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Mechanisms Behind Retirement Saving Behavior: Evidence From Administrative and Survey Data

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Executive Summary

Defaults, which specify an election when an individual fails to make an active choice, have been shown to have powerful effects on retirement saving behavior, including enrollment, contribution and asset allocation decisions. Despite strong empirical effects, there is little research identifying the mechanisms underlying these large effects. This research fills this void by linking administrative data from an employer-sponsored retirement account to survey data in which we measure individual characteristics thought to be important in explaining default effects. In particular, we measure procrastination tendencies and financial understanding, including the extent to which people understand exponential growth (termed "exponential growth bias"), which is a critical concept for retirement saving decisions given the long-term nature of the investment. Participants in the plan we study were covered by an "opt-in" policy that was later replaced by automatic enrollment in which employees who did not wish to participate had to actively opt out. This change allows us to evaluate the relationship between individual characteristics and saving behavior under different regimes to better understand the "stickiness" of defaults.

We find that whether employees were hired before or after automatic enrollment affects whether procrastination tendencies play a role in sticking to the default. Under auto-enrollment with a default contribution rate of 3 percent, the tendency to procrastinate is associated with higher tendencies to remain at the default contribution rate; however, procrastination tendencies do not predict such behavior in the opt-in regime in which the default contribution rate is effectively 0 percent. By contrast, we find that lower financial understanding and misunderstanding of exponential growth increases the likelihood of remaining at the default rate under the opt-in regime, but these factors do

not predict this behavior in the opt-out regime. Finding that distinct factors predict saving behavior under these two default regimes is a novel finding and has important implications for practice. In particular, it suggests that the ideal tools and assistance designed to aid participants' saving decisions may vary based on the default regime.

We also evaluate the relationship between financial understanding and procrastination tendencies and other types of saving decisions. We find that individuals with lower procrastination tendencies are more likely to contribute an amount that maximizes the employer match and at the maximum annual limit and have higher annual contribution amounts on average.

Background & motivation

Employer-provided defined contribution (DC) plans, such as 401(k)s and 403(b)s, are an increasingly critical source of retirement income for U.S. workers. Unlike traditional pension plans, which have declined markedly in the last several decades, DC plans require participants to make participation, contribution and investment decisions. Research on these plans has shown that aspects of the choice environment, such as the terms of the default which specify the election when an individual fails to make an active choice, have large effects on retirement saving behavior. Whether the plan default is "opt-in" (i.e., a default contribution rate is zero) or "opt-out" (i.e., default contribution rate is positive) has large effects on participation rates (Madrian and Shea 2001). In addition, employees tend to remain at the default contribution rate, which has led the characterization of defaults as "sticky" (Madrian and Shea, 2001; Choi et al., 2004; Beshears et al., 2009; Chetty et al., 2014).

Despite robust evidence on the effect of default provisions on retirement saving behavior, little is known empirically about the mechanisms driving these effects. Procrastination is a leading theoretical candidate as the costs of making an active choice, such as filling out paperwork, are immediate but the benefits of changing one's contribution are in the distant future (O'Donoghue and Rabin, 1999a,b; Beshears et al., 2009; Carroll et al., 2009; Bernheim et al., 2015). Additionally, many Americans have low levels of financial literacy (Lusardi and Mitchell, 2014) and employees with lower financial literacy may avoid making an active choice, feeling that they have insufficient understanding. These individuals may view the default as an endorsement from their employer (Beshears et al., 2009), or the default may serve as a salient anchor (Tversky and Kahneman, 1975; Ariely et al., 2003). Furthermore, misperception of how return from assets compound over time, known as exponential-growth bias (EGB), may lead employees to underestimate the cost of delaying action when the default contribution rate is not the best choice for the individual (Stango and Zinman, 2009; Levy and Tasoff, 2016; Goda et al., 2015).

Past research relates measures of financial literacy and procrastination to retirement wealth accumulation. Goda et al. (2015) evaluate the relationship between retirement savings and measures of procrastination, basic financial literacy, and understanding of exponential growth, finding that each has an important independent relationship with retirement wealth. Stango et al. (2017) also find that measures of procrastination tendencies and understanding of exponential growth are among the set of factors that are highly predictive of overall financial condition, which includes retirement wealth. While these papers consider the role of multiple individual characteristics in jointly predicting saving outcomes, neither of these papers examines the relationship between these individual characteristics and savings decisions with explicit consideration of the underlying choice architecture.

