

How Do Consumers Respond When Default Options Push the Envelope?

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Abstract: Many employers have increased the default contribution rates in their retirement plans, generating higher employee savings. However, a large fraction of employers are reluctant to default employees into savings rates that are high enough to leave those employees adequately prepared for retirement without supplementary savings. There are two potential concerns regarding a high default: (i) it may drag an employee along to a high contribution rate even when this outcome is not in the employee's best interest, and (ii) perhaps more importantly, it may cause an employee to opt out of plan participation entirely. We conducted a field experiment with 10,000 employees who visited a website that facilitated savings plan enrollment. They were randomly assigned to see a default contribution rate ranging from 6% (a typical default) to 11%. Relative to the 6% default, higher defaults increased average contribution rates 60 days after a website visit by 25-50 basis points of pay off of a base of 6.11% of pay. We find little evidence that the concerns with high defaults are warranted. The evidence suggests that erring on the high side when choosing a default contribution rate is less likely to generate unintended consequences than erring on the low side.

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The use of defaults in defined contribution retirement savings plans, such as 401(k)s, is one of the most widely-celebrated applications of behavioral science in the service of influencing consumer decision making (Thaler and Sunstein, 2008; Benartzi and Thaler, 2013). The default is the option that is implemented on behalf of a consumer when the consumer does not actively elect some other option. In employer-sponsored savings plans with positive default contribution rates, employees who do not take action with regard to their savings plan participation are automatically enrolled in their employer's savings plan, with a default fraction of their pay deducted from each paycheck and placed in a retirement account. Relative to a default contribution rate of zero, positive default contribution rates dramatically increase the fraction of employees participating in retirement savings plans, and they often increase the average plan contribution rate (Madrian and Shea, 2001; Choi et al., 2002, 2004; Beshears et al., 2008).¹ The success of automatic enrollment as a tool for promoting employee savings led to the inclusion of provisions in the U.S. Pension Protection Act of 2006 that encourage employers to automatically enroll their employees in retirement plans. More than half of the 614 U.S. employers recently surveyed by the Plan Sponsor Council of America (2016) use a positive default contribution rate in their retirement plans.

Despite the growing popularity of this use of defaults, there is doubt regarding whether the contribution rate defaults that are chosen in practice will help consumers save enough to avoid a substantial drop in their standard of living in retirement. The Plan Sponsor Council of America (2016) reports that approximately 40% of the employers with automatic enrollment policies that it surveyed offer a default contribution rate of 3% of pay, and approximately 20% offer 6% as the default, while only 2.4% offer a default greater than 6%. Unfortunately, Laibson (2012) calculates that current savings plan configurations will leave the typical U.S. worker with retirement income (including Social Security) that is only 50% of their pre-retirement income, in contrast to the recommendation of many professional financial planners that consumers should aim for retirement income that is 70%-80% of their pre-retirement income or higher.

A natural way of making progress on this problem would be to increase the default contribution rates in savings plans beyond 6% of pay, but two concerns immediately arise. First, the effect of defaults may be so powerful that consumers go along with higher contribution rate

¹ When the default is positive but low, it does not necessarily increase the average contribution rate, as the higher contribution rates of employees who would otherwise not participate are offset by the lower contribution rates of employees who would otherwise save more (Choi et al., 2004; see also Goswami and Urminsky, 2016).

defaults unthinkingly, even when doing so is harmful to them, for example because they end up accruing more high-interest credit card debt (Smith, Goldstein, and Johnson, 2013). Second, and perhaps more importantly, consumers may feel incapable of saving at contribution rates that are higher than the usual 3%-6% of income and may therefore reject higher defaults by opting out entirely from participating in savings plans, perversely leading to a decrease in savings (Blanchett, 2017).² Because of concerns like these and other reasons, very few employers have set default contribution rates higher than 6%, and as a consequence, it has been challenging to generate evidence to determine how consumers respond to higher contribution rate defaults and whether the aforementioned concerns regarding higher defaults are empirically valid.

This paper provides evidence to help fill this gap in our knowledge. In collaboration with Voya Financial (Voya), a provider of services to retirement plans, we conducted a field experiment that ran from November 2016 to July 2017 and included 10,000 participants. Participants were employees of Voya's client companies who visited a website designed to help them enroll in their workplace retirement plans. After entering some basic personal information, these employees arrived at a webpage where they were prompted to select a retirement savings contribution rate. On this webpage, they were randomly assigned to see a suggested contribution rate of 6% (the control group), 7%, 8%, 9%, 10%, or 11%. We label this suggested contribution rate the "display rate" because it was displayed prominently on the webpage in question. The display rate was also the default contribution rate in the sense that it was implemented for individuals who elected to continue to the next webpage in the enrollment sequence without actively changing their contribution rate.

In order to alleviate the two concerns mentioned above regarding the possible unintended negative consequences of high defaults, our experiment featured two safeguards. First, many default contribution rates that have been studied in the past took effect without any action on the part of the employee (Madrian and Shea, 2001; Choi et al., 2002, 2004; Beshears et al., 2008). In contrast, the display rate in our experiment took effect only if the employee elected to continue to the next webpage in the enrollment sequence without adjusting it. Thus, employees in our experiment were more clearly acknowledging their acceptance of the default and may therefore have been less likely to unthinkingly accept a default that was harmful to them. Second, our

² There is precedent for this type of effect in other domains. Brown et al. (2013) conducted a field experiment that changed the default winter thermostat settings in an office building. Reducing the default by 2°C led to higher ultimate thermostat settings than reducing the default by 1°C.

experiment featured a decision tool called myOrangeMoney® (“Orange Money”). Based on an employee’s age, salary, existing savings balance, expected retirement date, and target retirement income replacement rate (the fraction of pre-retirement income that the employee expressed a desire to have as retirement income)—all of which the employee entered earlier in the online experience—Voya calculated the implications of a given contribution rate for the employee’s ability to achieve the specified target retirement income. The results of the calculation were displayed graphically as a dollar bill that was partially colored orange. The fraction of the bill that was orange represented the fraction of the employee’s target retirement income that the default contribution rate (or a different rate entered by a participant who elected to reject the default) would make possible, under some reasonable assumptions about future rates of return on investments (6% per year) and the employee’s likely Social Security benefits.³ The fraction of the bill that was orange was initially determined based on the randomly assigned display rate, but it changed dynamically as the employee experimented with different possible contribution rates. Although the Orange Money tool could only approximate an employee’s future retirement income, it provided some protection against the adoption of contribution rates that were much too high or much too low.

We analyze employees’ contribution rates 60 days after their initial visits to the website. We estimate that increasing the display rate beyond 6% led to an increase in average contribution rates of 25-50 basis points of pay off of a base of 6.11% of pay. Furthermore, there was little evidence for either of the concerns regarding high default contribution rates. Each of the display rates greater than 6% led to a statistically significantly higher average contribution rate relative to the 6% display rate, but the average contribution rates for the 7% and 11% display rates were not statistically distinguishable from one another. Thus, employees did not seem to unthinkingly accept high defaults—increasing the display rate beyond a certain point did not lead to incrementally higher average contribution rates. In addition, the likelihood of opting not to participate in the savings plan at all was only approximately one percentage point higher among the groups that saw high display rates compared to the control group that saw a 6% display rate.

When defaults push the envelope by suggesting more extreme options, our findings suggest that they primarily serve as an anchor from which individuals adjust (Tversky and Kahneman, 1974), at least in the case where reasonable decision-making safeguards are in

³ Individuals had the option of telling the Orange Money tool to disregard Social Security benefits in its calculations.

place.⁴ In our experiment, high display rates were not adopted blindly, but they were also not rejected outright. Employees tended to opt out of high display rates with a likelihood that was 7-15 percentage points higher than the likelihood with a 6% display rate, but contribution rate choices still gravitated towards those high display rates. The net impact of these effects was to increase savings rates slightly overall: display rates greater than 6% increased average contribution rates by 25-50 basis points of pay relative to the 6% display rate. If an employee had an annual salary of \$70,000 (approximately the average in our sample) and contributed an additional 25-50 basis points of pay to a savings plan for 40 years, earning a 6% rate of return along the way, the incremental contributions prompted by this higher default would accumulate to an incremental balance of \$28,000-\$57,000.

We conclude that higher default contribution rates merit serious consideration as a tool for improving retirement preparedness. The evidence suggests that erring on the high side when choosing a default contribution rate is less likely to generate unintended consequences than erring on the low side, which can lead to decreases in average contribution rates (Choi et al., 2004). Of course, further testing is warranted. Our field experiment was a cautious first step, and it did not incorporate all of the behavioral mechanisms through which default effects in previous work may have operated, especially inattentiveness to defaults and procrastination in moving away from defaults (Madrian and Shea, 2001; Choi et al., 2002, 2004; Beshears et al., 2008; Carroll et al., 2009). However, our experimental setup did capture many of the other mechanisms behind default effects, including anchoring (Tversky and Kahneman, 1974), loss aversion triggered by moving away from the default (Kahneman and Tversky, 1979; Thaler, 1985; Johnson and Goldstein, 2003), status quo bias (Samuelson and Zeckhauser, 1988), and the leakage of information regarding social norms or the recommendations of the default setter (McKenzie, Liersch, and Finkelstein, 2006; Tannenbaum and Ditto, 2017). Thus, the lessons learned in our setting are likely to be applicable in other consumer decision-making settings.

The paper proceeds as follows. Section I provides information about our sample selection criteria and explains the details of our experiment. In Section II, we describe our data and variable definitions. Section III summarizes the data and reports the main results of the

⁴ Of course, profit-maximizing marketers may choose not to put basic safeguards in place and may instead use default options to take advantage of consumers (Levav et al., 2010).

experiment, as well as the results of heterogeneity analyses and robustness checks. Section IV concludes.

I. Sample Selection Criteria and Methods

1.A. Sample Selection Criteria

Our field experiment was conducted in collaboration with Voya, a leading U.S. retirement services and recordkeeping provider. We worked with the segment of Voya that helps employers manage retirement savings plans, and we focused on Voya’s corporate clients (as opposed to tax-exempt clients) that were small to mid-sized (typically less than 3,000 employees). Among the approximately 17,000 small to mid-sized corporate clients, a significant majority directed eligible employees to a Voya-administered website, known as Voya Enroll, as a primary means of enrolling in their retirement savings plans. Other modes of enrollment, such as making a telephone call to talk through the enrollment process, were available, but our experiment examined the savings decisions of employees who were eligible to participate in their small- to mid-sized employer’s retirement plan and who visited the Voya Enroll website. The standardized presentation format of the website allowed for a high degree of experimental control for investigating the response of consumer savings decisions to defaults in an organic context.

Because we were interested in employees who initiated plan contributions via the Voya Enroll website, our experimental sample excluded employers that automatically enrolled their employees in a retirement savings plan. We further narrowed the sample to employers for which Voya tracked employee contribution rate changes beyond an employee’s initial contribution rate at enrollment.⁵ This sample restriction allowed us to observe the contribution rates that were in effect for employees 60 days after going through the Voya Enroll experience. We use contribution rates at this point in time as our primary outcome measure in order to account for the possibility that employees chose one set of contribution rates using Voya Enroll but then made further adjustments to those contribution rates soon after leaving the website.⁶ Finally, we restrict our attention to individuals who remained with the same employer for at least 60 days

⁵ Some Voya clients tracked employee contribution rate changes without help from Voya.

