CENTER for RETIREMENT RESEARCH at BOSTON COLLEGE

AUTOMATIC ENROLLMENT, EMPLOYEE COMPENSATION, AND RETIREMENT SECURITY

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Abstract

This study uses restricted microdata from the *National Compensation Survey* to examine the impact of auto enrollment on employee compensation. By boosting plan participation, automatic enrollment likely increases employer costs when previously unenrolled workers receive matching retirement plan contributions. Our data show significant negative correlation between employer match rates and automatic enrollment provision. We find no evidence that total costs differ between firms with and without automatic enrollment, and no evidence that defined contribution costs crowd out other forms of compensation, suggesting that firms might be lowering their potential and/or default match rates enough to completely offset the higher costs of automatic enrollment without needing to reduce other compensation costs.

Introduction

The dramatic rise of employer-sponsored defined contribution (DC) plans in the United States has been accompanied by increasing concern about the retirement security that DC plans will provide. At the heart of the matter are two undisputed facts: 1) many employees do not sign up for their employer's retirement plan, and 2) contribution rates among participants are relatively low.

To tackle what has been described as inertia with regard to participation, increasingly employers are automatically enrolling new employees while allowing them to opt out. A number of studies have documented the success of automatic enrollment in increasing participation in retirement plans (Beshears et al. 2009; Choi et al. 2002, 2004; Madrian and Shea 2001). Yet, by boosting plan participation automatic enrollment likely increases employer costs (at least in the short term). Before auto enrollment, most employers encouraged workers to participate and contribute to retirement plans by matching some percentage or dollar amount of their contributions (Choi et al. 2002). But as previously unenrolled workers begin receiving matching retirement plan contributions, employers' costs of offering a match will increase—all else equal. In fact, companies often cite the cost of matching contributions as the most important barrier to adopting automatic enrollment (Bruno 2008).

Employers might respond to the higher costs associated with automatic enrollment by cutting wages, reducing health benefits, or trimming the plan's match rates. Some might eliminate the employer match altogether.

This paper examines the impact of auto enrollment on employee compensation using restricted microdata from the *National Compensation Survey*. We find that match rates in plans with automatic enrollment average about 0.38 percentage points or 11 percent lower than those without automatic enrollment, even after we control for other characteristics. In addition, we find no evidence that employers with opt-out 401(k)s have defined contribution costs that are any different from employers with opt-in 401(k)s. We also find no evidence that costs associated with automatic enrollment reduce other employer compensation. So while auto enrollment has been shown to increase the number of workers participating in private pension plans, our findings suggest that it might also reduce the level of pension contributions. These findings improve our understanding of employer behavior and provide insight into how automatic enrollment might impact employees' retirement security.

Background

The pension landscape in the United States has been gradually shifting as employers move away from offering their employees defined benefit (DB) pension plans towards offering them DC plans. Between 1989 and 2012, the proportion of private industry full-time workers participating in DB pension plans declined from 42 to 20 percent, while the share participating in DC plans increased from 40 to 51 percent (Wiatrowski 2011; U.S. Bureau of Labor Statistics 2012). The rise in DC plans has introduced problems not typically experienced with DB pensions, such as voluntary participation. In DB pensions, employees are usually automatically enrolled and typically cannot opt out. Although slowly changing, in most DC plans employees must elect to participate. As a result, participation rates among private wage and salary workers in 2012 who were offered an employer retirement plan were 89 percent in DB pensions but only 70 percent in DC plans (U.S. Bureau of Labor Statistics 2012). Even among full-time workers—whose participation rates are typically higher—participation rates were 91 percent in DB pensions but only 74 percent in DC plans (U.S. Bureau of Labor Statistics 2012).

Those employees who are offered plans yet choose not to participate are most concerning to policymakers.[1] Not only are these workers not taking advantage of tax-deferred opportunities to save for retirement, but many are giving away money by not taking advantage of their employer's matching contributions. Recognizing the capacity for automatic enrollment to increase participation in DC plans and thereby increase retirement savings, the U.S. Treasury Department authorized employer's adoption of auto enrollment in 1998 for new hires and again in 2000 for previously hired employees not already participating in their employer's plan (Choi et al. 2004).

Employers are also concerned about employees who do not enroll in 401(k)s, in part because these employees jeopardize the company's performance on nondiscrimination tests—rules forbidding employers from providing benefits exclusively to highly paid employees. By increasing participation among non-highly compensated employees (NHCEs), automatic enrollment makes it possible for employers to raise or eliminate contribution limits on highly compensated employees (HCEs)—effectively increasing their pension benefits. (See Brady

[1] Karamcheva and Sanzenbacher (2010) use the Survey of Income and Program Participation to explore some of the reasons why workers do not participate in their employers' defined contribution plans. While opt-out mechanisms are unlikely to increase participation among workers whose reasons for not participating are related to eligibility, or monetary constraints, such as "cannot afford to contribute" or "do not want to tie up money," automatic enrollment might be effective when non-participation is due to inertia, for example, "not thinking about it."

(2007) for a brief exposition of the cross-subsidies incentives from nondiscrimination testing.) In fact, one-fifth of plan sponsors said that improving nondiscrimination test results was their primary motivation for offering automatic enrollment, with 43 percent finding a positive impact versus only 1 percent who found the effect to be negative (Deloitte Development LLC 2010).

Automatic Enrollment. Automatic enrollment (also known as "negative election") is a 401(k) plan feature in which elective employee deferrals begin without requiring the employee to submit a request to join the plan. When automatic enrollment is present, employees have a pre-determined percentage of their pay deferred as soon as they become eligible for the plan. If employees do not want to participate, they must actively request to be excluded from the plan.

Several studies and anecdotal accounts suggest that automatic enrollment has succeeded in dramatically increasing 401(k) participation (Beshears et al.2009; Choi et al. 2002, 2004; Madrian and Shea 2001). Madrian and Shea (2001), for example, document a 48 percentage point increase in 401(k) participation among newly hired employees and an 11 percentage point increase in participation overall at one large U.S. company 15 months after the adoption of automatic enrollment. The authors also note that automatic enrollment has been particularly successful at increasing 401(k) participation among employees least likely to participate in retirement savings plans, namely those who are young, lower-paid, black, or Hispanic.

The Pension Protection Act of 2006 (PPA). Despite its success in increasing employee participation and the incentives for employers to adopt it, the percentage of plans with automatic enrollment remained relatively low before the passage of the Pension Protection Act of 2006 (PPA). The primary purpose of the PPA was to strengthen the DB pension system; however, it included a number of provisions to greatly enhance 401(k) plans—particularly with respect to auto enrollment (Patterson, Veal, and Wray 2006). Many of these provisions were motivated by research findings which showed that procrastination and inertia play an important role in workers' savings choices and that financial literacy and planning abilities varied widely among workers. As a result, the PPA included a number of fiduciary and tax incentives that were designed to encourage employers to adopt various automatic provisions, including auto enrollment, in their 401(k) plans (Nessmith, Utkus, and Young 2007). Specifically, the PPA removed disincentives to adopting automatic enrollment by: 1) offering more attractive safe

harbor rules; 2) preempting state payroll-withholding laws; and 3) protecting employers from fiduciary responsibility for their 401(k) plan's investment performance (Patterson, Veal, and Wray 2006).

Existing safe harbor rules, for plans without automatic enrollment feature, allow employers to avoid nondiscrimination tests by providing either: 1) a nonelective contribution of at least 3 percent of compensation for all eligible NHCEs; or 2) a matching contribution of 100 percent on the first 3 percent of pay plus 50 percent of the next 2 percent of pay—for a maximum potential employer matching contribution of 4 percent of compensation (Purcell 2007).

Although automatic enrollment by itself makes it easier for employers to pass nondiscrimination tests, the PPA provides another safe harbor that allows employers with auto enrollment to avoid nondiscrimination tests altogether. To qualify for the PPA safe harbor, participants must contribute at least 3 percent of pay in their first year in the plan, increasing it by 1 percentage point annually up to 6 percent of pay. However, higher contributions up to 10 percent of pay are permitted (Purcell 2007). The PPA safe harbor also requires employers to provide a matching contribution of 100 percent on the first 1 percent of pay plus 50 percent of the next 5 percent of pay—for a maximum potential employer matching contribution of 3.5 percent of compensation (Purcell 2007; Patterson, Veal, and Wray 2006). This lower match rate may also make automatic enrollment more attractive to employers (O'Hare and Amendola 2007).

In addition, the automatic enrollment provision in the PPA preempts state payroll-withholding laws. Before 2006, many employers were hesitant to automatically enroll employees because of state payroll-withholding laws that might subject employers to lawsuits by plan participants (O'Hare and Amendola 2007). The PPA deals with this by clarifying that ERISA preempts state laws prohibiting or restricting auto enrollment as long as employees are given proper advance notice and 90 days to affirmatively opt out of plan participation (O'Hare and Amendola 2007; Patterson, Veal, and Wray 2006).

Finally, the PPA amended ERISA section 404(c) to relieve employers of fiduciary liability for the performance of default investments in their auto enrollment plans—in effect granting the same protections that participant-directed investments receive (Patterson, Veal, and Wray 2006; Purcell 2007).

Automatic Enrollment after the PPA. Various sources point to the increasing popularity of automatic enrollment plans after the PPA. For example, Engelhardt (2011) found that since the PPA, 401(k) participation increased more in states that required employees' written permission before employers could deduct contributions from their wages—suggesting that before the PPA, state wage-payment laws deterred employers from adopting auto enrollment.