Understanding the mechanisms behind why default provisions have such large effects on behavior is important as it has direct implications for financial well-being and policy. If the stickiness of defaults is due to a perceptual bias, it indicates that in the absence of the bias, people would make different saving choices and, therefore, policies or interventions that mitigate that bias can improve well-being. Therefore, our findings can help us understand ways in which policies and interventions may improve outcomes.

Description of study

We examine the relationship between procrastination tendencies, financial literacy, and understanding of exponential growth with saving behavior in an employer-provided retirement plan. Our approach combines administrative records on employee contribution behavior with survey-based elicitations. Our survey allows us to quantify present bias (PB), which is the tendency to exhibit patience when contemplating tradeoffs between future periods, but impatience when making tradeoffs between the present and the future; this is our central measure of procrastination tendencies. We also quantify understanding of exponential growth by measuring exponential growth bias (EGB) and financial literacy.[1] We evaluate how these measures predict retirement saving behavior taking into account aspects of the choice environment, including the default contribution rate, the employer match schedule, and the annual maximum allowed by law.

The data come from employees at the U.S. Office of Personnel Management (OPM), an agency that provides human resources, leadership and support to most federal agencies. Benefits-covered federal employees participate in an optional defined contribution (DC) plan, the Thrift Savings Plan (TSP), in addition to a mandatory defined benefit (DB) plan. Employees receive a base TSP contribution of 1 percent from the agency and a match on employee contributions up to 5 percent of pay. The agency matches each dollar of an employee's first 3 percent of pay and $0.50 on the dollar for next two percent. Employees can contribute up to the IRS maximum each year, which is $18,000 in 2017.[2]

The Federal government implemented automatic enrollment for all benefits-covered employees hired after August 1, 2010. Under automatic enrollment, employees are enrolled in TSP at a 3 percent contribution rate, while employees hired prior to August 2010 had to opt in to participate in TSP. Therefore, the default contribution rate is zero for those hired prior to August 1, 2010 and 3 percent for those hired later.

Administrative data on TSP contributions

Our administrative data combine TSP contribution elections with HR records. These data were collected as of April 2017, and include 5,472 employees. We fielded an online survey to these employees in March/April 2017, and 1,585 (29%) provided complete response to the survey on the measures of interest. Data from these 1,585 employees are used in the analysis.

We construct the following retirement saving measures:

- Annual TSP contribution amount, including Roth and traditional contributions.[3]
- An indicator of whether the employee's saving choice is equal to the default rate in place during their hire date.
- An indicator of whether the employee contributes 5 percent, the amount that maximizes their match from the Federal government.
- An indicator for whether the employee contributes the annual maximum of $18,000.

[1] The survey questions we use to elicit these measures are discussed in more detail below.

[2] Employees hired before 1984 are covered by a more comprehensive DB plan and receive no base and no match on employee contributions to TSP, although they are allowed to contribute up to the IRS maximum allowable each year. Fewer than 10 percent of the current full-time, non-seasonal employees are in the more comprehensive plan.

[3] While employees can elect TSP contributions as a percent of pay, or as a dollar amount per pay period, we convert to a dollar amount and disregard contributions above the $18,000 annual limit.

Figure 1: Share of sample at different contribution levels before and after automatic enrollment