⁶ The 60-day period included at least two paychecks for almost all employees and included at least four paychecks for most employees. These paychecks gave employees the opportunity to see how a chosen contribution rate affected take-home pay. Learning that a chosen contribution rate led to a decrease in take-home pay of a particular size might cause an employee to reduce the contribution rate.

after visiting Voya Enroll, a requirement that is necessary to make the contribution rate at 60 days a meaningful measure.⁷

We set a target sample size of 10,000 individuals. Starting on November 15, 2016, any employees who met our sample selection criteria and who visited the Voya Enroll website were included in the experiment. The sample size reached our target of 10,000 employees on May 21, 2017, and data collection concluded 60 days later.⁸

I.B. Details of the Experiment

When employees in our experimental sample became eligible for their employers' retirement plans, they typically received enrollment kits from their employers or Voya. These kits contained general plan information, including instructions for visiting the Voya Enroll website to sign up and begin contributing. Online Appendix Figures 1-7 show screenshots of the webpages that employees viewed as they went through the Voya Enroll online savings plan enrollment experience.

When employees visited the Voya Enroll website, they were first required to provide login credentials. On the next screen after login, employees entered basic personal information, including their gender, date of birth, annual salary, number of pay periods per year, and other identifying and employment-related information. On the third screen of the enrollment process, individuals were invited to enter the amount of savings they had already accumulated and were asked to set goals for their retirement age and their retirement income replacement rate (the fraction of their pre-retirement income they would like to receive as retirement income).

The fourth screen of Voya Enroll contained our experimental manipulation, and employees were only randomly assigned to experimental conditions if they reached this screen. This webpage asked employees to select their retirement plan contribution rate. Employees were randomly assigned to see a default contribution rate of 6%, 7%, 8%, 9%, 10%, or 11%, but it was easy for employees to increase or decrease this number by clicking on "+" or "-" buttons

⁷ This sample restriction required us to randomize more than our target number of individuals in the experiment, as at the time of randomization we did not know whether an individual would remain at the same employer for at least 60 days. As explained in Section III.D, if we augment our sample by including the approximately 300 individuals who did not remain at the same employer for at least 60 days, and if we set their contribution rates at 60 days to zero, our results are unaffected.

⁸ This group of 10,000 employees did not include approximately 350 employees who met the sample selection criteria and visited the Voya Enroll website during the relevant timeframe, but for whom the website at some point did not assign a display rate because of technical malfunctions. The sources of these malfunctions are not known but likely had to do with network timeouts or incompatibilities between the website and individuals' web browser settings.

available on the screen. We label the prepopulated default contribution rate the “display rate.” See Figure 1 for a screenshot.

Based on the information gathered earlier in the Voya Enroll process (date of birth, annual salary, amount of savings already accumulated, target retirement age, and target retirement income replacement rate) and assumptions regarding factors such as future investment returns, the fourth webpage also reported the employee’s “Orange Money,” the fraction of the specified target retirement income that the employee was projected to receive (based on Voya’s calculations) if the employee adopted and maintained the contribution rate displayed on the page. Anticipated Social Security benefits were incorporated into the Orange Money calculation by default, but individuals had the option to remove Social Security benefits from the calculation. The Orange Money results were displayed graphically as a dollar bill that was partly colored orange, with the fraction colored orange equal to the projected fraction of the target retirement income that would be achieved. The webpage also displayed the employee’s projected monthly retirement income in dollars and the employee’s target monthly retirement income in dollars, as well as the difference between these two numbers.

When an employee first opened this webpage, the initial Orange Money calculation was based on the randomly assigned display rate. See Online Appendix Figure 8 for the breakdown, for each display rate, of employees into groups for whom the Orange Money calculation first indicated that less than 90%, between 90% and 110%, or more than 110% of the specified target retirement income was projected to be attained. The employee could adjust the contribution rate away from the display rate, and the Orange Money calculation would update dynamically. If the employee elected to continue past this screen in the enrollment process without adjusting the contribution rate, the display rate would be implemented by default.

The fourth screen in Voya Enroll also asked employees to select an asset allocation for their contributions, but we did not introduce an experimental manipulation related to this decision and do not analyze these investment choices. Similarly, subsequent webpages in the Voya Enroll sequence asked individuals to make decisions about issues such as beneficiaries and a schedule of future contribution rate increases, but we do not analyze these decisions either, as we have no reason to expect that our experimental treatments would affect them.

Employees were able to revisit the Voya Enroll website as many times as they wished. If they revisited Voya Enroll using the same browser that they had used on previous visits, and if

they had not deleted browser cookies, they would see the same display rate as before. If they revisited Voya Enroll using a different browser or after having deleted browser cookies, they could potentially see a different display rate. For any given employee, we only consider the first display rate encountered to be that employee’s experimental treatment assignment. After this initial visit to the Voya Enroll website, an individual could make subsequent contribution rate changes by returning to Voya Enroll or by engaging with Voya through other communication channels, but we focus our analysis on the contribution rate in effect 60 days after the initial visit (although we also examine the contribution rate chosen at the initial Voya Enroll visit as a secondary outcome variable).

II. Data and Definitions of Variables

Voya provided us with administrative data on the contribution rates of the 10,000 employees in our experiment, both at the conclusion of their first visit to the Voya Enroll website and 60 days later. We also received data on employees’ randomly assigned display rates and the personal information that they entered into Voya Enroll (e.g., gender, date of birth, current savings, etc.).

One outcome variable of interest is an employee’s *initial contribution rate*, and we set this variable equal to the contribution rate that an employee selected (or passively accepted) during his or her initial visit to the Voya Enroll website. Some individuals selected a contribution amount per paycheck in dollars rather than choosing a percentage contribution rate, and for those individuals we set *initial contribution rate* equal to the equivalent contribution rate using the following formula:

$$\text{contribution rate} = 100 \times \frac{\text{contribution amount per paycheck} \times \text{paychecks per year}}{\text{annual salary}}$$

This calculation is imperfect because it relies on salary and pay frequency information that the individual entered manually into Voya Enroll, so we reduce the impact of data entry errors by replacing the calculated contribution rate with a missing value if the individual’s self-reported salary was below the 1st percentile, if the individual’s self-reported salary was above the 99th percentile, or if the calculated contribution rate exceeded 100%.⁹ If the employee exited Voya

⁹ The process of converting contribution dollar amounts to contribution rates generates 68 missing values for the variable *initial contribution rate*.

Enroll without selecting a contribution rate or contribution amount, we set the variable *initial contribution rate* to zero.

We use the same procedure to construct our primary outcome variable of interest, *60-day contribution rate*, except we base this new variable on the contribution rate or amount in effect for the employee 60 days after his or her initial visit to the Voya Enroll website, regardless of whether or not the contribution rate choice in place at that time was implemented through Voya Enroll.¹⁰ For employees who were not making retirement plan contributions at this point in time, we set *60-day contribution rate* to zero. We use *60-day contribution rate* as our primary outcome variable because it captures any contribution rate changes implemented soon after an employee's initial Voya Enroll visit. The paychecks that arrived during the 60-day period (at least two paychecks for almost all employees and at least four paychecks for most employees) helped employees learn how a chosen contribution rate affected take-home pay, which may have played a role in contribution rate adjustments. In the sample of 10,000 employees we study, there were 1,251 people who adjusted their contribution choices within 60 days of their initial selections.

In order to reduce the risk that outliers might exert undue influence on our study results, we winsorize both *initial contribution rate* and *60-day contribution rate* by setting values below the 1st percentile equal to the 1st percentile and values above the 99th percentile equal to the 99th percentile. We also generate indicator variables for having a contribution rate of zero. The first takes on a value of one if an employee had an *initial contribution rate* of zero, and the second takes on a value of one if the employee had a *60-day contribution rate* of zero. Finally, we create indicator variables for whether an employee remained at his or her randomly-assigned Voya Enroll display rate. The first takes on a value of one if the employee's *initial contribution rate* was equal to the display rate, and the second takes on a value of one if the employee's *60-day contribution rate* was equal to the display rate.

In addition to generating the aforementioned outcome variables, we generate a set of control variables using the information that individuals entered into Voya Enroll regarding their gender, age, and annual salary. The full list of control variables included in all of our regression analyses, unless otherwise noted, is as follows: (1) indicator for male, (2) indicator for missing

¹⁰ The process of converting contribution dollar amounts to contribution rates generates 92 missing values for the variable *60-day contribution rate*.

gender, (3) indicators for age deciles, (4) indicator for missing age, (5) indicators for annual salary deciles, and (6) indicator for missing salary.¹¹

III. Results

III.A. Summary Statistics and Experimental Balance

Table 1 summarizes the characteristics of the employees in the six experimental treatment groups as well as the overall experimental sample. Slightly more than half of the employees in the experiment who provided information about their gender were male. A chi-squared test does not reject the hypothesis that the six treatments had the same proportion of males. The mean age in the sample, after winsorizing the variable by setting observations below the 1st percentile equal to the 1st percentile and setting observations above the 99th percentile equal to the 99th percentile in order to reduce the influence of outliers, was nearly 40 years. The mean annual salary, also after winsorizing the variable by setting observations below the 1st percentile equal to the 1st percentile and setting observations above the 99th percentile equal to the 99th percentile, was a little more than \$70,000. F-tests do not reject the hypothesis that the mean winsorized age was the same across the six treatments or the hypothesis that the mean winsorized annual salary was the same across the six treatments.

The 9% display rate experimental treatment contained 1,769 employees, which is a somewhat larger sample size than the sample sizes in the other conditions. To assess whether this difference is statistically significant, we conducted 10,000 simulations in which we randomly assigned a sequence of 10,000 employees to six conditions. The probability that a given employee was assigned to a given condition was 1/6, independent of the assignments of other employees (exactly as we executed the randomization in our experiment). Across the 10,000 simulations, we found 414 instances of a treatment condition with a sample size greater than 1,760. Thus, the likelihood of observing a treatment condition as large as our 9% display rate condition is less than 5%, although the event is not so extreme as to cause concern. Overall, we conclude that randomization in our experiment was successful.

Before turning to our main results, we assess the impact of the randomly assigned display rates on decisions that we did not hypothesize would be affected. Some employees returned to

¹¹ One might wish to control for an employee's tenure at the employer, but we did not receive data on tenure from Voya.

the Voya Enroll website after their initial visits, but the frequency of return visits was not statistically significantly different across experimental conditions ($p=0.81$). Similarly, some employees specified that they would contribute a dollar amount to the retirement plan every paycheck instead of a percentage of pay, but the fraction of employees who took this route, as of 60 days after the initial Voya Enroll website visit, was not statistically significantly different across experimental conditions ($p=0.45$).

III.B. Main Results

The outcome variable in our main analysis is *60-day contribution rate*, the contribution rate in effect 60 days after the employee's initial visit to the Voya Enroll website. Figure 2 presents histograms summarizing *60-day contribution rate*, with one histogram for each of the six display rates. It is immediately clear from this figure that display rates influenced employee contribution rates, as making a given contribution rate into the display rate increased the number of employees who retained that particular contribution rate 60 days after first visiting Voya Enroll. Other popular contribution rates included 5% and 10% of pay, consistent with past research on the attractiveness of round numbers (Pope and Simonsohn, 2010).