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

The majority of plans who automatically enroll employees do this only for new hires. In the PSCA survey, 82 percent of plans reported that auto enrollment was used only for new hires (PSCA 2011). There is some evidence that employers are reluctant to "backsweep" existing nonparticipants because of the desire to minimize employer match contributions and other plan-related costs (Andersen et al. 2001).

The Costs of Automatic Enrollment. Most companies with 401(k)s offer an employer match—a contribution made by the employer to supplement employee contributions (Dworak-Fisher 2007). But holding all other factors constant, the adoption of automatic enrollment will increase employer costs. Increasing the number of 401(k) participants increases employers' compensation through employer matches. A 2001 Vanguard report outlining the benefits and costs of adopting automatic enrollment noted that the largest expense related to auto enrollment "…is the money needed to fund any employer match for new enrollees" (Andersen et al. 2001). The same report noted that aside from the extra costs of an employer match, firms adopting automatic enrollment are likely to incur additional costs associated with maintaining and servicing a large number of small accounts—especially if auto enrollment is extended to all eligible employees (Andersen et al. 2001). A recent survey found that among plans that reported being unlikely to adopt auto enrollment in 2011, 73 percent cited the increased cost of the employer match as a primary barrier (Hess and Xu 2011).

Recognizing that automatic enrollment may be costly for employers, Soto and Butrica (2009) was the first study to analyze employers' profit-maximizing behavior with regard to auto enrollment. The authors identified three ways in which employers could respond to the increase in costs due to automatic enrollment:

1) Reduce the match offered to workers to offset the increase in costs from automatic enrollment.
2) Reduce compensation other than pension benefits to keep total compensation at the same level as before the introduction of the auto enrollment feature.
3) Leave the pension and other compensation arrangements unchanged, which increases the total compensation (wages plus pensions plus other benefits) paid to workers.

In their study, the authors focused on measuring the extent to which firms adjust their match rate to offset the increase in costs due to automatic enrollment. In the past, important incentives for firms to offer a match have been to increase participation and contributions (Choi et al. 2002) and to avoid nondiscrimination tests through 401(k) matching safe harbors. But some research finds that a match has only a modest impact on plan participation beyond the boost from automatic enrollment (Beshears et al. 2009)—particularly for low-income workers (Dworak-Fisher 2008). Additionally, the PPA introduced an automatic enrollment safe harbor with lower minimum required matching contribution rates. Each of these results reduces employers' incentives to keep existing match rates.

In fact, using data from the Form 5500 filings, Soto and Butrica (2009) showed that firms with auto enrollment have lower employer match rates than those without automatic enrollment—suggesting that employers might reduce match rates when they begin automatically enrolling participants. Their conclusions remain tentative and controversial, however, because information on automatic enrollment was available for only a subset of companies (from a different data source) and data limitations forced the authors to construct match rates based on the ratio of total employer contributions to total employee contributions, instead of using actual match rates.[2]

Another way to keep costs down, and one not identified in Soto and Butrica (2009), is for employers to set a low default contribution rate. When instituting automatic enrollment,

[2] Focusing on large 401(k) sponsors, a 2010 EBRI study reported higher effective match rates in 2009 than in 2005 among those that had adopted automatic enrollment (VanDerhei 2010).

employers must choose a default contribution rate for employees who do not actively select a contribution rate or level. A recent Plan Sponsor Council of America survey reported that the most common default deferral is 3 percent of pay (PSCA 2012). Purcell (2007) notes that many plan sponsors have been reluctant to set the default contribution rate higher than 3 percent of pay because that was the rate used in examples of permissible automatic enrollment practices published by the IRS.

Studies have shown that automatically enrolled employees tend to remain with the default options of their plan. Madrian and Shea (2001) showed that, at least in the short term, only a small fraction of automatically enrolled 401(k) participants elect a contribution rate or asset allocation that differs from the company-specified default. Additionally, a Vanguard study found that automatic enrollment leads to lower plan contribution rates, as participants who would have voluntarily saved at a higher rate remain at the lower default contribution rates (Nessmith, Utkus, and Young 2007). The same study also found that the default contribution rate under automatic enrollment does not appear to affect whether employees quit the plan or not. Thus, one potential way for firms to offset the higher match-related costs created by higher participation rates under automatic enrollment is to set low default contribution rates.

This study reexamines the findings in Soto and Butrica (2009) using better and more recent data, and expands that study to more broadly analyze the relationship between auto enrollment and total compensation.

Data

This study uses restricted microdata from the *National Compensation Survey* (NCS) conducted by the U.S. Bureau of Labor Statistics. The NCS is a large nationally representative survey which collects information from establishments on occupational earnings, the incidence and costs of employer-sponsored benefits among workers, and the provisions of employer-sponsored benefit plans. The sample covers civilian workers in private industry and state and local governments.[3]

[3] The NCS excludes several types of workers from its survey scope including workers who set their own pay such as owners/officers/board members of incorporated firms, workers in positions with token pay, and student workers in set aside positions. The NCS removes these workers from its total employment count based on the frequency of such workers in sampled establishments as identified during sample initiation.

The NCS collects employer-level data on establishment size, region, and industry. It also collects job-level information on unionization, percentage of full-time workers, occupation, participation in retirement plans, the incidence of benefits and provisions of benefit plans, such as insurance (life, short-term disability, and long-term disability), paid leave (sick, vacation, jury, personal, and family) and paid holidays, and detailed plan provisions (i.e. through plan brochures) for health care (medical, dental, vision, and prescription drugs) and retirement plans (defined benefit and defined contribution). It collects pension-plan level data on plan type, match structure, match rates, contributions, and automatic enrollment.

The NCS also has information on employer costs. It uses these cost data to calculate the Employer Cost for Employee Compensation (ECEC) series, which includes estimates of the levels of average hourly costs to employers for compensation, and the Employment Cost Index (ECI), which estimates quarterly changes in these costs. The costs include wages and salaries and a variety of employee benefit categories, such as paid leave, health insurance, and retirement. In the ECEC microdata, each benefit cost is averaged across workers in a particular job, even though there may be some variation among workers within the job in take-up of or eligibility for the benefit (see Chapter 8 in BLS Handbook of Methods).[4]

For our analysis, we use NCS data from 2010/2011. We start with private-sector establishments for which there are about 14,000 establishment-job-plan records. We restrict our sample to single-employer DC plans. We then select savings and thrift plans since this is the only type of 401(k) plan for which the NCS collects information about both employer match rates and auto enrollment.[5] The most prevalent form of 401(k) plans, savings and thrift plans entail voluntary tax-deductible contributions by employees that are matched to some extent by employers. We further restrict our sample to include only those plans with flat match rate structures – where a percentage is applied to employee's contributions up to a specified percentage of the employee's salary – since BLS collects detailed information on the match

[4] Similarly, wages are averaged across workers in a particular job, which potentially obscures intra-job wage variation.

[5] We exclude "zero-match" plans from our sample because the BLS does not consider these plans to provide employee benefits and therefore does not collect data about their plan features (see section 10.5 in Holmer, Janney, and Cohen (2012) for more information). We also exclude plans for which the employer contributes without requiring minimum employee contributions (typically money-purchase or profit-sharing plans). The BLS does not collect automatic enrollment information on these plans.

structure of only these plans. After dropping some duplicate records, our final sample includes roughly 3,800 job-level observations uniquely identifying about a 1,200 savings and thrift plans with flat match structures.

In our analysis, the key variables of interest are first dollar match rate, match percent, potential match rate, default percent, default match rate, an auto enrollment indicator, DC costs, and other compensation cost variables (Table 1). The *first dollar match rate* is the percentage of an employee's first dollar of contributions that is matched by the employer. The *match percent* is the maximum percentage of pay that an employer will match. To capture the overall generosity of the plans, we also calculate a *potential match rate* (Dworak-Fisher, 2007). That is the amount that employers contribute, as a percentage of wages, when employees contribute enough to exhaust the employer's match offer. For example, if a plan offers a 50 percent match up to 6 percent of wages that the employee contributes, then the first dollar match rate is 50, the match percent is 6, and the potential match rate is 3 percent. In plans with automatic enrollment, the *default percent* is the default employee contribution rate. If it is lower than the match percent, then effectively it is the default percentage of pay that an employer will match if an employee does not actively make a selection. Following this is the *default match rate* which is similar to the potential match rate but computed using the default percent instead of the match percent. It is equivalent to the percent of salary that the employer would be contributing if all workers remained at the default contribution rate. Some plans with automatic enrollment also have escalating employee default contribution rates. In that respect, the *default max percent* and *default max match rate* are analogous to the *default percent* and *default match rate*, respectively, using the default percent reached at the end of the escalation. *DC costs* come from the ECEC data and represent an employer's average cost per labor hour for providing DC plan(s) to its employees in a given job.

In the descriptive analysis we use job-level weights to reflect the percentage of workers in the private sector who have jobs with a DC plan of particular characteristics.

Descriptive Analyses

In this section we first describe the prevalence of automatic enrollment. Then we analyze establishment characteristics, participation rates, match rates, and employer costs to better understand how they differ between plans with and without automatic enrollment.

Prevalence of Automatic Enrollment. Overall, 14.5 percent of workers in our sample with savings and thrift plans have an automatic enrollment plan feature (Figure 1).[6] This includes between 20 and 25 percent of workers in the agriculture, mining, and & construction, wholesale trade, and financial services, insurance, & real estate sectors, but only about 4 percent of workers in retail trade. It also includes about one in five workers employed by large firms with at least 1,000 employees, but only one in eight workers in small firms with less than 500 employees (Figure 2).