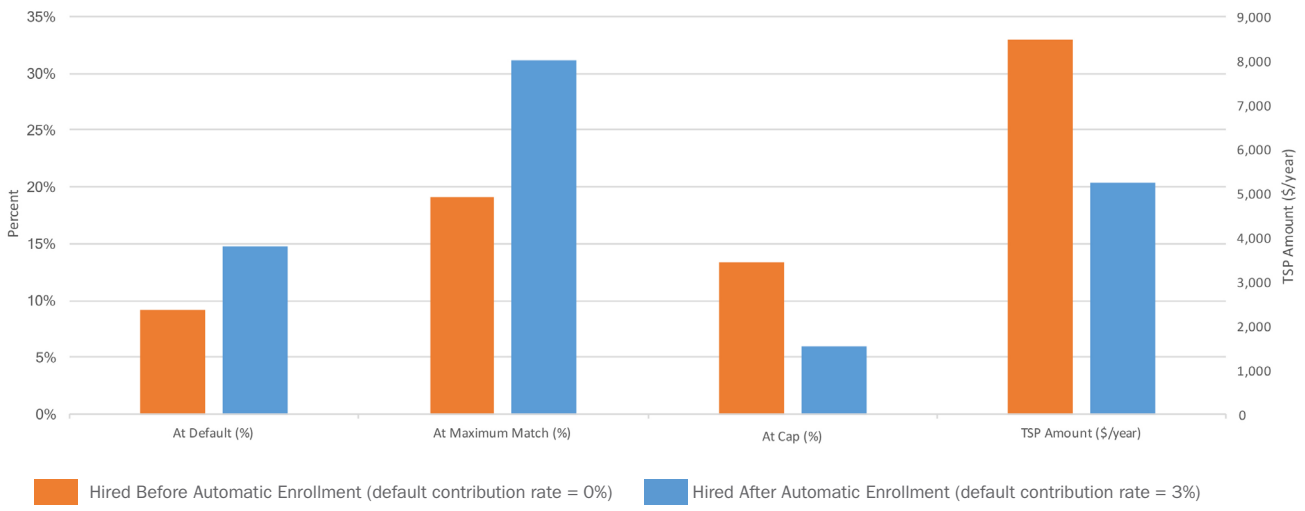


Figure 1 presents our main outcome variables separately for employees who were hired before and after the introduction of automatic enrollment (AE). Approximately 9 percent of pre-AE employees are at their default contribution rate of 0 percent, while 14.7 percent of post-AE employees are at their default contribution rate of 3 percent. The two groups of employees also differ on their contributions at higher levels. Approximately 19 percent of pre-AE employees contribute 5 percent of their salary, while 31.1 percent of post-AE employees contribute 5 percent. We also observe that whereas 13.3 percent of pre-AE employees are contributing the annual maximum, only 6 percent of post-AE employees are at this cap. Finally, employees hired before AE have annual TSP contributions of $8,460 on average, while the younger cohort hired after AE average $5,223. Note that these averages include zeroes for non-participants who make up approximately 7 percent of the sample.

Because automatic enrollment is determined by hire date, and our data come from a single cross-section, people hired before automatic enrollment are also longer tenured and generally older. Therefore, some of the differences we see in Figure 1 may be due to systematic differences in tenure and/or age between the two groups. Figure 2 shows that TSP annual contributions are increasing in age, possibly due to increases in salaries; notwithstanding, the pre-AE cohort consistently contributes more than the post-AE cohort at any given age. Figure 3 shows the stickiness of defaults and how it varies among employees hired before and after automatic enrollment. Perhaps surprisingly, the share of pre-AE employees choosing the 0 percent pre-AE default rate is higher for older employees. Figure 4 shows that for both groups, the share at the 5 percent maximum match decreases by roughly 0.5 percent per year of age.