To make the patterns in the histograms easier to digest, we group contribution rates into four bins (zero, between zero and the display rate, the display rate, and above the display rate), and we use stacked bar graphs to show the distributions of employees' savings rates across these four bins, by experimental condition (see Figure 3). These stacked bar graphs reveal that as the display rate increased, employees increasingly opted out of the display rate and into lower contribution rates, especially those between zero and the display rate.

Figure 4 summarizes the *60-day contribution rate* variable at an even higher level. The top-left panel shows the mean of the variable by display rate. Relative to the 6.11% mean contribution rate when the display rate was 6%, the mean contribution rate was approximately 25-50 basis points of pay higher in each of the experimental conditions with a display rate greater than 6%. However, the conditions with a display rate above 6% all exhibited similar mean contribution rates that were not statistically significantly different from one another.

For each display rate, the top-right panel of Figure 4 shows the mean contribution rate among employees who had a non-zero contribution rate. This panel indicates that the patterns observed for the overall mean contribution rate are primarily driven by employees with positive contribution rates. The bottom-left panel of Figure 4 corroborates this account. It shows the

fraction of employees with a zero contribution rate by display rate, and it suggests that increasing the display rate led to an increase in the likelihood of having a zero contribution rate by up to four percentage points.¹² This effect pushes against the overall pattern of higher display rates leading to higher contribution rates, but not enough to wipe out the net increase in contribution rates induced by higher display rates.

Finally, the bottom-right panel of Figure 4 reveals that the fraction of employees whose contribution rate 60 days after visiting Voya Enroll is exactly equal to the display rate declines as the display rate increases. Taken together, the four panels in Figure 4 present the main findings from our experiment. High display rates did not cause most employees to adopt high contribution rates unthinkingly, as increasing the display rate increased the fraction of employees who opted out of the display rate. At the same time, increasing the display rate caused only small increases in the likelihood of selecting a contribution rate of zero. The display rate did, however, seem to act as an anchor in the contribution rate decision even if employees opted out of it—higher display rates led to modest increases in mean contribution rates.

Ordinary least squares regression analyses presented in Table 2 corroborate these main results. In columns 1-4, the outcome variable is *60-day contribution rate*. We use the full sample in columns 1-2 but restrict the sample to employees with non-zero contribution rates in columns 3-4. In columns 5-6, the outcome variable is an indicator for having a contribution rate of zero. In columns 7-8, the outcome variable is an indicator for having a contribution rate equal to the display rate. The explanatory variables are all of the control variables described in Section II plus the randomly-assigned display rate, which enters the model with a linear functional form in the odd-numbered columns and enters the model as a collection of indicator variables for each of the six display rates assigned in our study (6%, 7%, 8%, 9%, 10% and 11%) in the even-numbered columns. The regression estimates of the effects of the display rate are very similar to the estimates obtained by comparing the raw means in Figure 4.¹³

¹² The fraction of individuals with a zero contribution rate in the 11% display rate condition is almost four percentage points higher than the fraction in the 6% display rate condition, a statistically significant difference. However, when we move to a regression framework and control for observable characteristics, the difference becomes smaller in magnitude and is no longer statistically significant, suggesting that the raw difference between the 6% and 11% display rate conditions is mostly the result of a slight imbalance in observable characteristics across the two groups.

¹³ As mentioned previously, an important exception is the effect of the 11% display rate relative to the 6% display rate on the likelihood of having a contribution rate of zero. The raw difference is more than three percentage points and statistically significant, but the regression estimate is approximately one percentage point and not statistically significant.

Although our primary outcome is the *60-day contribution rate* variable, we have conducted the same analyses described above using the *initial contribution rate* variable, and we obtained qualitatively similar results. See Online Appendix Figures 9-11 and Online Appendix Table 1 for these results.

III.C. Heterogeneity Analysis

To explore heterogeneity in the effect of the randomly assigned display rates by employees' demographic characteristics, we repeat the primary regressions reported in columns 1-2 of Table 2 but analyze subsets of the experimental sample. Online Appendix Table 2 splits the sample into males and females. Online Appendix Table 3 splits the sample into employees with below versus above median age. Online Appendix Table 4 splits the sample into employees with below versus above median salary. We do not find evidence for heterogeneity in the effect of display rates along these basic demographic dimensions.

III.D. Robustness Checks

To assess the robustness of our main results, we begin by investigating the impact of the control variables on our regression estimates. We re-run the regressions reported in Table 2 but remove all of the control variables from the specification. As shown in Online Appendix Table 5, the results are similar, although the estimated effect of the 11% display rate relative to the 6% display rate on the likelihood of having a contribution rate of zero becomes larger and statistically significant.

When estimating treatment effects, it is acceptable to use ordinary least squares regressions to model dichotomous outcome variables (Angrist and Pischke, 2009), but we also use logistic regressions to estimate the effect of the display rate on the likelihood of having a *60-day contribution rate* equal to zero and on the likelihood of having a *60-day contribution rate* equal to the display rate. The results, shown in Online Appendix Table 6, are similar to the analogous results presented in Table 2.

It is important to note that the Internal Revenue Service places an annual limit on the number of dollars that an employee can contribute to the types of retirement savings plans studied in our experiment. The limit for individuals under 50 years of age was \$18,000 per year at the time of our study, and the limit for older individuals was \$24,000 per year. To investigate the role these limits may have played in our experiment, we create an indicator variable that takes a value of one if an employee's projected annual contributions (*60-day contribution rate*

multiplied by annual salary) were \$1,000 less than the applicable limit or larger.¹⁴ We perform an ordinary least squares regression of this indicator on the display rate and our standard control variables. We also perform an ordinary least squares regression of *60-day contribution rate* on the display rate and our standard control variables, excluding from the sample any individual whose projected annual contributions were \$1,000 less than the applicable limit or larger. Online Appendix Table 7 reports the results. In line with the main results, an increase in the display rate increases the likelihood of reaching the limit, and an increase in the display rate also increases contribution rates conditional on not reaching the limit.

When conducting our main analyses, we excluded the approximately 300 employees who did not remain with their employer for at least 60 days after their initial visit to the Voya Enroll website. In a chi-squared test, we cannot reject the hypothesis that these employees were equally distributed across the six randomly assigned display rates ($p=0.44$). To investigate the robustness of our results to the decision to drop these individuals, we repeat our analysis from Table 2 but include these individuals in the sample, assigning a *60-day contribution rate* of zero to them. Online Appendix Table 8 shows that our results are essentially unchanged.

When an employee made savings plan contributions by specifying an amount in dollars to be contributed out of each paycheck instead of specifying a percent of pay to be contributed out of each paycheck, we used a simple calculation to transform contribution dollar amounts into contribution rates. However, when an employee had a salary below the 1st percentile or above the 99th percentile, we were concerned that the value was entered incorrectly and therefore did not rely on it to calculate a contribution rate. We set those contribution rates to missing. If we instead take those contribution rates at face value¹⁵ and repeat the analysis from Table 2, Online Appendix Table 9 shows that our results are similar.

As a final robustness check, we repeat the analysis from Table 2 but eliminate from the sample all employees for whom we had to calculate contribution rates based on savings plan contribution decisions that were expressed in dollars to be contributed out of each paycheck. Our results, shown in Online Appendix Table 10, remain essentially unchanged.

IV. Conclusion

¹⁴ The \$1,000 band is in place because integer contribution rates may not allow an employee to hit the limit exactly.

¹⁵ We still treat contribution rates that are calculated to exceed 100% as missing because such contribution rates are impossible.

We conducted a field experiment with 10,000 individuals who visited a website through which they could enroll in an employer-sponsored retirement savings plan. We randomly assigned each individual to see a default contribution rate of 6%, 7%, 8%, 9%, 10%, or 11%. This display rate was the contribution rate that was suggested to individuals and that served as the default if they did not adjust away from it. Increasing the display rate from 6% of pay to a contribution rate in the 7%-11% range increased average contribution rates 60 days after the initial website visit by 25-50 basis points of pay off of a base of 6.11% of pay. We did not find evidence strongly supporting either of the two concerns commonly raised regarding the risks of setting high default contribution rates. Specifically, most employees in our experiment did not seem to be unthinkingly adopting high display rates, as increasing the display rate increased the fraction of individuals who opted out of the display rate to a lower contribution rate. In addition, increasing the display rate increased the fraction of individuals adopting a contribution rate of zero by only one percentage point. High display rates seemed to serve as anchors (Tversky and Kahneman, 1974), as individuals tended to adjust away from them slightly but still ended up with moderately higher contribution rates.

While our study is the first to explore the effect of increasing default contribution rates in employer-sponsored retirement plans beyond standard levels as a means of addressing under-saving for retirement, it has a number of limitations. We only track employees for 60 days after their initial visit to the plan enrollment website. In future work, it would be valuable to follow individuals for longer periods of time to determine whether and when the impact of display rates diminishes. Furthermore, the experimental sample that we study is composed of employees who visited a website to make decisions related to their participation in savings plans, and these employees may be more active in managing their financial lives than the broad population of employees. Perhaps most importantly, the defaults examined in this experiment were different from the retirement plan defaults that have often been examined in previous research. The default contribution rates studied in previous research took effect even if an employee never affirmatively agreed to have a non-zero contribution rate implemented. In our experiment, employees did have to click on a webpage to acknowledge their acceptance of a non-zero contribution rate. We believe this design feature was a necessary safeguard in this initial investigation of the impact of high default contribution rates. Because the concerns that have been raised regarding the impact of high default savings rates were not borne out in our

experiment, a reasonable next step would be to experiment cautiously with high default contribution rates that do not require affirmative agreement from a consumer before they are implemented. Such research may help consumers build more secure financial futures.

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Table 1. Covariate Balance Across Randomly Assigned Display Rates

This table summarizes the characteristics of the employees in our study’s six experimental treatment groups as well as in the overall experimental sample. For the purposes of this table only, we winsorize age and annual salary by setting observations below the 1st percentile equal to the 1st percentile and setting observations above the 99th percentile equal to the 99th percentile in order to reduce the influence of outliers. The last column reports test statistics (chi-squared statistic for percentage male and F-statistics for age and salary) for the null hypothesis that the six treatment groups are equal, with p-values in brackets.