Distribution of Workers in Plans with and without Auto Enrollment. Table 2 shows the distribution of workers with and without auto enrollment plans by the characteristics of their establishments. Compared with workers without auto enrollment plans, those with automatic enrollment are more likely to be employed: 1) in agricultural, mining & construction, wholesale trade, and financial services, insurance & real estate industries (also see Figure 3); and 2) by companies that have 500 or more employees (also see Figure 4). Relative to workers without auto enrollment plans, those with automatic enrollment are also in establishments: 1) with larger shares of workers who have DB pensions and are full-time, unionized, and highly paid; and 2) located in metropolitan areas and in the West. For example, 20.3 percent of workers in auto enrolled plans are in the financial services/insurance/real estate sectors, compared with 14.1 percent of workers in plans without auto enrollment. Also, 43.7 percent of workers in plans with auto enrollment are employed by large establishments (500 or more employees), compared with only 30.3 percent of those in plans without automatic enrollment. Additionally, 17.7 percent of workers in auto-enrolled plans are in unionized jobs, compared with only 4.4 percent of those in plans without auto enrollment provisions. Finally, only 4 percent of workers in firms with auto enrollment have wages in the bottom tercile of the wage distribution, compared with 13.4 percent of their counterparts without automatic enrollment.[7]

[6] Automatic enrollment is much less prevalent in our data than in industry studies. For example, PSCA (2012) reports that 46 percent of plans had automatic enrollment in 2011. We believe the difference in numbers may be due to differences in the samples. Our sample includes only savings and thrift plans with flat match structures. Among workers in all savings and thrift plans in our data, including those with tiered match structures, 19 percent have an autoenrollment provision. As an alternative measure, 25 percent of establishments with savings and thrift plans have at least one plan with automatic enrollment. Furthermore, our sample is nationally representative, and our reported statistics represent the percentage of workers in these plans. In contrast, most industry studies are based on large plans and are not nationally representative.

[7] Overall, only 12 percent of the workers in our sample have wages in the bottom tercile of the wage distribution, while 54 percent have wages in the top tercile. Because the terciles are based on the overall distribution of wages—

Differences in Participation and Match Rates by Auto Enrollment. Table 3 compares participation and plan provisions among workers with and without automatic enrollment. Overall, 68.7 percent of workers participate in their employers' plans. Confirming the findings of previous studies, we find that plans with automatic enrollment have higher participation rates than those without this plan feature—77.1 versus 67.3 percent (Beshears et al. 2009; Choi et al. 2002, 2004; Madrian and Shea 2001).

Overall, workers have their first dollar of contributions matched an average of 71.1 percent by employers. However, the first dollar match rate statistically differs by whether their plan has an auto enrollment provision – 72.1 percent for those without automatic enrollment, but only 65.4 percent for those with this plan feature. Overall, workers have their contributions matched up to an average of 5 percent of pay; however, the match percent does not differ significantly between workers with and without automatic enrollment. Workers' potential match rates average 3.5 percent overall and statistically differ between those with and without auto-enrollment plans – 3.5 percent for those without auto enrollment compared with 3.2 percent for those with this plan feature. In most industries we examine, average potential match rates are higher among workers without auto enrollment than those with this provision (Figure 5). Differences are especially large for workers in the transportation & public utilities and retail trade sectors. In establishments with less than 1,000 employees and those with 2,500-4,999 employees, potential match rates are also higher among workers without auto enrollment than those with it (Figure 6). However, differences are especially large for workers in establishments with less than 500 employees.

Figure 7 examines the distribution of first dollar match rates and shows that most firms (67.6 percent) with automatic enrollment match less than a full dollar on their employee's first dollar of contributions. In this respect, firms without automatic enrollment appear more generous since almost half of them (47.8 percent) match at least 100 percent of their employee's contributions.

DC plan costs depend not only on how much the employer offers to match, but also on how much workers actually contribute. While we know nothing about employees' actual contributions, we do know the default contribution percent of plans with automatic enrollment.

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including both establishments with and without DC plans, this result reflects the fact that higher wage workers are more likely to have access to DC plans.

Previous literature has shown that workers are slow to move away, if at all, from the default percent once enrolled (Choi et al., 2004). If that is the case, the default contribution percent and the resulting default employer match rate might get us closer to the actual cost of a DC plan than the potential match rate would.

The average default percent for workers in auto enrollment plans is 2.8, which is 2.3 percentage points lower than the match percent (Table 3). Even with the built-in escalation of the default contribution in 22 percent of our plans, the default max percent is 3.4—1.7 percentage points lower than the match percent. Thus, on average, firms in our sample are defaulting their workers at a contribution rate at which workers cannot take full advantage of the employer match. Figure 8 compares the match percent in plans with and without automatic enrollment and shows how it differs from the default percent. Although the average match percent does not differ significantly for plans with and without automatic enrollment (see Table 3), there are differences in the distribution. About half of plans with auto enrollment have a match percent that is more than 5 but less or equal to 6 percent, compared with only 37 percent of those without auto enrollment. Even more noticeable is the difference between the distributions of the match percent and default percent among plans with automatic enrollment. Only 3 percent of plans have a default percent that is more than 5, while 87 percent of plans have a default percent of 3 percent or less. The default max percent mitigates the difference between the default and match percents a bit, but the difference is still noticeable.

Figure 9 shows the combined effect of the first dollar match rate and the match or default percent by comparing the distributions of the potential match rate and the default match rate. Three-quarters of plans with automatic enrollment have a default match rate and two-thirds have a default max match rate of 2 percent or less of pay; however, less than a third of them have a potential match rate within that same range. An even a smaller percentage of plans without automatic enrollment have a potential match rate of 2 percent or less of pay.

Thus, employers with auto enrollment plans may have found another way to offset the higher costs that come with higher participation rates created by automatic enrollment. By setting default match rates lower than potential match rates, employers can contribute to the accounts of more workers without necessarily increasing their costs.[8]

[8] Unfortunately, we do not observe employees' contribution rates in the data, so we cannot ascertain to what degree employees stay at the default contribution rate and to what extent that contributes to keeping employers' matching

Understanding How Establishment Costs Vary by Automatic Enrollment. Wages and benefits are higher among workers in plans with autoe nrollment (Table 4). Among workers in savings and thrift plans with automatic enrollment, for example, hourly wages average $27.7 per labor hour, health insurance benefits average $3.8 per labor hour, and total costs average $40.9 per labor hour. In contrast, for those without auto enrollment, hourly wages average $26 per labor hour, health insurance benefits average $2.9 per labor hour, and total costs average $37.6 per labor hour.

The average cost per labor hour for defined contribution plans, unlike match rates and auto enrollment provisions, are not specific to particular plans. Instead, these data reflect employer costs accrued at the job level for defined contribution plans.[9] For example, DC costs vary by jobs in the establishment, but not by plans within that job—it is an aggregate measure of the cost per hour of providing DC plan(s) to workers on that job. Nonetheless, DC costs should be correlated with the potential match rate, which our results show is significantly lower among auto enrollment plans.[10] Furthermore, in addition to the employers' matching contributions, DC costs include administrative and other expenses that are likely to be higher in plans with auto enrollment provisions than those without (Andersen et al. 2001). However, our descriptive statistics show no statistically significant difference between the DC costs of plans with and without automatic enrollment (Table 4).

Multivariate Analyses

In this section, we analyze the relationship between automatic enrollment and employer match rates and compensation using a series of ordinary least squares (OLS) regressions on plan-level and establishment-level data.[11] The key predictor in our models is an indicator for whether

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costs low. At best, when analyzing total DC costs, our results show these two factors working in combination and we are not able to separately identify their effects.

[9] See also Dworak-Fisher (2007)

[10] Dworak-Fisher (2007) discusses the correlation between the potential match rate and DC costs in savings and thrift plans. The strongest relationship he finds is in a regression of employers' DC costs per labor hour on the potential dollar match multiplied by the job's participation rate in the plan. The resulting measure accounts for 43 percent of the variation in employer costs for defined contribution plans, and its estimated effect on costs is close to 1 (a slope coefficient of 0.82).

[11] We cannot estimate the effect of automatic enrollment on the likelihood of providing a match, since that information is not collected in the data. If a retirement plan does not provide a match, BLS does not classify it as a

the plan includes automatic enrollment features. Our hypothesis is that auto enrollment is negatively correlated with either employer match rates or other forms of employer compensation. We report robust standard errors, clustered on state level.

Automatic Enrollment and Participation. Table 5 presents results from an OLS regression of the effect of automatic enrollment, along with other factors, on plan participation. Our hypothesis, as noted in the introduction, is that as automatic enrollment increases participation rates, firms will need to find a way to offset the additional costs—either by readjusting the match rate or by reducing other types of compensation. For this reason, we test whether automatic enrollment is associated with higher participation rates in our sample of savings and thrift plans, controlling for other factors. Consistent with other studies, we find that the coefficient on automatic enrollment is positive and highly significant—suggesting that auto enrollment is correlated with higher participation rates.[12] Among savings and thrift plans, those with automatic enrollment have average participation rates that are 7 percentage points higher rates than those without auto enrollment.

The above result is not particularly surprising, since the literature on automatic enrollment has consistently and unambiguously reported strong positive effects of automatic enrollment on participation. However, the literature on the effects of the employer match on participation has produced conflicting results. While most studies have found a strong positive link between participation in a retirement plan and the *existence* of an employer match, the relationship between participation and the *level* of the match has not been proven to be particularly strong. For example, Beshears et al (2010), in a sample of nine firms with automatic enrollment, found that decreasing the employer match by 1 percent of pay was associated with a 1.8 to 3.8 percentage point decrease in the plan participation rate at six months of eligibility, and

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pension plan and does not collect information about its provisions, including autoenrollment. Thus, our sample includes only plans with a positive employer match.