Figure 2: TSP amount ($/year) by age

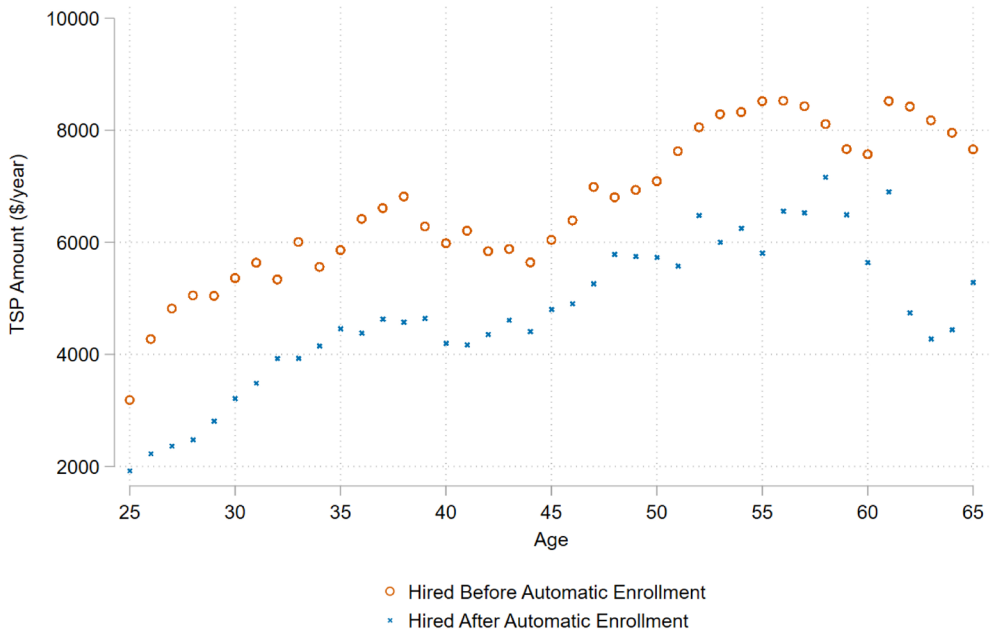


Figure 3: Share at default contribution rate by age

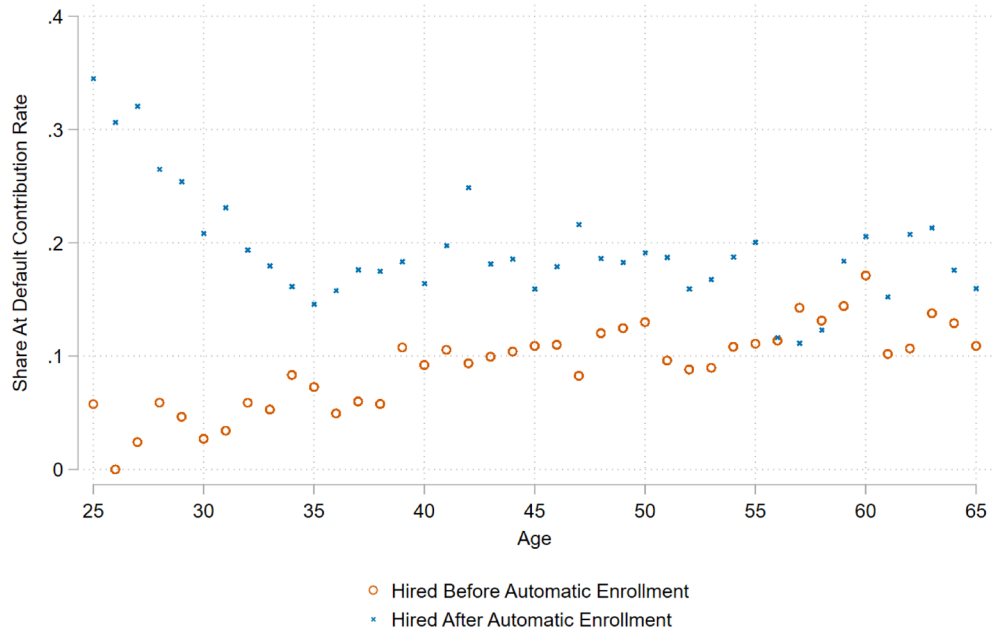
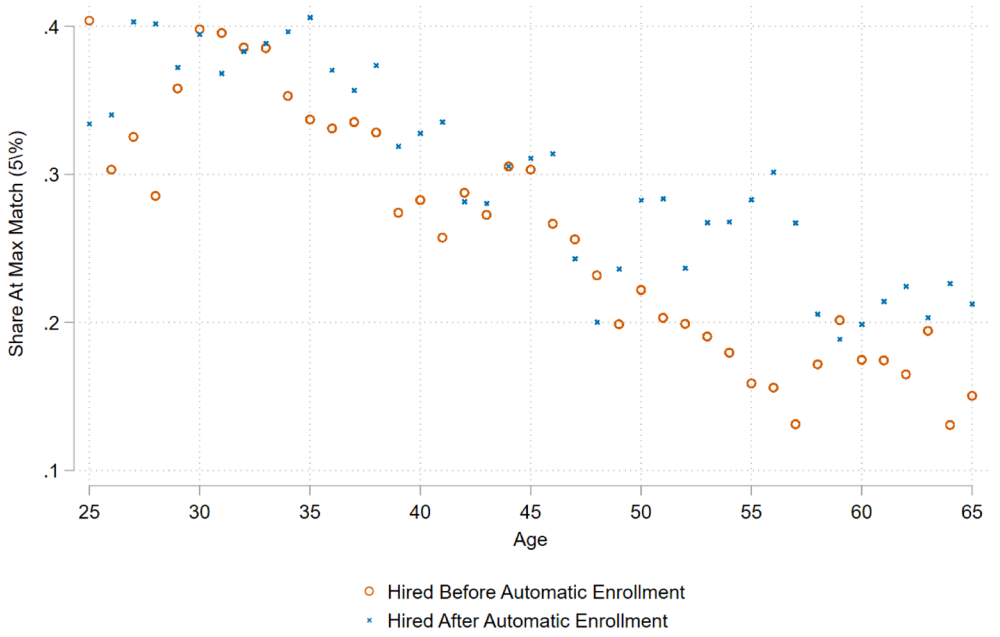


Figure 4: Share at maximum match contribution by age



Data collected via survey

We used an online survey to elicit measures of present-bias (PB), which captures procrastination tendencies, basic financial literacy and exponential growth bias (EGB), or the failure to understand compound interest.