	6% (control)	7%	8%	9%	10%	11%	Overall	Chi-squared statistic or F-statistic [p-value]
Percentage male	53.1	53	52.7	52.7	51.6	53.3	52.7	1.66 [0.89]
Mean age (standard deviation)	39.4 (11.7)	40.0 (11.8)	39.8 (11.6)	39.6 (11.7)	39.1 (11.4)	39.2 (11.3)	39.5 (11.6)	1.60 [0.16]
Mean annual salary (standard deviation)	\$71,593 (\$53,137)	\$75,609 (\$55,546)	\$74,698 (\$54,800)	\$74,342 (\$54,933)	\$75,205 (\$55,266)	\$74,652 (\$54,852)	\$74,348 (\$54,763)	1.02 [0.40]
Observations	1,640	1,643	1,617	1,769	1,636	1,695	10,000	

Table 2. The Effect of Display Rates on Employee Contribution Rates 60 Days After the Initial Voya Enroll Website Visit

This table reports the results of ordinary least squares regressions in which the outcome variable is the employee contribution rate in effect 60 days after the individual's initial visit to the Voya Enroll website (columns 1-4), an indicator for this contribution rate being equal to zero (columns 5-6), or an indicator for this contribution rate being equal to the display rate (columns 7-8). The explanatory variable of interest is the randomly assigned display rate, which takes the values 6%, 7%, 8%, 9%, 10%, or 11% (coded as 6, 7, 8, 9, 10, and 11, respectively). In columns 1, 3, 5, and 7, the regression model imposes a linear functional form on the display rate. In columns 2, 4, 6, and 8, the regression model includes indicator variables for each display rate above 6%. The regressions include the following control variables: indicator for male, indicator for missing gender, indicators for age deciles, indicator for missing age, indicators for annual salary deciles, and indicator for missing salary. In columns 3-4, the sample is limited to individuals with strictly positive contribution rates. Standard errors robust to heteroskedasticity are in parentheses. +, $p < 0.10$; *, $p < 0.05$; **, $p < 0.01$; ***, $p < 0.001$

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	60-day contribution rate		60-day contribution rate (conditional on rate > 0)		Indicator for 60-day contribution rate equal to zero		Indicator for 60-day contribution rate equal to display rate	
Display rate	0.0648** (0.0250)		0.0892*** (0.0264)		0.00180 (0.00123)		-0.0202*** (0.00191)	
7% display rate indicator		0.346* (0.149)		0.426** (0.154)		0.00590 (0.00752)		-0.107*** (0.0125)
8% display rate indicator		0.327* (0.146)		0.401** (0.153)		0.00456 (0.00739)		-0.106*** (0.0125)
9% display rate indicator		0.250+ (0.141)		0.323* (0.148)		0.00446 (0.00713)		-0.152*** (0.0113)
10% display rate indicator		0.321* (0.149)		0.419** (0.156)		0.00875 (0.00731)		-0.0751*** (0.0130)
11% display rate indicator		0.485*** (0.145)		0.645*** (0.153)		0.0109 (0.00712)		-0.150*** (0.0114)
Observations	9,908	9,908	8,756	8,756	9,908	9,908	9,908	9,908
R-squared	0.202	0.202	0.097	0.097	0.565	0.566	0.024	0.040

Figure 1. Voya Enroll Orange Money and Contribution Choice Webpage, Where Random Assignment to Display Rates Occurred (Screen 4 of Voya Enroll Sequence)

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Your estimate is based on your goals and the savings amount selected below.

	You may have \$4,267	You may need \$4,375	You Might Be Short \$108
-----------------------------------------------------------------------------------	--------------------------------	--------------------------------	------------------------------------

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[How do we come up with your number? ?](#) [Change my retirement goals ?](#)

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- 6% +

While **\$188** in PRETAX dollars goes into your account per pay period, only **\$135** comes out of your take-home pay after taxes.¹

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Select an investment option:

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by choosing my own investments

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* To better understand the investment options please carefully review this [additional information document](#) about types of investment risks, as well as a glossary of terms and statistics found on the fund fact sheets. The document also provides instructions about how to obtain any underlying fund prospectus.

Figure 2. Histograms of Employee Contribution Rates 60 Days After the Initial Voya Enroll Website Visit, by Randomly Assigned Display Rate

Contribution rates are rounded to the nearest integer, and contribution rates greater than 15% are grouped in the 15% bin. The bin corresponding to the randomly assigned display rate experienced by participants in each histogram is shaded grey.

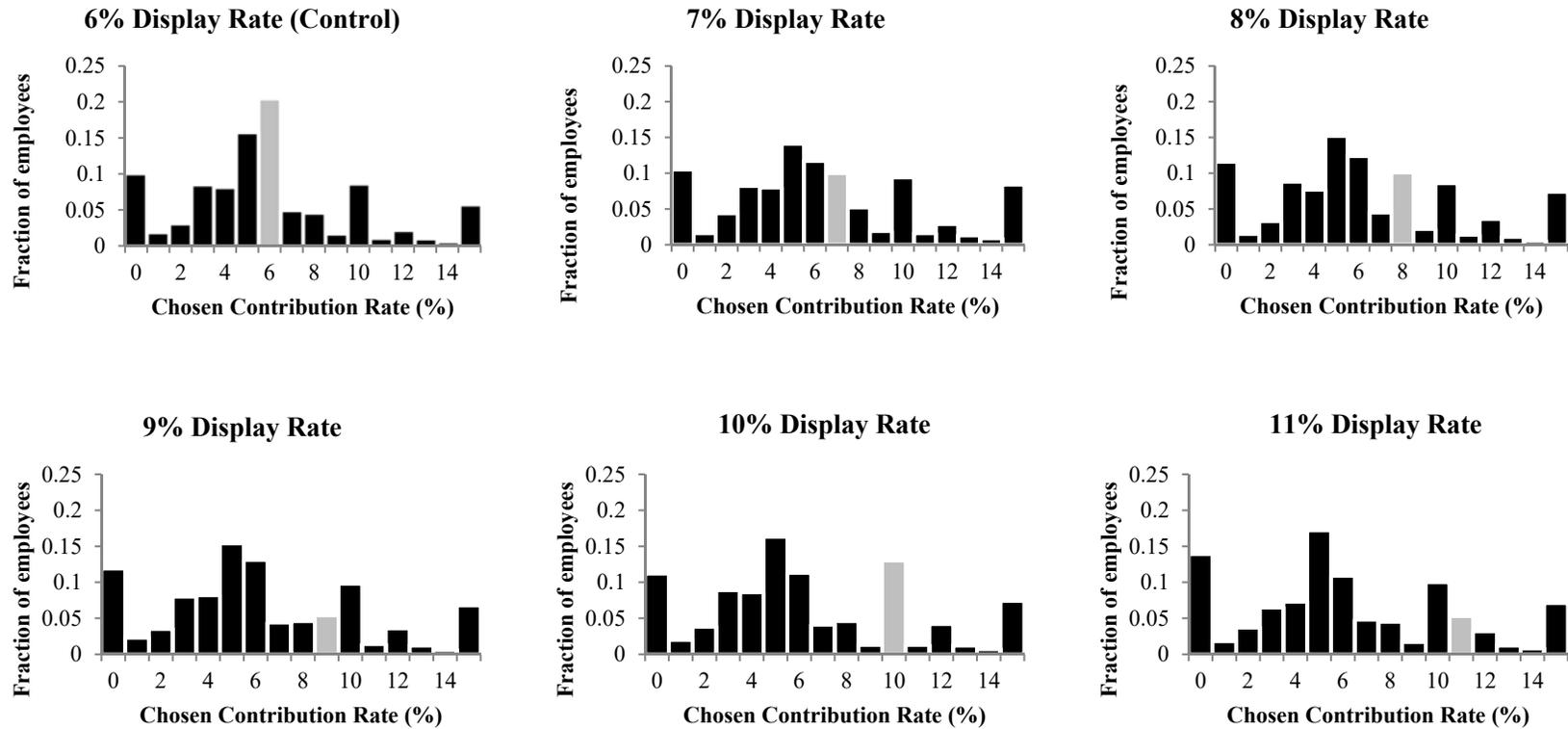


Figure 3. Breakdown of Employee Contribution Rates 60 Days After the Initial Voya Enroll Website Visit, by Randomly Assigned Display Rate

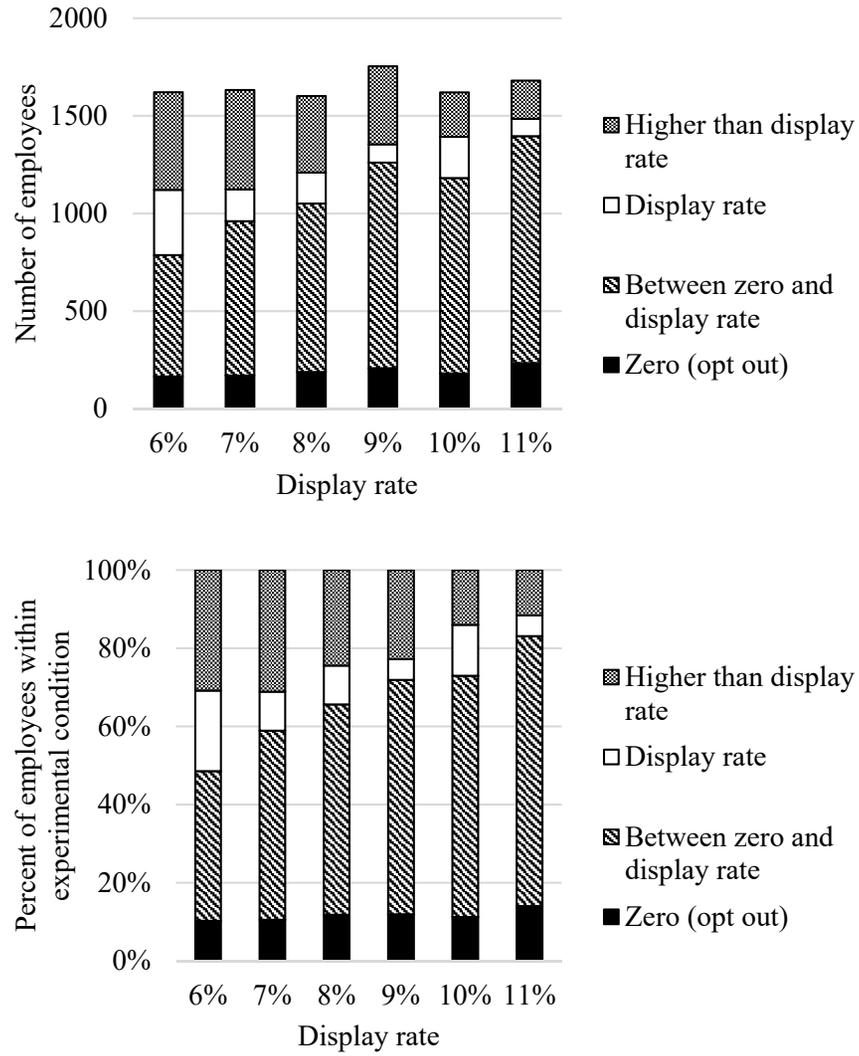
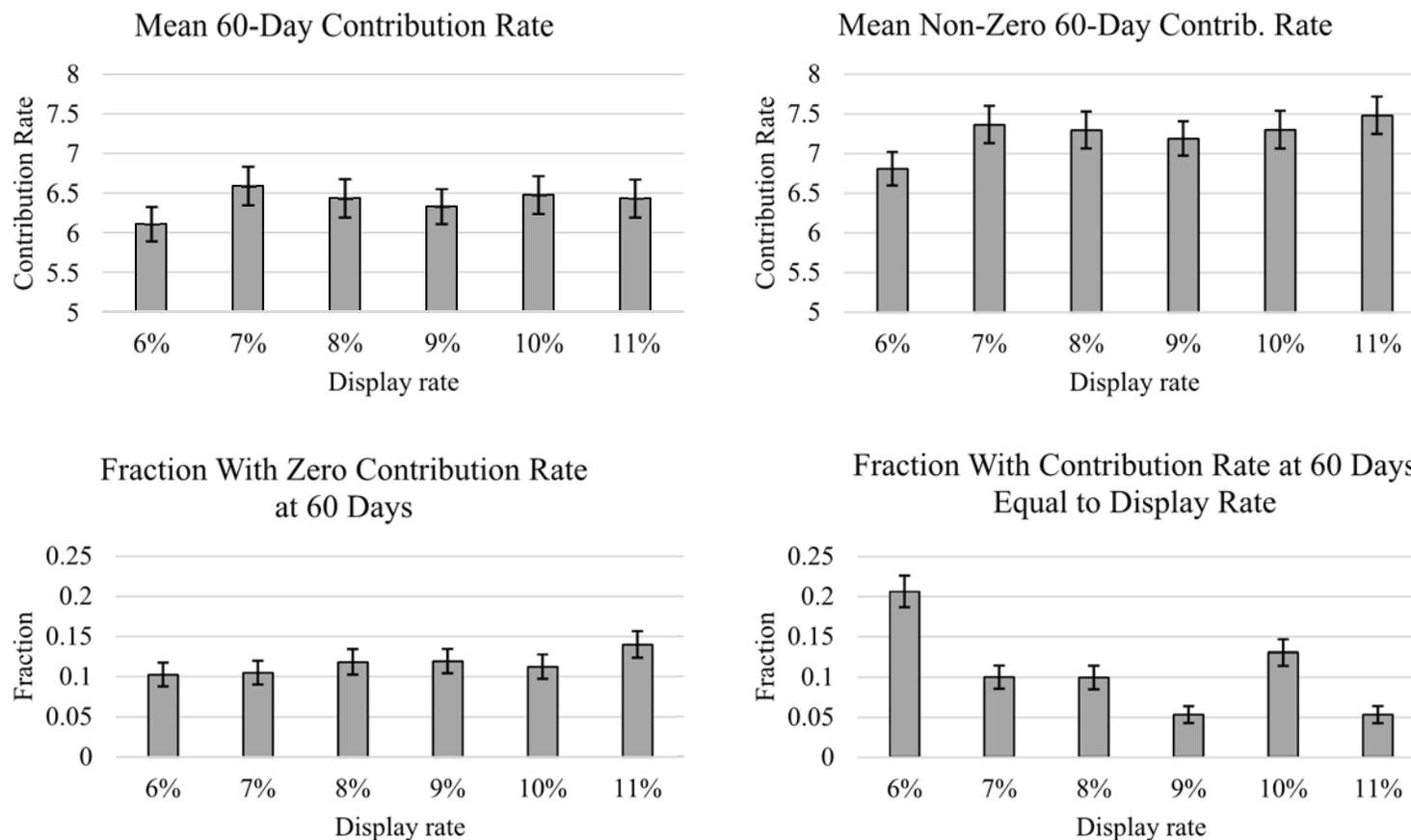