[12] Note that most of the results in the literature are based on case studies of a handful of firms that have switched to automatic enrollment. One advantage of our data is that it is nationally representative; hence, we can draw conclusions that relate to the population of workers. However, some of the drawbacks of our data are that we can only study savings and thrift plans, and only a subset of them that have positive match rates and a flat match structures. Also, we can only observe firms at one point in time instead of before and after autoenrollment, and we do not have information how much time has elapsed since firms instituted the autoenrollment feature in their plans. Hence, we cannot draw a clear picture of causality.

concluded that the presence of an automatic enrollment provision diminishes the need for employers to provide generous matches. In that respect, our results side with the studies that find positive but only weak effects of the employer match itself. We find that the effect of the potential match rate on participation is positive, but small and not statistically different from zero.[13] Hence, automatic enrollment is a much stronger determinant of participation than the potential match rate—suggesting that reducing the potential match rate would not have significant effects on plan participation. Moreover, the second column in Table 5 shows results from an OLS regression of the relationship between the default match rate and plan participation among plans with automatic enrollment. Although positive, the coefficient on the default match rate is also not statistically different from zero and is much smaller that the coefficient on auto enrollment. This result suggests that another way for employers to keep costs down after implementing automatic enrollment would be to set a relatively low default match rate because it would not negatively impact participation. This finding is also consistent with those of other studies. For example, Nessmith, Utkus, and Young (2007) found that quit rates among employees who had been automatically enrolled in their employers' retirement plans did not vary in response to the default contribution rate.

Impact of Automatic Enrollment on Employer Match Rates. Next we estimate the correlation between automatic enrollment and the potential match rate, the first dollar match rate, and the match percent (Table 6). We control for industry, establishment size, share of workers in that plan who also have a DB plan, proportion of full-time and union workers, metropolitan area, and geographic region.

The first column of the table shows results from an OLS regression on employers' potential match rate. The coefficient on automatic enrollment is negative and statistically significant with a 99 percent confidence level. Controlling for other factors, plans with automatic enrollment have an average potential match rate that is 0.38 percentage points (11 percent of the average) lower than those without an automatic provision. The next two columns of the table reveal what is driving this result. Automatic enrollment is strongly significant and negative with respect to the first dollar match rate, but it is not a significant predictor of the

[13] Choi et al. (2004) conclude from the literature that the rate at which employers match employee contributions has at most a small effect on participation and that the impact of automatic enrollment is much greater.

match percent. On average, plans with automatic enrollment have a first dollar match rate that is 8.2 percentage points (12 percent of the average) lower than plans without the feature.

The coefficients on the other variables generally align with our expectations. Compared with the wholesale trade industry, we find that plans in the financial, insurance & real estate industries have significantly higher potential match rates—a result driven entirely by first dollar match rates. For example, the average potential match for these sectors is 1.1 percentage points higher and the average first dollar match rate is 15.2 percentage points higher. In addition, establishment size is also positively correlated with employers' match rates. Plans among establishments with at least 500 employees have an average potential match rate that is 0.2 percentage points higher and an average first dollar match rate that is 4.9 percentage points higher than plans in smaller establishments. However, their match percents do not differ significantly. Also, plans among establishments located in metropolitan areas also have significantly higher potential match rates than those in nonmetropolitan areas, while those in the South have significantly lower potential rates than those in the Northeast. To capture the generosity of establishments, we also control for the share of workers with defined benefit plans, the share of full-time workers, and the share of union workers. None of these variables are significant determinants of the potential match rate, although a couple of them are correlated with the first dollar match rate and/or the match percent. Finally, some plans provisions in the NCS data have been imputed via a statistical match. We control for this using a flag and find that it is not statistically significantly correlated with our dependent variables.

We also estimated these regressions using plan-level weights to understand the effect of automatic enrollment on employer matches for a sample that is representative of the population of workers in these plans. The results (not presented here) show that in the weighted sample the effect of automatic enrollment on the potential match rate increases in both its size and significance. In the weighted regression, average potential match rates offered to workers in plans with an automatic enrollment feature are 0.42 percentage points lower than those offered to workers in plans without automatic enrollment. This result is likely driven by the fact that when we weight by workers, we give more importance to the relationship between automatic enrollment and match rates in smaller establishments as they represent a bigger share of the workforce. As we showed in the descriptive statistics, the difference in potential match rates

between plans with and without automatic enrollment is greater in small establishments than in larger ones.

Impact of Automatic Enrollment on Compensation Costs. In the previous section, we showed that plans with automatic enrollment had lower match rates than those without this plan feature. Next, we consider the relationship between auto enrollment and employer compensation. Because the ECEC data calculates compensation costs on the job level, rather than associating them with a particular plan, we estimate these equations on the establishment level. With that in mind, the definition of the automatic enrollment dummy changes slightly and now equals one if there exists at least one savings and thrift plan with automatic enrollment at that establishment. Table 7 shows the results of a regression of automatic enrollment on total employer costs, including those from DC plans. Although most of the variables have the expected sign with relation to total costs, we find no evidence that automatic enrollment, which we showed to be correlated with higher participation, is correlated with higher costs.

We then consider whether the reason auto enrollment has no impact on total costs is because employers are offsetting the higher costs of providing DC plans by lowering their other compensation. To do this, we jointly estimate a number of cost equations in a seemingly unrelated regressions model (SUR), allowing us to test cross-equation restrictions and the possibility that the error terms across equations are contemporaneously correlated. We use the estimator proposed by Zellner (1962). We write the SUR model as:

$$y_i = X_i\beta_i + \epsilon_i, i = 1, \dots, M$$

where y_i is the ith equation's dependent variable, on which we have T observations. The error process $\epsilon = [\epsilon_1', \epsilon_2', \dots, \epsilon_M']$ is assumed to have an expectation of zero and a covariance matrix of Ω. We assume that $[\epsilon_{it}\epsilon_{js}] = \sigma_{ij}, t = s$, otherwise zero, to allow the error terms in different equations to be contemporaneously correlated, but assuming that they are not correlated at other

points. The efficient estimator for this problem is generalized least squares, which we implement in Stata via the SUREG command.[14]

The second set of regressions in Table 7 show the seemingly unrelated regression results for DC costs and non-DC costs. We find no evidence that firms with auto enrollment have DC costs that are different—higher or lower—from those without auto enrollment. We also find no evidence that these firms have different non-DC costs, nor any evidence that DC costs crowd out non-DC costs. We cannot reject the hypothesis that the coefficient on automatic enrollment is jointly equal to zero in the two equations. The Breusch-Pagan test of independence, however, strongly rejects the hypothesis that the error terms are uncorrelated ($p < .01$), indicating that the SUR model is the appropriate specification.

With regard to the share of total compensation that DC costs constitute, we also find no statistically significant difference between firms with and without automatic enrollment. Interestingly, the higher a firm's average total compensation, the more it spends on its DC plans. For example, the DC cost share for firms in the middle quintile of total compensation is 0.6 percentage points higher than for firms in the bottom quintile; and it is 1.7 percentage points higher for firms in the top quintile than for those in the bottom quintile.

Table 8 shows the seemingly unrelated regression results for various employer costs. We group the costs in the following categories: defined contributions, wages, legal (Social Security, Medicare, state/federal unemployment insurance, and workers' compensation), health insurance, defined benefit, leave (vacation, holidays, sick leave, and other leave), insurance (life insurance and short-term and long-term disability insurance), and other costs (non-production bonuses, severance pay, and supplemental unemployment insurance). Again, there is no evidence that firms with and without auto enrollment have different DC costs. However, auto enrollment is associated with higher costs for health insurance and leave benefits, and lower costs for defined benefit pensions. A significance test rejects the null hypothesis that the coefficients on automatic enrollment across equations are jointly equal to zero ($p < .05$). Additionally, there is no evidence that DC costs crowd out other forms of employer compensation. Many of the coefficients have the expected signs. In general, costs per labor hour increase with establishment size and the percentage of full-time workers. Employer costs are higher in metropolitan areas and the

[14] If all the equations in our SUR specification have the same number of observations and a common set of independent variables, then the coefficients would be identical to OLS; however, estimating a SUR model allows for tests of cross-equation constraints.

Northeast and are lowest in nonmetropolitan areas and the Midwest. Interestingly, the share of union workers in an establishment positively influences the costs associated with legal requirements, health insurance, and other insurance, but has no significant impact on the costs for DC plans, wages, DB pensions, or leave. Almost across the board, transportation and public utilities sectors have the highest employer costs.

Finally, the larger the share of workers covered by a DB plan, the lower the average DC costs, suggesting that employers consider these benefits to be substitutes for one another. However, the share of workers with DB plans and the share of workers with another DC plan are positively correlated with a number of employer benefits, suggesting that establishments with large shares of workers with DB plans or multiple DC plans pay higher total compensation, on average, to attract and retain more productive workers or for other reasons that are unknown.

Table 9 shows similar regressions, but for the cost shares. Again, we find no evidence that firms with auto enrollment spend a larger or smaller share of their total costs on DC plans than those without auto enrollment. However, auto enrollment is associated with a lower share of total costs going to DB pensions and a higher share going to leave benefits. A significance test weakly rejects the null hypothesis that the coefficients on automatic enrollment are jointly equal to zero across the equations ($p < .10$). Again, there is no evidence that DC costs crowd out other forms of employer compensation.

