) savings behavior. In Wise D (ed.), *Perspectives on the Economics of Aging*. Chicago: University of Chicago Press, pp. 81–126.

**Choi JJ, Laibson D, Madrian BC and Metrick A** (2005) Saving for retirement on the path of least resistance. In McCaffrey EJ and Slemrod J (eds), *Behavioral Public Finance: Toward A New Agenda*. New York: Russell Sage Foundation, 2006, pp. 304–351.

**Clark R, Hanson E and Mitchell O** (2016a) Lessons for public pensions from Utah's move to pension choice. *Journal of Pension Economics and Finance* **15**, 285–310.

**Clark R, Hanson E, Morrill M and Pathak A** (2016b) Supplemental plan offerings and retirement saving choices: an analysis of North Carolina school districts, *Journal of Pension Economics and Finance* **15**, 333–355.

**Clark R, Pathak A and Pelletier D** (2018a) Supplemental retirement savings plans in the public sector: participation and contribution decisions by school personnel. *Journal of Labor Research* **39**, 383–404.

**Clark R, Franzel J and Pelletier D** (2018b) Impact of Automatic Enrollment in the 457 Plan for South Dakota Public Employees, Center for State and Local Government Excellence. Available at https://slge.org/publications/impact-of-automatic-enrollment-in-the-457-plan-for-south-dakota-public-employees.

**Goda GS, Levy M, Flaherty C, Sojourner A and Tassoff J** (2020) Who is a passive saver under Opt-In and auto-enrollment? *Journal of Economic Behavior and Organization* **173**, 301–321.

**Hayashi F** (2000) *Econometrics*. Princeton, NJ: Princeton University Press.

**Madrian B and Shea D** (2001) The power of suggestion: inertia in 401(k) participation and savings behavior. *Quarterly Journal of Economics* **66**(4), 1149–1188.

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