Figure 4. Summary of Employee Contribution Rates 60 Days After the Initial Voya Enroll Website Visit, by Randomly Assigned Display Rate

This figure summarizes the employee contribution rates in effect 60 days after the individual’s initial visit to the Voya Enroll website, by display rate. The top-left panel shows the mean contribution rate. The top-right panel shows the mean contribution rate among individuals with a non-zero contribution rate. The bottom-left panel shows the fraction of individuals with a contribution rate of zero. The bottom-right panel shows the fraction of individuals with contribution rate equal to the display rate. The whiskers indicate 95% confidence intervals.



Online Appendix: How Do Consumers Respond When Default Options Push the Envelope?

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Online Appendix Table 1. The Effect of Display Rates on Initial Employee Contribution Rates

This table reports the results of ordinary least squares regressions in which the outcome variable is the employee contribution rate from the individual's initial visit to the Voya Enroll website (columns 1-4), an indicator for this contribution rate being equal to zero (columns 5-6), or an indicator for this contribution rate being equal to the display rate (columns 7-8). The explanatory variable of interest is the randomly assigned display rate, which takes the values 6%, 7%, 8%, 9%, 10%, or 11% (coded as 6, 7, 8, 9, 10, and 11, respectively). In columns 1, 3, 5, and 7, the regression model imposes a linear functional form on the display rate. In columns 2, 4, 6, and 8, the regression model includes indicator variables for each display rate above 6%. The regressions include the following control variables: indicator for male, indicator for missing gender, indicators for age deciles, indicator for missing age, indicators for annual salary deciles, and indicator for missing salary. In columns 3-4, the sample is limited to individuals with strictly positive contribution rates. Standard errors robust to heteroskedasticity are in parentheses. +, $p < 0.10$; *, $p < 0.05$; **, $p < 0.01$; ***, $p < 0.001$

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Initial contribution rate		Initial contribution rate (conditional on rate > 0)		Indicator for initial contribution rate equal to zero		Indicator for initial contribution rate equal to display rate	
Display rate	0.0894*** (0.0251)		0.115*** (0.0265)		0.00056 (0.00180)		-0.0179*** (0.00186)	
7% display rate indicator		0.232 (0.147)		0.387* (0.153)		0.0104 (0.0108)		-0.0930*** (0.0121)
8% display rate indicator		0.310* (0.145)		0.455** (0.151)		0.00652 (0.0107)		-0.0905*** (0.0122)
9% display rate indicator		0.329* (0.140)		0.384** (0.147)		-0.0039 (0.0103)		-0.139*** (0.0109)
10% display rate indicator		0.262+ (0.145)		0.431** (0.151)		0.0129 (0.0108)		-0.0609*** (0.0127)
11% display rate indicator		0.601*** (0.147)		0.792*** (0.156)		0.00473 (0.0105)		-0.134*** (0.0111)
Observations	9,932	9,932	8,022	8,022	9,932	9,932	9,932	9,932
R-squared	0.197	0.197	0.100	0.100	0.399	0.399	0.024	0.038

Online Appendix Table 2. The Effect of Display Rates on Employee Contribution Rates 60 Days After the Initial Voya Enroll Website Visit, by Gender

This table reports the results of ordinary least squares regressions in which the outcome variable is the employee contribution rate in effect 60 days after the individual's initial visit to the Voya Enroll website. The sample is limited to males for the first pair of columns and females for the second pair of columns. The explanatory variable of interest is the randomly assigned display rate, which takes the values 6%, 7%, 8%, 9%, 10%, or 11% (coded as 6, 7, 8, 9, 10, and 11, respectively). In the first and third columns, the regression model imposes a linear functional form on the display rate. In the second and fourth columns, the regression model includes indicator variables for each display rate above 6%. The regressions include the following control variables: indicators for age deciles, indicator for missing age, indicators for annual salary deciles, and indicator for missing salary. Standard errors robust to heteroskedasticity are in parentheses. +, $p < 0.10$; *, $p < 0.05$; **, $p < 0.01$; ***, $p < 0.001$

	Males		Females	
	60-day contribution rate		60-day contribution rate	
Display rate	0.0998*		0.0434	
	(0.0404)		(0.0407)	
7% display rate indicator		0.277		0.425+
		(0.231)		(0.248)
8% display rate indicator		0.282		0.169
		(0.231)		(0.240)
9% display rate indicator		0.187		0.347
		(0.226)		(0.234)
10% display rate indicator		0.437+		0.113
		(0.245)		(0.234)
11% display rate indicator		0.621**		0.457+
		(0.238)		(0.238)
Observations	4,279	4,279	3,829	3,829
R-squared	0.102	0.103	0.120	0.121

Online Appendix Table 3. The Effect of Display Rates on Employee Contribution Rates 60 Days After the Initial Voya Enroll Website Visit, by Age

This table reports the results of ordinary least squares regressions in which the outcome variable is the employee contribution rate in effect 60 days after the individual's initial visit to the Voya Enroll website. The sample is limited to individuals with below-median age for the first pair of columns and individuals with above-median age for the second pair of columns. The explanatory variable of interest is the randomly assigned display rate, which takes the values 6%, 7%, 8%, 9%, 10%, or 11% (coded as 6, 7, 8, 9, 10, and 11, respectively). In the first and third columns, the regression model imposes a linear functional form on the display rate. In the second and fourth columns, the regression model includes indicator variables for each display rate above 6%. The regressions include the following control variables: indicator for male, indicator for missing gender, indicators for age deciles, indicators for annual salary deciles, and indicator for missing salary. Standard errors robust to heteroskedasticity are in parentheses. +, $p < 0.10$; *, $p < 0.05$; **, $p < 0.01$; ***, $p < 0.001$

	Age Below Median		Age Above Median	
	60-day contribution rate		60-day contribution rate	
Display rate	0.0605*		0.0707+	
	(0.0292)		(0.0406)	
7% display rate indicator		0.440*		0.264
		(0.174)		(0.240)
8% display rate indicator		0.338*		0.328
		(0.169)		(0.240)
9% display rate indicator		0.463**		0.0549
		(0.164)		(0.228)
10% display rate indicator		0.236		0.400
		(0.169)		(0.245)
11% display rate indicator		0.519**		0.472*
		(0.165)		(0.238)
Observations	4,913	4,913	4,976	4,976
R-squared	0.250	0.251	0.149	0.150

Online Appendix Table 4. The Effect of Display Rates on Employee Contribution Rates 60 Days After the Initial Voya Enroll Website Visit, by Salary

This table reports the results of ordinary least squares regressions in which the outcome variable is the employee contribution rate in effect 60 days after the individual's initial visit to the Voya Enroll website. The sample is limited to individuals with below-median salary for the first pair of columns and individuals with above-median salary for the second pair of columns. The explanatory variable of interest is the randomly assigned display rate, which takes the values 6%, 7%, 8%, 9%, 10%, or 11% (coded as 6, 7, 8, 9, 10, and 11, respectively). In the first and third columns, the regression model imposes a linear functional form on the display rate. In the second and fourth columns, the regression model includes indicator variables for each display rate above 6%. The regressions include the following control variables: indicator for male, indicator for missing gender, indicators for age deciles, indicator for missing age, and indicators for annual salary deciles. Standard errors robust to heteroskedasticity are in parentheses. +, $p < 0.10$; *, $p < 0.05$; **, $p < 0.01$; ***, $p < 0.001$

	Salary Below Median		Salary Above Median	
	60-day contribution rate		60-day contribution rate	
Display rate	0.0713*		0.0969*	
	(0.0327)		(0.0425)	
7% display rate indicator		0.449*		0.277
		(0.192)		(0.249)
8% display rate indicator		0.481**		0.242
		(0.182)		(0.254)
9% display rate indicator		0.537**		0.0594
		(0.179)		(0.245)
10% display rate indicator		0.359+		0.371
		(0.191)		(0.249)
11% display rate indicator		0.528**		0.663**
		(0.185)		(0.252)
Observations	4,509	4,509	4,540	4,540
R-squared	0.027	0.029	0.038	0.038

Online Appendix Table 5. The Effect of Display Rates on Employee Contribution Rates 60 Days After the Initial Voya Enroll Website Visit, Omitting Control Variables from the Regressions