Conclusions

Most pension-related research has focused on individuals' behavior – whether workers participate in a 401(k), how much they contribute, and how they make investment choices. Even the discussion surrounding automatic enrollment has focused on how it benefits employees by increasing their pension coverage and ultimately their retirement savings. Comparatively little is known about employer decisions regarding retirement plans, yet employer actions surrounding these plans substantially affect future retirement security. By boosting plan participation, automatic enrollment likely increases employer costs as previously unenrolled workers receive matching retirement plan contributions. Employers might respond to the surge in retirement plan costs associated with automatic enrollment by trimming match rates to 401(k) plans or reducing other compensation.

Recognizing that automatic enrollment is not free for employers, Soto and Butrica (2009) was the first study to examine the relationship between automatic enrollment and employer matching behavior. The authors showed that firms with auto enrollment have lower employer match rates than those without automatic enrollment, suggesting that employers might reduce match rates when they begin automatically enrolling participants.

This study reexamines the findings in Soto and Butrica (2009) using better and more recent data, and expands that study to more broadly analyze the relationship between auto enrollment and total compensation. Like Soto and Butrica (2009), we find employer match rates are negatively and significantly correlated with auto enrollment. The potential match rate averages 3.5 percent for plans without automatic enrollment, but only 3.2 percent for those with automatic enrollment. Even controlling for other factors, we find that the potential match rate is 0.38 percentage points lower for firms with automatic enrollment than for those without this provision. Although the effect of automatic enrollment may seem modest, it is potentially bigger when one considers that the average default match rate in our sample is only 1.8 percent. Thus, on average, firms in our sample are defaulting their workers at a contribution rate at which workers cannot take full advantage of the employer match.

We also find that automatic enrollment is associated with a 7 percentage point increase in plan participation. Despite this, we find no statistical difference between the DC costs of establishments with and without auto enrollment. In addition, we find no evidence that DC costs crowd out other forms of employer compensation—suggesting that firms might be lowering their match rates—the potential and/or the default—enough to completely offset the higher costs of automatic enrollment without needing to simultaneously reduce other compensation costs.

Thus, while auto enrollment is likely to boost the retirement savings of workers who would not participate without it, our findings suggest it could lead to lower account balances at retirement for those who were already enrolled or would have enrolled anyway. Furthermore, the prospect of lower match rates may not only reduce employer contributions to retirement accounts, but might also lower workers' contributions (Engelhardt and Kumar 2007; Even and Macpherson 2005).

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Figure 1. Prevalence of Automatic Enrollment by Industry, 2011

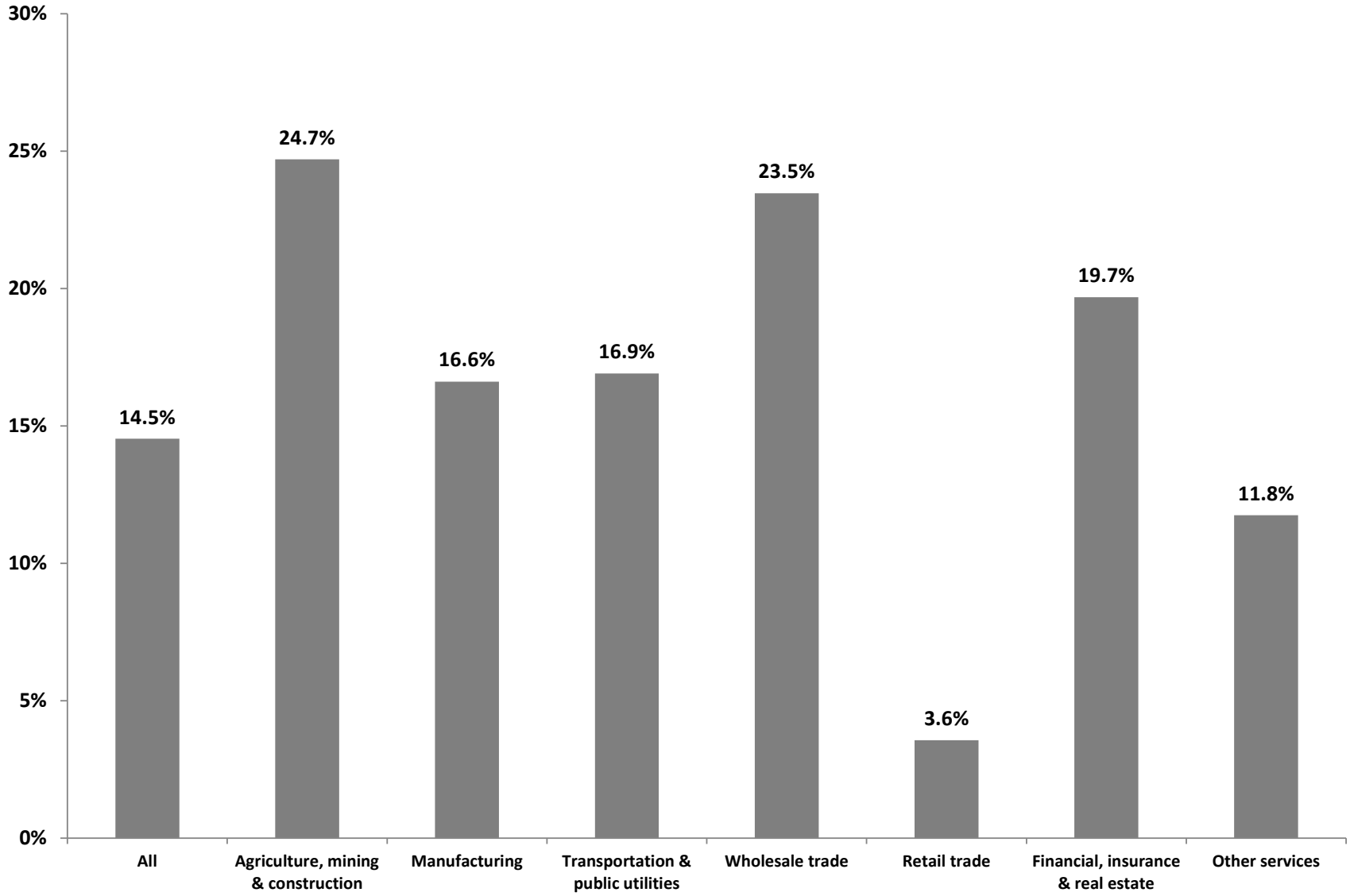

Figure 2. Prevalence of Automatic Enrollment by Establishment Size, 2011

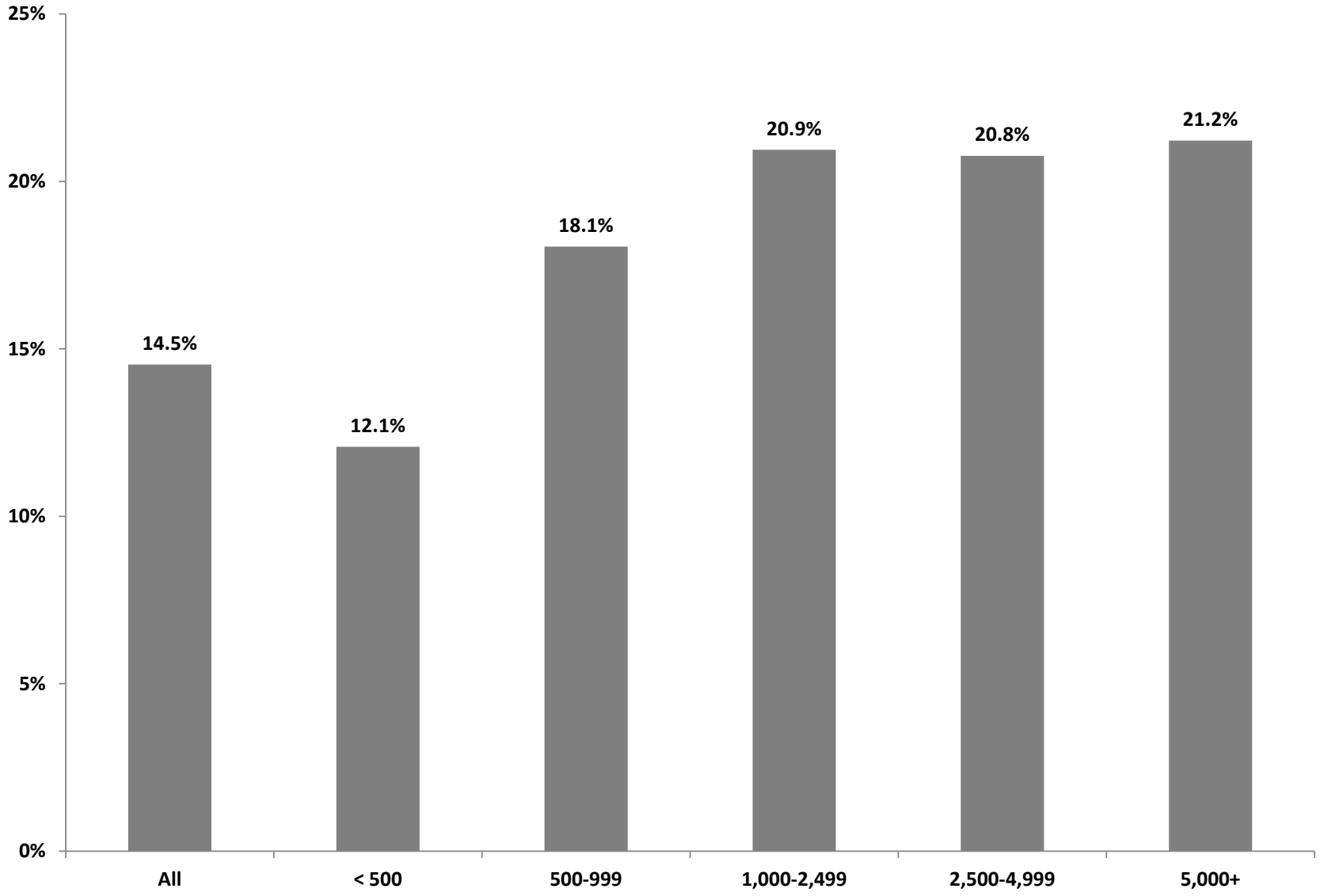

Figure 3. Distribution of Workers With and Without Autoenrollment Plans by Industry, 2011