Our measure of present bias uses individuals' reports of how they value receiving various amounts of money over different time horizons. For example, they were asked, "Would you rather receive $100 today or $125.40 in 12 months?" and "Would you rather receive $120.00 in 12 months or $150.50 in 24 months?" Individuals who indicate that they value payments received today relative to payments received in 12 months *more than* they value payments received in 12 months relative to 24 months display characteristics of present bias. On average, our sample is time-consistent (i.e., not present biased). The measure of PB from this sample is similar to that collected from a nationally representative sample (Goda et al. 2015).

We measure basic financial literacy using the 5-item battery of financial literacy questions developed by Lusardi and Mitchell (2011) and widely used since then (Lusardi and Mitchell, 2014). These questions measure understanding of inflation, diversification, compound interest, mortgage payments and bond prices using multiple choice questions. For the subsequent analysis, we standardize our measure of financial literacy to have a mean of zero and a standard deviation of one. OPM employees performed well on these questions relative to the U.S. population; percent correct ranged between 39 and 95 percent for OPM employees, and 21 to 70 percent for a representative sample of the U.S. population (Lusardi and Mitchell 2011). The share of employees who answered all five questions correctly was 30 percent, relative to 10 percent for the U.S. population. Both of these facts suggest that OPM employees are more financially literate than average.

We measure EGB separately given that previous work has found that this bias is particularly important for retirement saving, which has a long investment horizon (Stango and Zinman, 2009; Goda et al., 2015). To assess EGB, we include three hypothetical investment questions asking participants to provide a value for an asset given a specified return and time horizon. An example question is, "An asset has an initial value of $100 and grows at an interest rate of 10% each period. What is the value of the asset after 20 periods?" EGB is assessed based on the accuracy of the respondents' answers. If our measure of EGB equals one, then the individual exhibits no bias. If the measure is less than one, then the individual exhibits negative EGB. The average value of our measure of EGB is 0.48, which implies that our sample underestimates compound growth, on average. Our sample performs similarly to the U.S. population: between 29 and 33 percent of survey participants answered the questions within 10% of the correct value as compared to 23 to 31 percent in a representative U.S. sample (Goda et al., 2015).

We combine our measures of PB, basic financial literacy, and EGB with data from administrative records. The administrative records include the outcomes listed earlier as well as data on pay, basic demographics (gender, birth year, race/ethnicity), education, tenure, position (team leader, manager or supervisor) and work location (DC, MD, PA, VA, other). These variables will be used as controls in our analysis.

Results

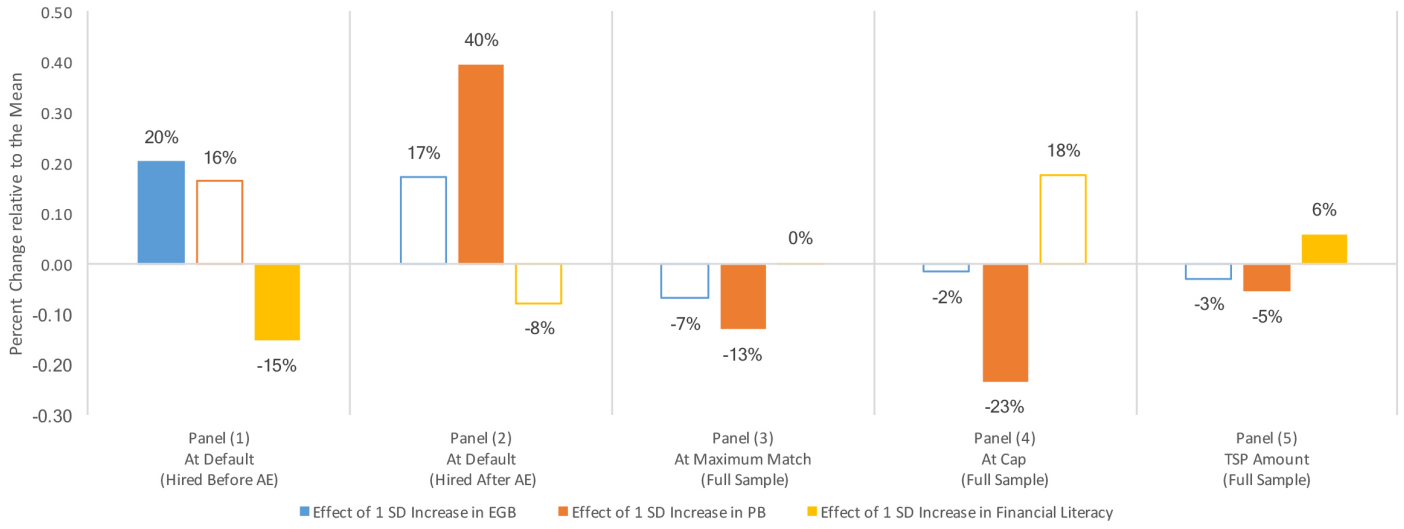
Figure 5 summarizes our results. The figure is divided into 4 panels where each panel displays the relationship between PB, basic financial literacy and EGB and different saving behaviors. If the bars are solid, the relationship shown is statistically meaningful and otherwise the effect is not distinguishable from zero.