This table reports the results of ordinary least squares regressions in which the outcome variable is the employee contribution rate in effect 60 days after the individual’s initial visit to the Voya Enroll website (columns 1-4), an indicator for this contribution rate being equal to zero (columns 5-6), or an indicator for this contribution rate being equal to the display rate (columns 7-8). The explanatory variable of interest is the randomly assigned display rate, which takes the values 6%, 7%, 8%, 9%, 10%, or 11% (coded as 6, 7, 8, 9, 10, and 11, respectively). In columns 1, 3, 5, and 7, the regression model imposes a linear functional form on the display rate. In columns 2, 4, 6, and 8, the regression model includes indicator variables for each display rate above 6%. The regressions include no control variables. In columns 3-4, the sample is limited to individuals with strictly positive contribution rates. Standard errors robust to heteroskedasticity are in parentheses. +, $p < 0.10$; *, $p < 0.05$; **, $p < 0.01$; ***, $p < 0.001$

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	60-day contribution rate		60-day contribution rate (conditional on rate > 0)		Indicator for 60-day contribution rate equal to zero		Indicator for 60-day contribution rate equal to display rate	
Display rate	0.0329 (0.0281)		0.0872** (0.0278)		0.00608** (0.00190)		-0.0207*** (0.00192)	
7% display rate indicator		0.481** (0.164)		0.556*** (0.162)		0.00237 (0.0107)		-0.106*** (0.0125)
8% display rate indicator		0.328* (0.163)		0.493** (0.161)		0.0156 (0.0110)		-0.107*** (0.0125)
9% display rate indicator		0.220 (0.157)		0.380* (0.154)		0.0168 (0.0108)		-0.153*** (0.0114)
10% display rate indicator		0.368* (0.165)		0.491** (0.163)		0.00994 (0.0109)		-0.0758*** (0.0131)
11% display rate indicator		0.324* (0.164)		0.673*** (0.162)		0.0375*** (0.0113)		-0.153*** (0.0114)
Observations	9,908	9,908	8,756	8,756	9,908	9,908	9,908	9,908
R-squared	0.000	0.001	0.001	0.002	0.001	0.001	0.013	0.029

Online Appendix Table 6. The Effect of Display Rates on the Likelihood of Having a Contribution Rate of Zero and the Likelihood of Having a Contribution Rate Equal to the Display Rate 60 Days After the Initial Voya Enroll Website Visit, Logistic Regressions

This table reports the results of logistic regressions in which the outcome variable is an indicator for having an employee contribution rate of zero in effect 60 days after the individual's initial visit to the Voya Enroll website (the first pair of columns) or an indicator for this contribution rate being equal to the display rate (the second pair of columns). The explanatory variable of interest is the randomly assigned display rate, which takes the values 6%, 7%, 8%, 9%, 10%, or 11% (coded as 6, 7, 8, 9, 10, and 11, respectively). In the first and third columns, the regression model imposes a linear functional form on the display rate. In the second and fourth columns, the regression model includes indicator variables for each display rate above 6%. The regressions include the following control variables: indicator for male, indicator for missing gender, indicators for age deciles, indicator for missing age, indicators for annual salary deciles, and indicator for missing salary. The table shows marginal effects evaluated for the median individual in the sample. Standard errors are in parentheses. +, $p < 0.10$; *, $p < 0.05$; **, $p < 0.01$; ***, $p < 0.001$

	Indicator for 60-day contribution rate equal to zero		Indicator for 60-day contribution rate equal to display rate	
Display rate	0.00113 (0.000812)		-0.0203*** (0.00318)	
7% display rate indicator		0.00364 (0.00471)		-0.108*** (0.0175)
8% display rate indicator		0.00261 (0.00456)		-0.108*** (0.0172)
9% display rate indicator		0.00285 (0.00431)		-0.154*** (0.0217)
10% display rate indicator		0.00549 (0.00477)		-0.0763*** (0.0156)
11% display rate indicator		0.00672 (0.00467)		-0.153*** (0.0217)
Observations	9,908	9,908	9,889	9,889

Online Appendix Table 7. The Effect of Display Rates on the Likelihood of Reaching the Contribution Limit and on Employee Contribution Rates 60 Days After the Initial Voya Enroll Website Visit, Conditional on Not Reaching the Contribution Limit

The Internal Revenue Service places an annual limit of \$18,000 (or \$24,000 for individual who are at least 50 years of age) on the amount of money that an employee can contribute to the types of retirement savings plans studied in our experiment. Based on the employee contribution rate in effect 60 days after the individual’s initial visit to the Voya Enroll website, we calculate the individual’s projected annual contributions as the contribution rate multiplied by annual salary. We create an indicator variable for reaching the contribution limit that takes a value of one if an individual’s projected annual contributions were \$1,000 less than the applicable limit or larger. This table reports the results of ordinary least squares regressions in which the outcome variable is the indicator variable (the first pair of columns) or the employee contribution rate in effect 60 days after the individual’s initial visit to the Voya Enroll website (the second pair of columns). The explanatory variable of interest is the randomly assigned display rate, which takes the values 6%, 7%, 8%, 9%, 10%, or 11% (coded as 6, 7, 8, 9, 10, and 11, respectively). In the first and third columns, the regression model imposes a linear functional form on the display rate. In the second and fourth columns, the regression model includes indicator variables for each display rate above 6%. The regressions include the following control variables: indicator for male, indicator for missing gender, indicators for age deciles, indicator for missing age, indicators for annual salary deciles, and indicator for missing salary. In the second pair of columns, the sample is limited to individuals who did not reach the contribution limit. Standard errors robust to heteroskedasticity are in parentheses. +, $p < 0.10$; *, $p < 0.05$; **, $p < 0.01$; ***, $p < 0.001$

	Indicator for reaching the contribution limit		60-day contribution rate (conditional on not reaching limit)	
Display rate	0.00247+		0.0656**	
	(0.00129)		(0.0239)	
7% display rate indicator		0.0201**		0.184
		(0.00762)		(0.138)
8% display rate indicator		0.0169*		0.245+
		(0.00748)		(0.140)
9% display rate indicator		0.00676		0.271*
		(0.00712)		(0.137)
10% display rate indicator		0.0141+		0.241+
		(0.00728)		(0.140)
11% display rate indicator		0.0230**		0.419**
		(0.00751)		(0.139)
Observations	8,895	8,895	8,369	8,369
R-squared	0.212	0.213	0.068	0.068

Online Appendix Table 8. The Effect of Display Rates on Employee Contribution Rates 60 Days After the Initial Voya Enroll Website Visit, Including Individuals Who Did Not Remain at the Same Employer for 60 Days

This table reports the results of ordinary least squares regressions in which the outcome variable is the employee contribution rate in effect 60 days after the individual's initial visit to the Voya Enroll website (columns 1-4), an indicator for this contribution rate being equal to zero (columns 5-6), or an indicator for this contribution rate being equal to the display rate (columns 7-8). The explanatory variable of interest is the randomly assigned display rate, which takes the values 6%, 7%, 8%, 9%, 10%, or 11% (coded as 6, 7, 8, 9, 10, and 11, respectively). In columns 1, 3, 5, and 7, the regression model imposes a linear functional form on the display rate. In columns 2, 4, 6, and 8, the regression model includes indicator variables for each display rate above 6%. The regressions include the following control variables: indicator for male, indicator for missing gender, indicators for age deciles, indicator for missing age, indicators for annual salary deciles, and indicator for missing salary. The sample is augmented to include individuals who did not remain at the same employer for 60 days after the initial visit to the Voya Enroll website. Their contribution rates are set to zero. In columns 3-4, the sample is limited to individuals with strictly positive contribution rates. Standard errors robust to heteroskedasticity are in parentheses. +, $p < 0.10$; *, $p < 0.05$; **, $p < 0.01$; ***, $p < 0.001$

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	60-day contribution rate		60-day contribution rate (conditional on rate > 0)		Indicator for 60-day contribution rate equal to zero		Indicator for 60-day contribution rate equal to display rate	
Display rate	0.0708** (0.0253)		0.0890*** (0.0264)		0.000965 (0.00152)		-0.0194*** (0.00185)	
7% display rate indicator		0.413** (0.150)		0.428** (0.154)		-0.00369 (0.00926)		-0.101*** (0.0121)
8% display rate indicator		0.329* (0.148)		0.406** (0.153)		0.00546 (0.00941)		-0.102*** (0.0121)
9% display rate indicator		0.296* (0.143)		0.322* (0.148)		-0.00229 (0.00896)		-0.146*** (0.0110)
10% display rate indicator		0.341* (0.150)		0.419** (0.156)		0.00649 (0.00927)		-0.0720*** (0.0126)
11% display rate indicator		0.544*** (0.147)		0.645*** (0.153)		0.00230 (0.00892)		-0.144*** (0.0110)
Observations	10,245	10,245	8,756	8,756	10,245	10,245	10,245	10,245
R-squared	0.181	0.182	0.097	0.098	0.433	0.433	0.023	0.038

Online Appendix Table 9. The Effect of Display Rates on Employee Contribution Rates 60 Days After the Initial Voya Enroll Website Visit, Including Contribution Rates Calculated from Very Low or Very High Salaries

This table reports the results of ordinary least squares regressions in which the outcome variable is the employee contribution rate in effect 60 days after the individual's initial visit to the Voya Enroll website (columns 1-4), an indicator for this contribution rate being equal to zero (columns 5-6), or an indicator for this contribution rate being equal to the display rate (columns 7-8). The explanatory variable of interest is the randomly assigned display rate, which takes the values 6%, 7%, 8%, 9%, 10%, or 11% (coded as 6, 7, 8, 9, 10, and 11, respectively). In columns 1, 3, 5, and 7, the regression model imposes a linear functional form on the display rate. In columns 2, 4, 6, and 8, the regression model includes indicator variables for each display rate above 6%. The regressions include the following control variables: indicator for male, indicator for missing gender, indicators for age deciles, indicator for missing age, indicators for annual salary deciles, and indicator for missing salary. The sample is augmented to include individuals for whom the contribution rate is calculated using a salary that is below the 1st percentile or above the 99th percentile. In columns 3-4, the sample is limited to individuals with strictly positive contribution rates. Standard errors robust to heteroskedasticity are in parentheses. +, $p < 0.10$; *, $p < 0.05$; **, $p < 0.01$; ***, $p < 0.001$

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	60-day contribution rate		60-day contribution rate (conditional on rate > 0)		Indicator for 60-day contribution rate equal to zero		Indicator for 60-day contribution rate equal to display rate	
Display rate	0.0727+ (0.0397)		0.100* (0.0432)		0.00180 (0.00123)		-0.0202*** (0.00190)	
7% display rate indicator		0.424+ (0.238)		0.511* (0.257)		0.00583 (0.00752)		-0.107*** (0.0125)
8% display rate indicator		0.446+ (0.233)		0.531* (0.253)		0.00438 (0.00738)		-0.106*** (0.0125)
9% display rate indicator		0.138 (0.198)		0.198 (0.213)		0.00445 (0.00712)		-0.152*** (0.0113)
10% display rate indicator		0.377+ (0.225)		0.487* (0.243)		0.00868 (0.00731)		-0.0753*** (0.0130)
11% display rate indicator		0.600** (0.232)		0.785** (0.253)		0.0109 (0.00711)		-0.150*** (0.0114)
Observations	9,918	9,918	8,766	8,766	9,918	9,918	9,918	9,918
R-squared	0.104	0.104	0.047	0.048	0.566	0.566	0.024	0.040