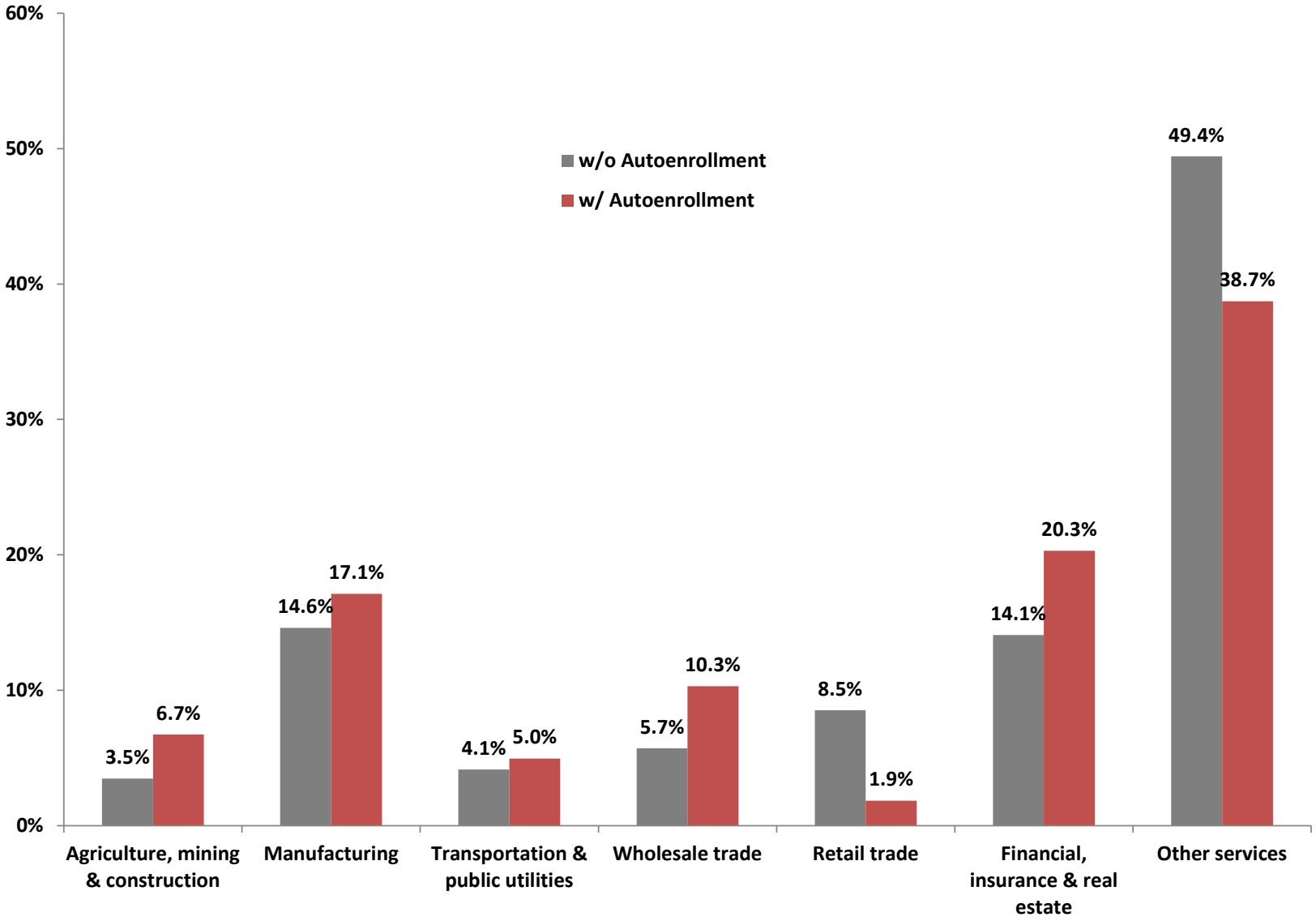

Figure 4. Distribution of Workers With and Without Autoenrollment Plans by Establishment Size, 2011

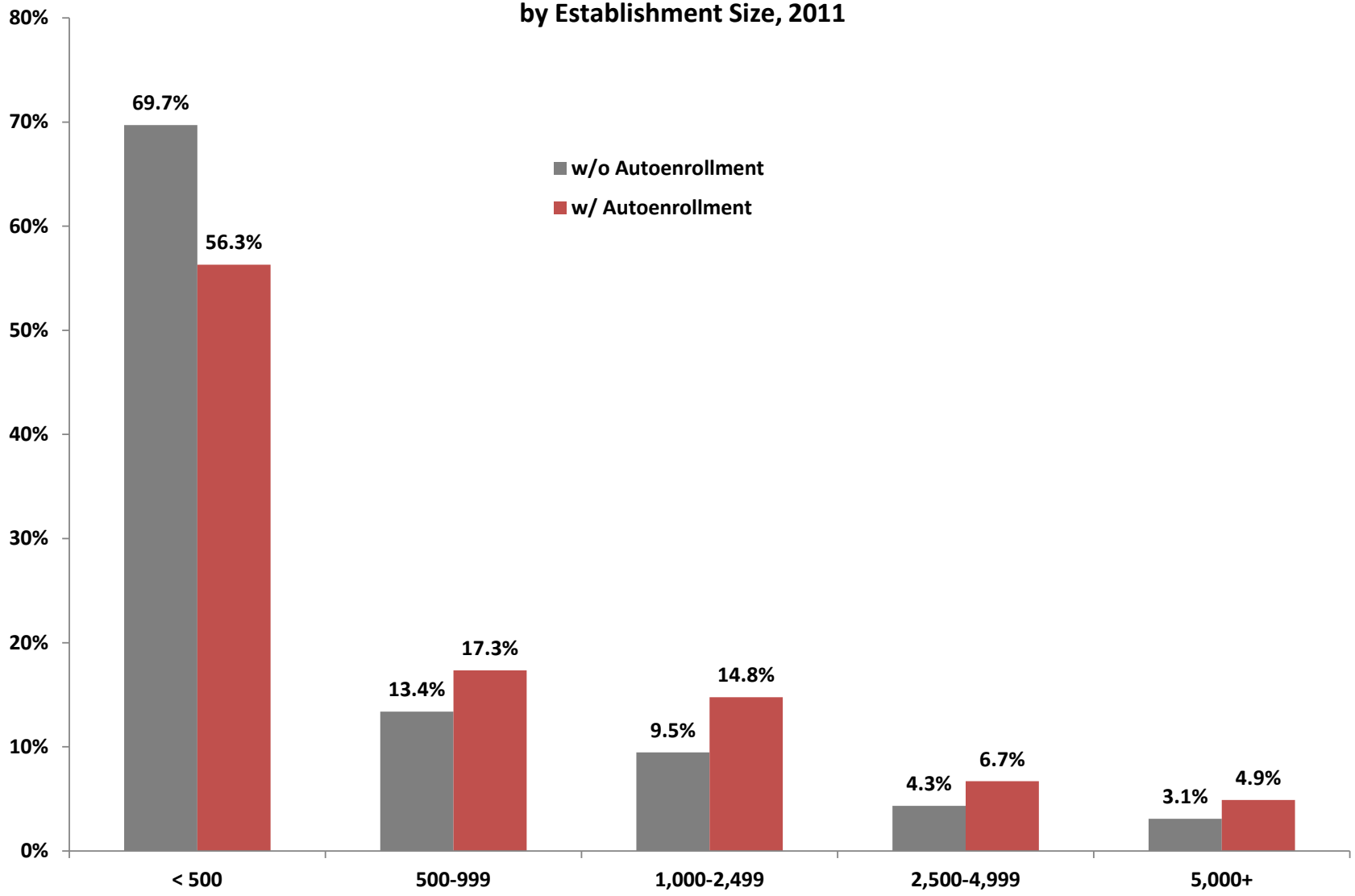

Figure 5. Average Potential Match Rate of Workers by Industry and Autoenrollment, 2011