Panels 1 and 2 display the role that PB, EGB and basic financial literacy have in explaining whether the employee is contributing the default rate. Due to the possibility that these different default contribution rates may differ in their "stickiness," we conduct our analysis separately on those hired before and after automatic enrollment. The results show no evidence that PB is a predictor of remaining at the default when the default contribution rate is zero (Panel 1), but strong evidence that PB is a predictor of remaining at the default when the default contribution rate is three percent (Panel 2). Panel 2 implies that having a one standard deviation higher tendency for procrastination is associated with a 5.6 percentage point higher likelihood of being at the default, amounting to an increase of 40 percent. While procrastination tendency does not predict remaining at the default contribution rate for employees hired under the opt-in regime, EGB and financial literacy do predict this behavior. Panel 1 shows that a one standard deviation increase in EGB is associated with 2.3 percentage point (or 20 percent) higher likelihood of being at the zero-percent default contribution rate, while a one standard deviation higher financial literacy is associated with a 1.7 percentage point (or 15 percent) lower likelihood.

For Panels 3-5, the results are qualitatively similar for those hired before and after automatic enrollment so we combine them in the analysis. Panels 3 and 4 examine how our factors affect contributing the maximum eligible for an employer match and the likelihood of contributing the $18,000 per year maximum. A one standard deviation increase in the tendency for procrastination is associated with a 3.3 percentage point (or 13 percent) lower likelihood of contributing the maximum eligible for an employer match and a 2.4 percentage point (or 23 percent) lower likelihood of being at the annual maximum.

Finally, we examine the relationship between individual characteristics and annual TSP Amount in Panel 5. We find that a one standard deviation increase in procrastination tendency is associated with 5 percent lower annual TSP contributions. Further, a one standard deviation increase in financial literacy is associated with 6 percent higher annual TSP contributions.

Figure 5: Effects of exponential growth bias, present bias and financial literacy on saving behavior



Note: Solid bars represent statistically meaningful relationships between the given factor and the outcome in each panel relative to the mean level of the outcome variable. Open bars represent effects that are not distinguishable from zero.

Conclusion

Our study directly assesses potential mechanisms for explaining observed saving behavior in the context of a large U.S. employer's retirement savings plan. In particular, we examine the role that procrastination tendency, basic financial literacy, and misunderstanding of exponential-growth have in explaining whether employees remain at the default contribution rate, respond to match incentives, and take full advantage of tax-preferred saving vehicles by contributing the annual maximum.

Our results indicate that the default regime influences the mechanisms underlying employee saving behavior. We find that procrastination tendency plays an important role in explaining who remains at the default contribution rate under an automatic enrollment regime. By contrast, financial literacy and understanding of exponential growth explain movements away from the default when the participant is in a regime that requires actively enrolling to participate. We also find that procrastination tendencies and financial literacy are related to whether an individual is at the maximum annual contribution amount.

This study highlights the importance of examining the mechanisms behind retirement saving choices and the likelihood of sticking with defaults differentially based on the underlying choice architecture. Specifically, we find that procrastination explains whether people remain at a default contribution rate of 3 percent, but that exponential-growth bias and financial literacy may play a larger role in explaining whether employees contribute in the absence of automatic enrollment. Finding distinct mechanisms for explaining participant movement away from the default contribution rate under the two default regimes has important implications for policy and development of participant support. In particular, focusing on financial literacy and understanding of exponential growth is likely to be fruitful for engaging participants in an opt-in context, while efforts targeted at procrastination tendencies are likely to be particularly important in automatic enrollment environments.

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Her research has been published or forthcoming in leading journals, including *Academy of Management Journal, Industrial and Labor Relations Review, Industrial Relations, Journal of Human Resources*, and *Journal of Public Economics*.

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