Online Appendix Table 10. The Effect of Display Rates on Employee Contribution Rates 60 Days After the Initial Voya Enroll Website Visit, Excluding Contribution Rates Calculated from Contribution Decisions Expressed in Dollars To Be Contributed

This table reports the results of ordinary least squares regressions in which the outcome variable is the employee contribution rate in effect 60 days after the individual's initial visit to the Voya Enroll website (columns 1-4), an indicator for this contribution rate being equal to zero (columns 5-6), or an indicator for this contribution rate being equal to the display rate (columns 7-8). The explanatory variable of interest is the randomly assigned display rate, which takes the values 6%, 7%, 8%, 9%, 10%, or 11% (coded as 6, 7, 8, 9, 10, and 11, respectively). In columns 1, 3, 5, and 7, the regression model imposes a linear functional form on the display rate. In columns 2, 4, 6, and 8, the regression model includes indicator variables for each display rate above 6%. The regressions include the following control variables: indicator for male, indicator for missing gender, indicators for age deciles, indicator for missing age, indicators for annual salary deciles, and indicator for missing salary. The sample excludes individuals for whom contribution rates are calculated from contribution decisions expressed in dollars to be contributed out of each paycheck. In columns 3-4, the sample is limited to individuals with strictly positive contribution rates. Standard errors robust to heteroskedasticity are in parentheses. +, $p < 0.10$; *, $p < 0.05$; **, $p < 0.01$; ***, $p < 0.001$

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	60-day contribution rate		60-day contribution rate (conditional on rate > 0)		Indicator for 60-day contribution rate equal to zero		Indicator for 60-day contribution rate equal to display rate	
Display rate	0.0675+ (0.0386)		0.0946* (0.0421)		0.00184 (0.00125)		-0.0206*** (0.00194)	
7% display rate indicator		0.493* (0.237)		0.591* (0.257)		0.00655 (0.00766)		-0.110*** (0.0127)
8% display rate indicator		0.386+ (0.222)		0.458+ (0.241)		0.00479 (0.00751)		-0.108*** (0.0127)
9% display rate indicator		0.212 (0.197)		0.281 (0.212)		0.00468 (0.00725)		-0.156*** (0.0115)
10% display rate indicator		0.425+ (0.223)		0.549* (0.241)		0.00983 (0.00747)		-0.0762*** (0.0133)
11% display rate indicator		0.551* (0.223)		0.726** (0.243)		0.0110 (0.00722)		-0.154*** (0.0116)
Observations	9,689	9,689	8,541	8,541	9,689	9,689	9,689	9,689
R-squared	0.104	0.105	0.043	0.044	0.567	0.567	0.026	0.042

Online Appendix Figure 1. Voya Enroll Login Webpage (Screen 1)

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Need Help? / ¿Necesitas Ayuda?

be ready™

Your retirement savings plan enrollment center

Take an important first step toward being ready for tomorrow.

Join the movement!

Start here to enroll today.

Plan Number * 

Verification Number * 

LET'S GO

So what's all this talk about
Orange Money®?



Your employer-sponsored retirement savings plan is a great way to put away your Orange Money®.

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Online Appendix Figure 2. Voya Enroll Personal Information Webpage (Screen 2)

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[Need Help?](#) | [¿Necesitas Ayuda?](#) | [Steps to Save](#) | [About My Plan](#) | [Important Information](#)

ABOUT ME | SET A GOAL | ENROLLMENT CHOICES | REVIEW & CONFIRM

Tell us more about you

Let's get a few details out of the way

Your Plan *Required

ABC EMPLOYER'S SAVINGS PLAN
If this is not your plan, please [enter your plan number again](#) or contact your employer or plan representative.

Please review [Important Information](#) about your retirement program including details on fees and investment options.

Personal Information

First Name* M.I. Last Name* Suffix Gender*

Date of Birth* Social Security Number* Confirm Social Security Number*

Street Address* Apartment / Suite / P.O. Box City*

State* ZIP Code*

Email & Phone

[? Why do we ask for your email and phone number?](#)

Email Address* Confirm Email*

Mobile Phone Number

Employment

Annual Salary*

Number of pay periods per year* Date of Hire*

CONTINUE

Online Appendix Figure 3. Voya Enroll Orange Money Input Webpage (Screen 3)

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Need Help? / ¿Necesitas Ayuda? | Steps to Save | About My Plan | Important Information

ABOUT ME | SET A GOAL | ENROLLMENT CHOICES | REVIEW & CONFIRM

Okay, now it's time to set some goals.

For most savers, it helps to have a goal in mind to know where you stand. It's okay if you aren't sure what your goal is yet. Give us your best guess—you can make changes later.

We'll use **your information** to estimate how ready you may be for retirement.

I want to retire at age **67** and save enough to have **70%** * of my pre-retirement income. I have already saved **\$20,000**.

* In retirement, the average person may need to replace at least 70% of their annual income.

Sarah, based on these goals will you be ready?

LET'S SEE

Online Appendix Figure 4. Voya Enroll Orange Money and Contribution Choice Webpage, Where Random Assignment to Display Rates Occurred (Screen 4)

VOYA FINANCIAL

Need Help? | ¿Necesitas Ayuda? | Steps to Save | About My Plan | Important Information

ABOUT ME | SET A GOAL | **ENROLLMENT CHOICES** | REVIEW & CONFIRM

Here's what your monthly income in retirement could look like.
Your estimate is based on your goals and the savings amount selected below.

You may have \$4,267 | **You may need \$4,375** | **You Might Be Short \$108**

Include Social Security Retirement Income

[How do we come up with your number?](#) | [Change my retirement goals](#)

You can keep these numbers and enroll now, or adjust them below to get closer to your goal.

Select an amount from your paycheck:

Your employer matches up to 6% of your savings.

6%

While \$188 in PRETAX dollars goes into your account per pay period, only \$135 comes out of your take-home pay after taxes.¹

[More Savings Options](#)

Select an investment option:

"Get me there" with a professionally-managed account

"Guide me" with a pre-defined investment

"Get there myself" by choosing my own investments

[See All Investment Options](#)

¹ Assumes a single filer and 25% marginal tax rate based on the annual salary you provided. For illustrative purposes only. Consult with an appropriate tax and/or legal advisor regarding your situation as your individual rate may vary.

GO WITH THESE CHOICES

And don't worry, you'll be able to make changes after you've enrolled.

If your plan offers a match, the match amount reflects the most recent information we have on file from your employer

* To better understand the investment options please carefully review this [additional information document](#) about types of investment risks, as well as a glossary of terms and statistics found on the fund fact sheets. The document also provides instructions about how to obtain any underlying fund prospectus.

Online Appendix Figure 5. Voya Enroll Beneficiary Designation Webpage (Screen 5)



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ABOUT ME

SET A GOAL

ENROLLMENT CHOICES

REVIEW & CONFIRM

Now let's talk about beneficiaries.

A beneficiary can be any person or entity you choose to receive the benefits of your retirement account after you die. If you do not designate any beneficiaries—or the beneficiaries you designate die before you—benefits will be paid as mandated by your plan document or as allowed by your retirement plan. Please consult with your employer or Plan Administrator for additional information.

Please Note: If one or more of your named beneficiaries has a disability or special need, and is now, or may in the future, receiving government benefits, the following [helpful information](#) may assist you in understanding how the receipt of beneficiary payments may affect the ability to receive other benefits. This should not stop you from this enrollment process and information will be available after enrollment.

Would you like to elect your beneficiaries now or later?

ELECT LATER

ELECT NOW

< BACK



Online Appendix Figure 6. Voya Enroll Confirmation Webpage (Screen 6)



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ABOUT ME

SET A GOAL

ENROLLMENT CHOICES

REVIEW & CONFIRM

Before you head out, confirm your enrollment choices.

I will save the following from my pay:

Employee PreTax

Contributing **6%** of salary or **\$188** per pay period. Only **\$135** comes out of your take-home pay. This assumes a single filer and 10% marginal tax rate based on the annual salary you provided. For illustrative purposes only. Consult with an appropriate tax and/or legal advisor regarding your situation as your individual rate may vary.

Roth

Contributing **0%** of salary or **\$0** per pay period.

Would you like to pick up the pace each year?

YES, I would like to set an annual automatic increase starting on

Please note: Any changes to my savings rate each year will be subject to normal plan processing.

Increase my Employee PreTax contribution by...

...until my total rate reaches

Future monthly income estimate

[View myOrangeMoney® estimates](#)

I will invest it in:

100% *****Target Date 2050**

A single fund that's professionally managed and aligns with my retirement age of around 65.

Online Appendix Figure 6 Continued. Voya Enroll Confirmation Webpage (Screen 6)

My beneficiaries are:

Primary Beneficiary

Your Spouse [John Voya](#), born on [09/09/1980](#), will receive [100%](#) of your benefits.

Please Note: If one or more of your named beneficiaries has a disability or special need, and is now, or may in the future, receiving government benefits, the following [helpful information](#) may assist you in understanding how the receipt of beneficiary payments may affect the ability to receive other benefits. This should not stop you from this enrollment process and information will be available after enrollment.

I acknowledge that:

All account information and transactions are subject to terms of my plan.

FOR ANNUITY CONTRACT AND FUNDING AGREEMENT PRODUCTS: I understand that my employer has selected a group annuity contract or group funding agreement to fund a tax-qualified arrangement; that the tax laws provide for deferral of taxation on earnings on account balances; and that, although the annuity contract or funding agreement provides features and benefits that may be of value, it does not provide any additional deferral of taxation beyond that provided by the tax-qualified arrangement itself.

I provide my informed consent to the electronic delivery of [Important Information](#) by Voya via this website. I understand that this consent applies to the documents available on this website during the period of my enrollment. I understand that the most recent versions of these documents are available on the website.

Any person who knowingly presents a false or fraudulent claim for payment of a loss or benefit or knowingly presents false information in an application for insurance may be guilty of a crime and may be subject to fines and confinement in prison.

I understand that by selecting the Enroll Now button, I acknowledge the above statements and affirm that I have reviewed [Important Information](#), including details on fees and investment options, prior to submitting my enrollment choices.

[← BACK](#)

[ENROLL NOW](#)

To better understand your investment choices, please carefully review this [additional information](#) document about types of investment risks, as well as a glossary of terms and statistics found on each investment fund fact sheets. The document also provides instructions about how to obtain any underlying fund prospectus.

*** Generally speaking, Target Date funds target a certain date range for retirement, or the date the investor plans to start withdrawing money. Investors can select the fund that corresponds to their target date. They are designed to rebalance to a more conservative approach as the date nears. An investment in the Target Date Fund is not guaranteed at any time, including on or after the target date.

Online Appendix Figure 7. Voya Enroll Exit Webpage (Screen 7)



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Way to go, Sarah!

You've enrolled in your plan ABC EMPLOYER'S SAVINGS PLAN

Your Enrollment Selections

You've taken the most important step. Now consider taking a few more.

Would you like to consolidate any previous retirement accounts?