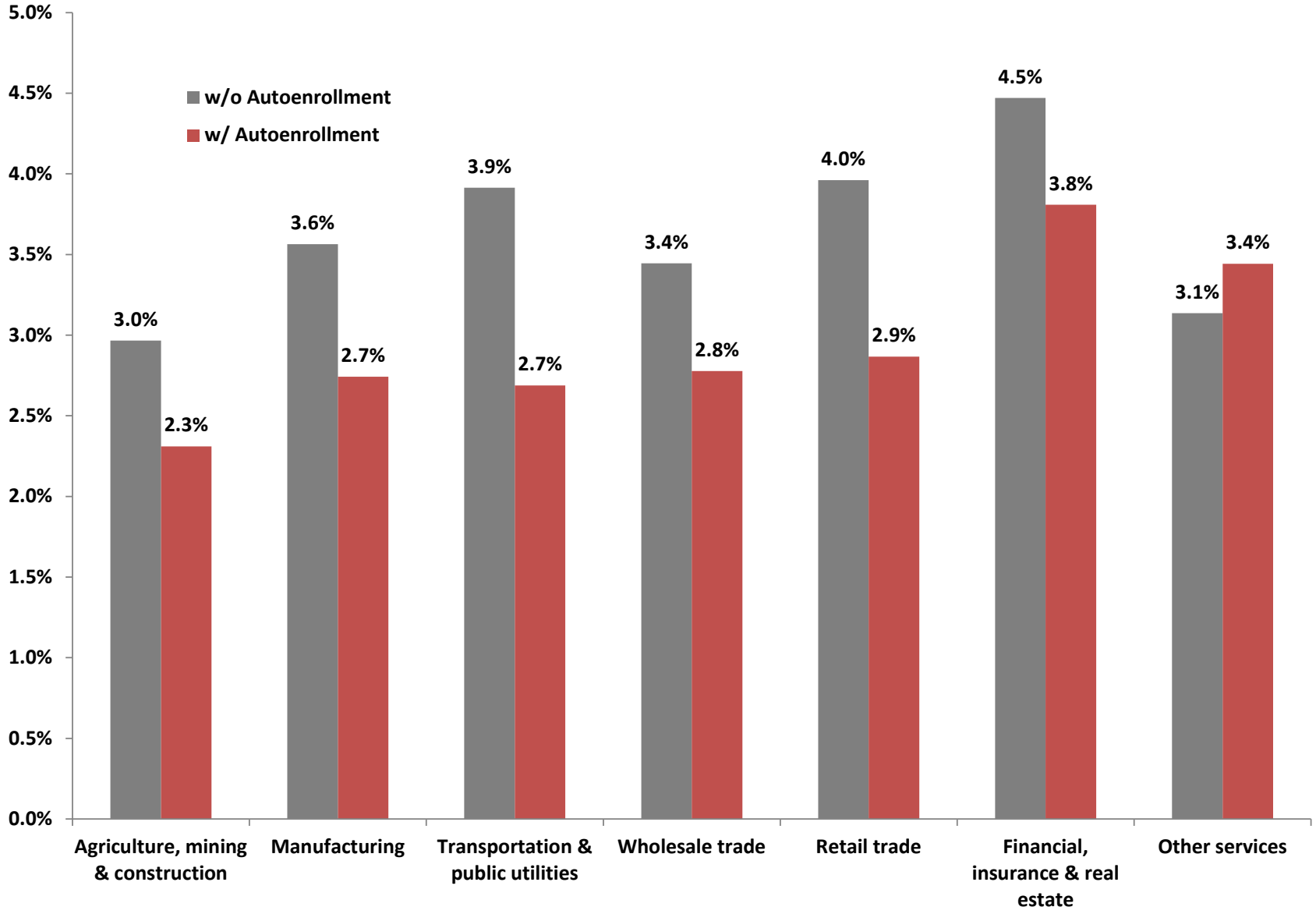

Figure 6. Average Potential Match Rate of Workers by Establishment Size and Autoenrollment, 2011