This retirement plan can become your focal point for all your retirement savings resources, when you pull all your qualified savings together in one place. We can provide the administrative support to help set it up and inform you of your options. Just include the information needed here, and we'll be in touch shortly.

*Required

YES, I would like someone to contact me about consolidating all of my retirement savings.

Name*	Email Address*	
<input type="text" value="Sarah Voya"/>	<input type="text" value="sarah.voya@email.com"/>	
<input type="text" value="Phone Number"/>	<input type="text" value="Extension"/>	<input type="text" value="Best time to call"/>

Note: You are consenting to receive telephone calls from—or on behalf of—Voya's account consolidation team to the telephone number you provided above, including a wireless number (if applicable).

[CONTACT ME](#)

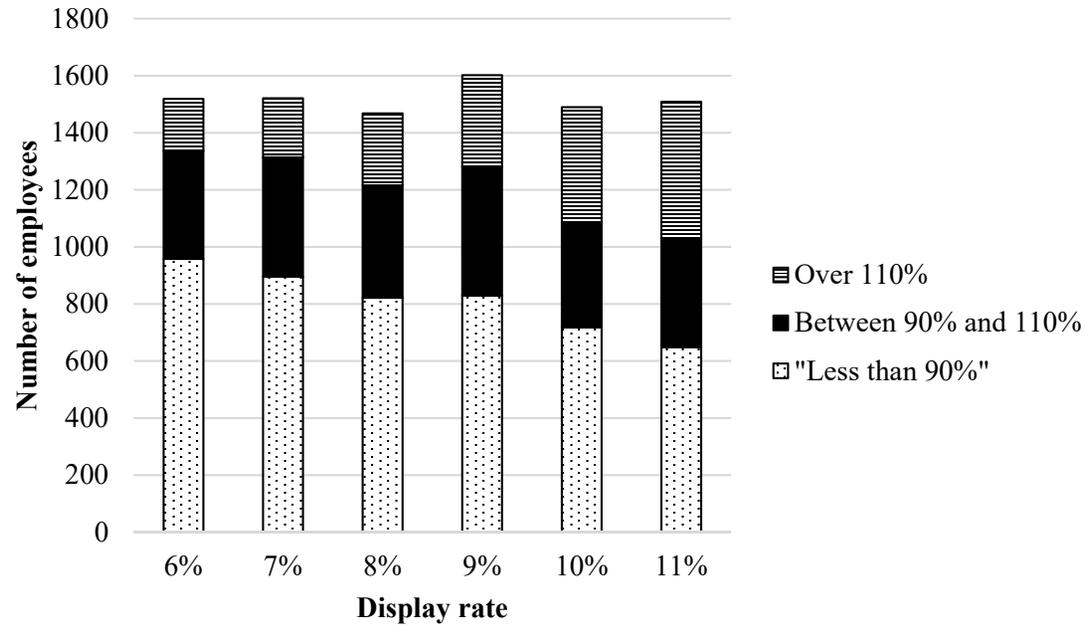
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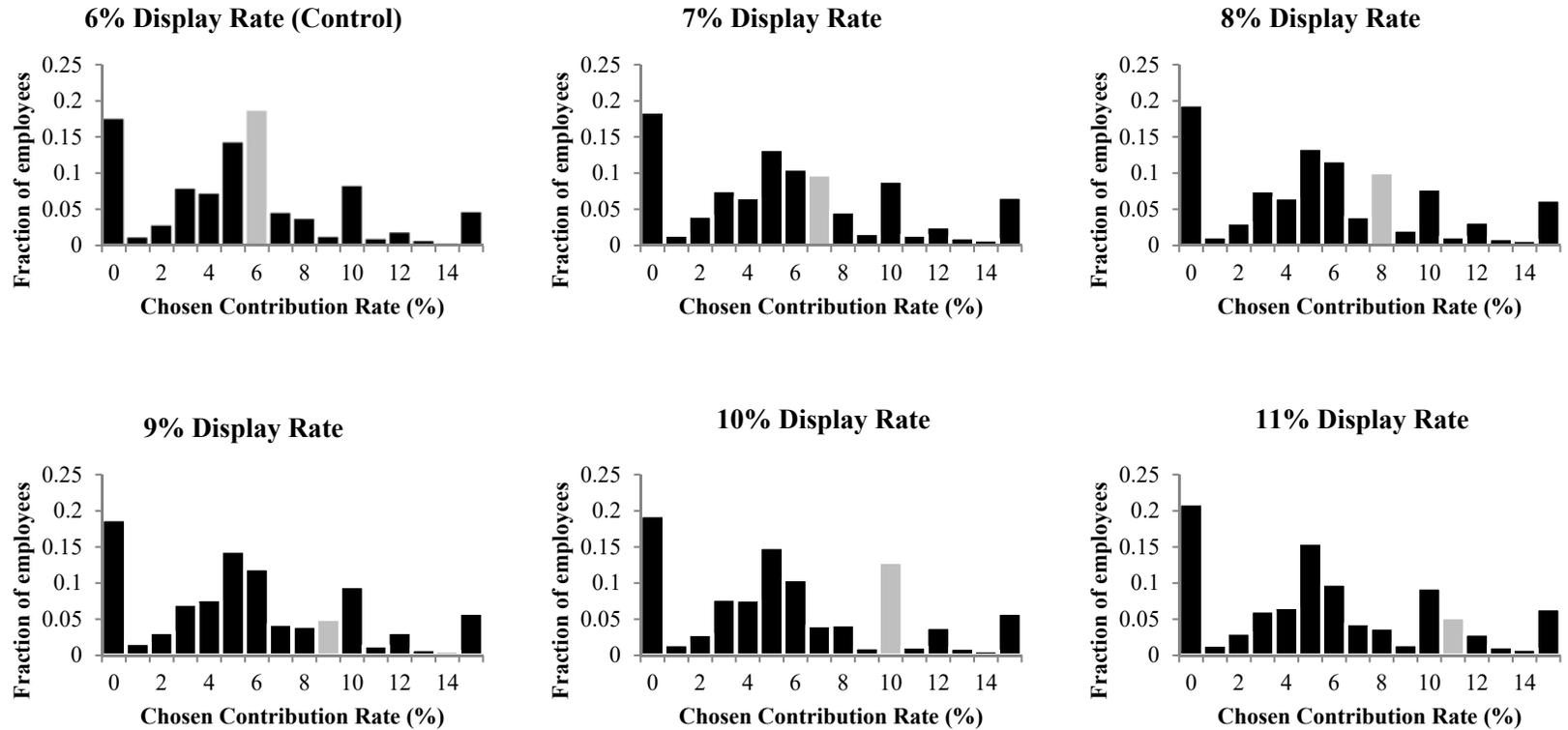
Online Appendix Figure 8. Breakdown of Orange Money (Projected Percentage of Target Retirement Income That Will Be Attained), by Randomly Assigned Display Rate

Based on an employee’s age, salary, existing savings balance, expected retirement date, and target retirement income replacement rate (the fraction of pre-retirement income that the employee expressed a desire to have as retirement income), Voya Financial calculated the implications of the display rate for the employee’s ability to achieve the specified target retirement income. The results of the calculation were displayed graphically as a dollar bill that was partially colored orange. The fraction of the bill that was orange represented the fraction of the employee’s target retirement income that the display rate would make possible, under some reasonable assumptions about future rates of return on investments (6% per year) and the employee’s likely Social Security benefits. This figure gives the breakdown of the number of employees for whom the fraction of the bill that was orange was less than 90%, between 90% and 110%, and over 110%, by randomly assigned display rate.

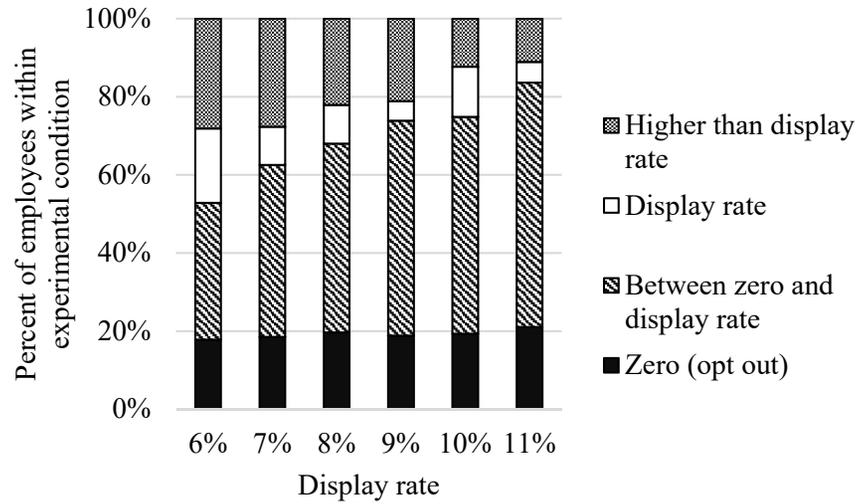
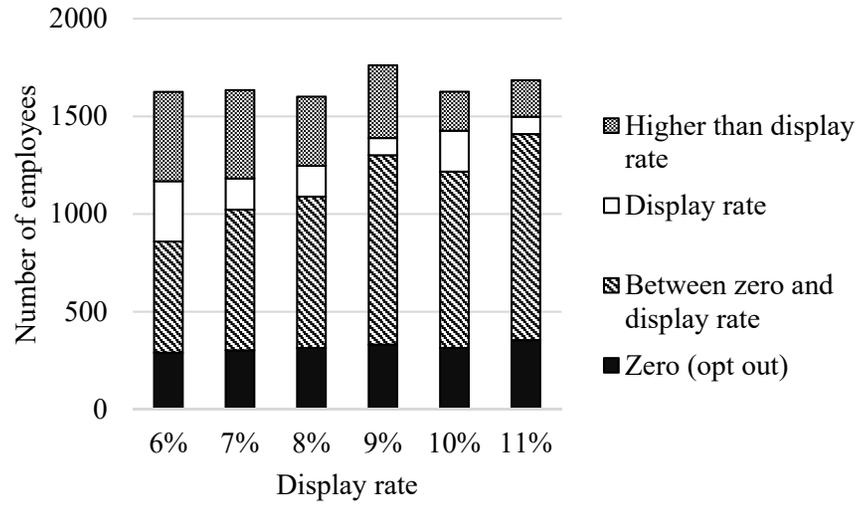


Online Appendix Figure 9. Histograms of Initial Employee Contribution Rates, by Randomly Assigned Display Rate

Contribution rates are rounded to the nearest integer, and contribution rates greater than 15% are grouped in the 15% bin. The bin corresponding to the randomly assigned display rate experienced by participants in each histogram is shaded grey.



Online Appendix Figure 10. Breakdown of Initial Employee Contribution Rates, by Randomly Assigned Display Rate



Online Appendix Figure 11. Summary of Initial Employee Contribution Rates, by Randomly Assigned Display Rate

This figure summarizes the employee contribution rates from the individual's initial visit to the Voya Enroll website, by display rate. The top-left panel shows the mean contribution rate. The top-right panel shows the mean contribution rate among individuals with a non-zero contribution rate. The bottom-left panel shows the fraction of individuals with a contribution rate of zero. The bottom-right panel shows the fraction of individuals with contribution rate equal to the display rate. The whiskers indicate 95% confidence intervals.