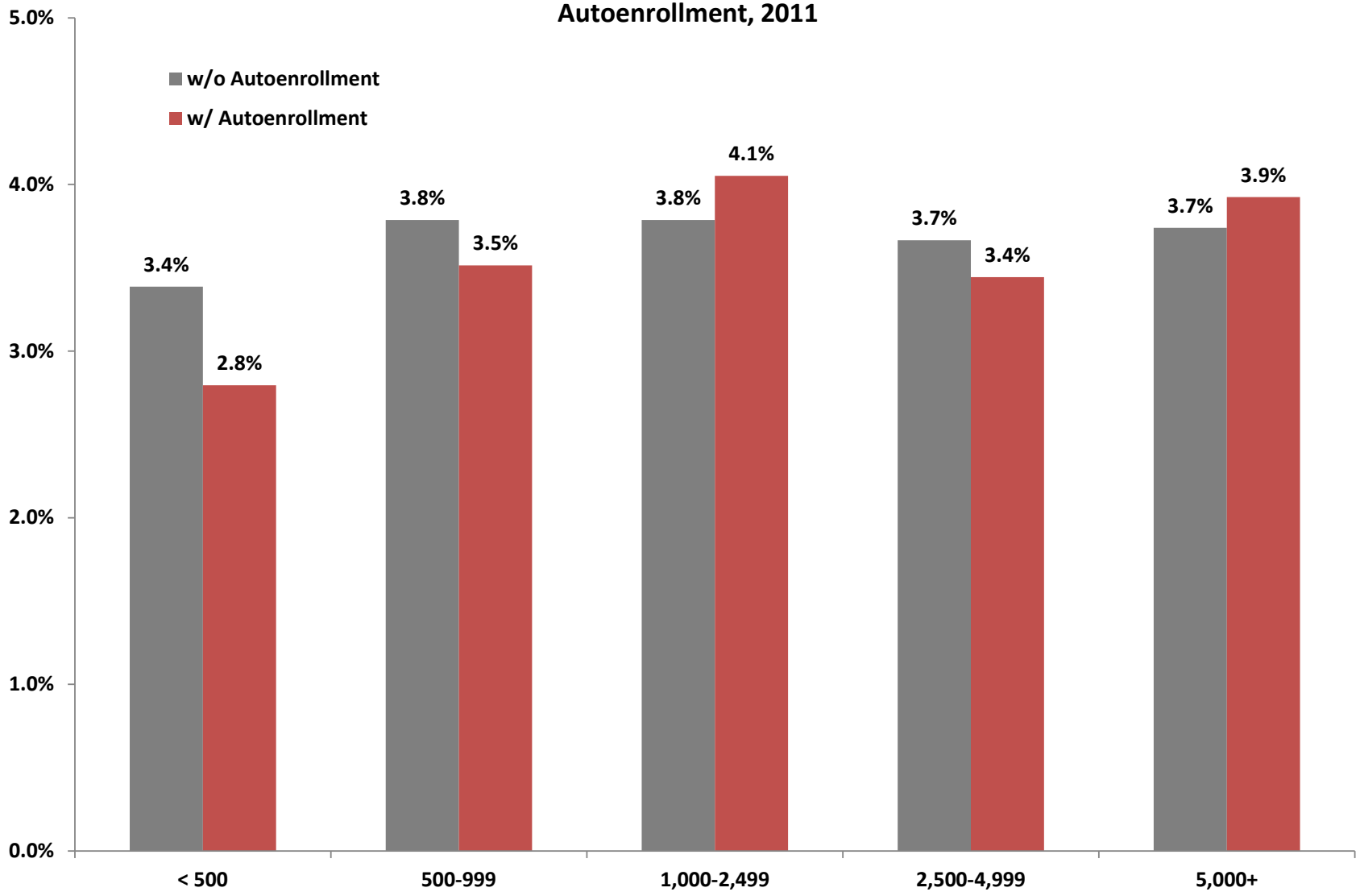

Figure 7. Distribution of First Dollar Match Rates by Autoenrollment , 2011

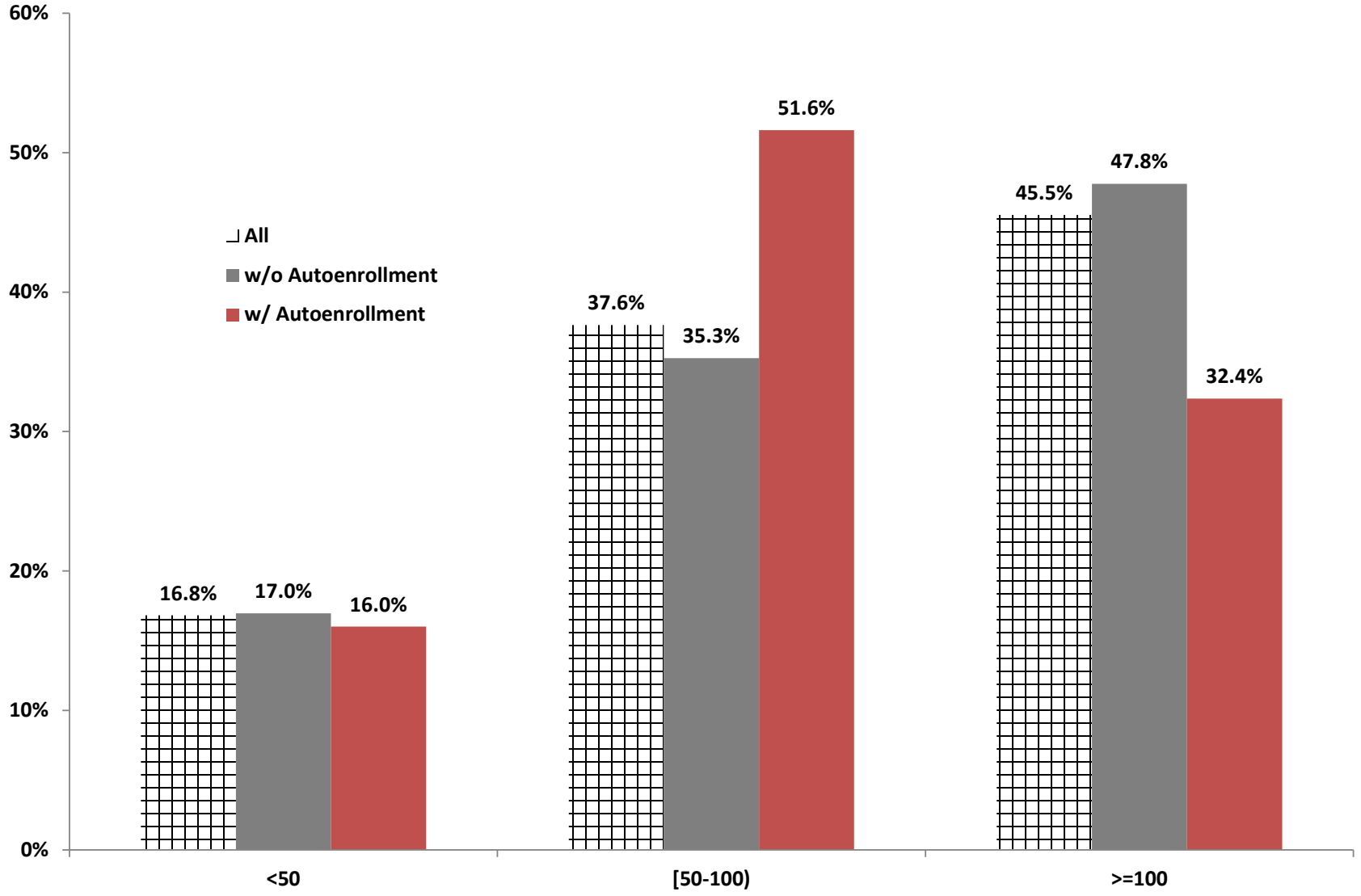

Figure 8. Distribution of Match and Default Percents by Autoenrollment , 2011

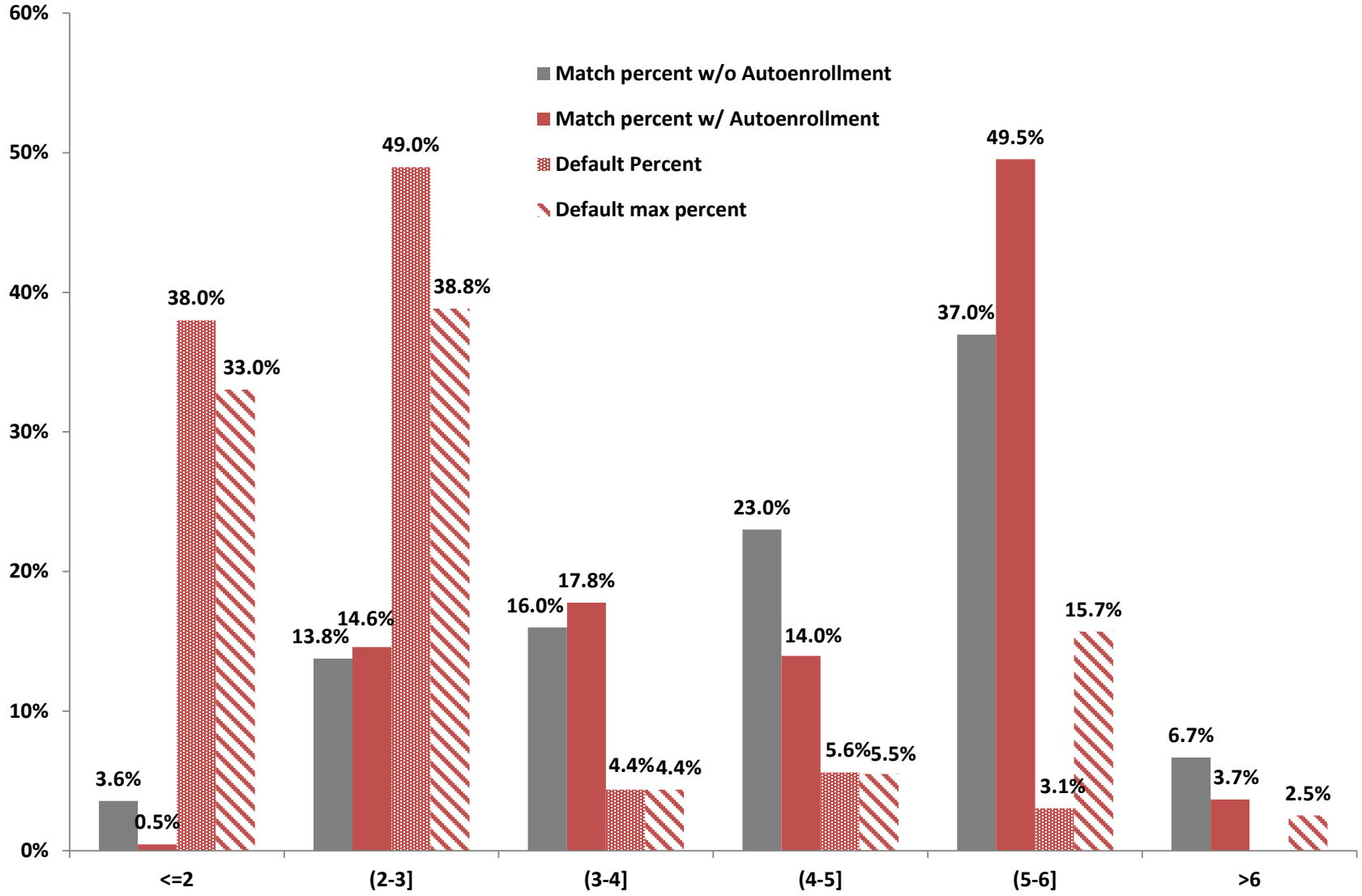

Figure 9. Distribution of Potential and Default Match Rates by Autoenrollment , 2011

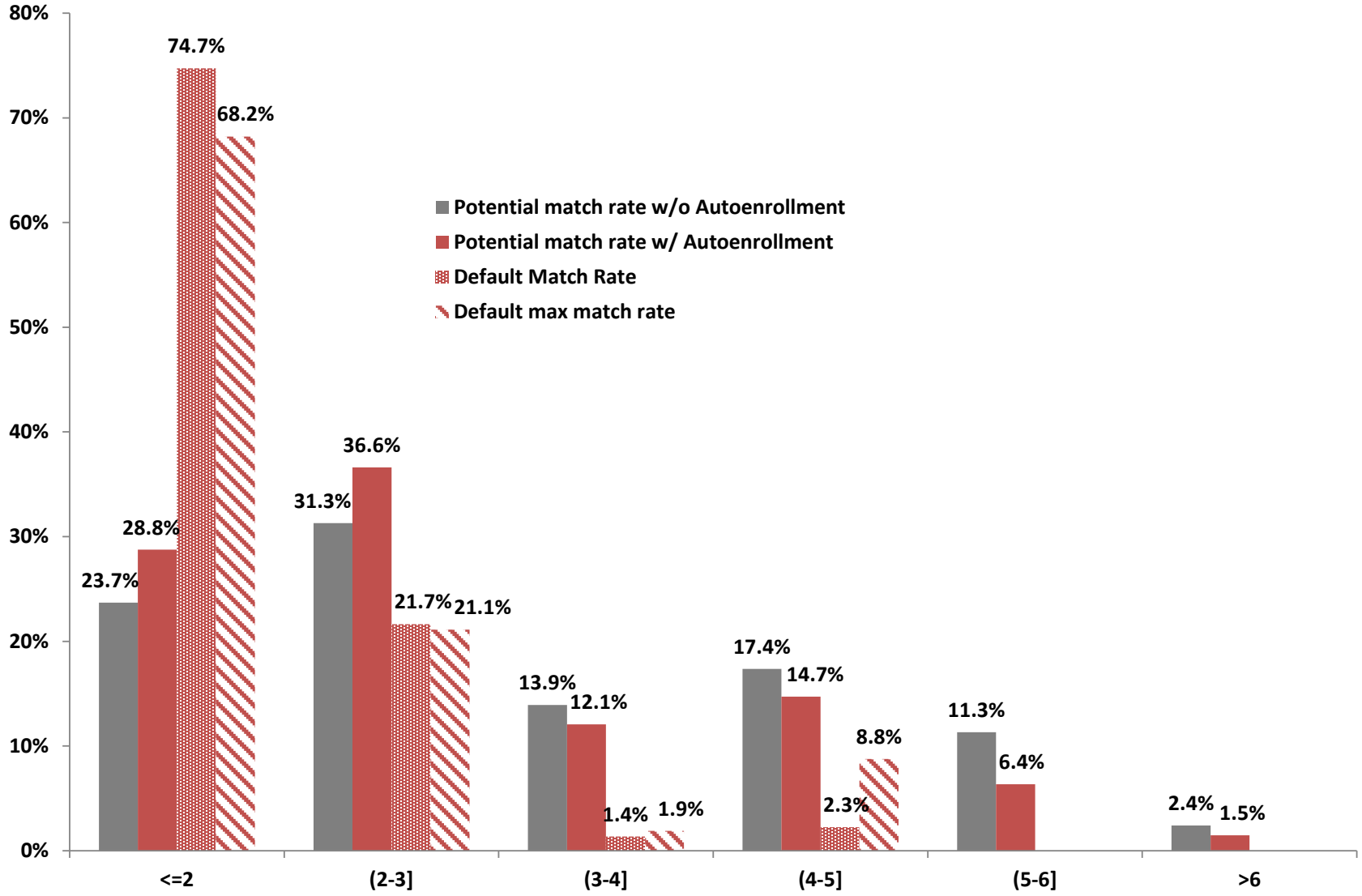

Table 1. Variables

Generosity Measure	Unit of Measurement	Definition
Plan Provisions		
First dollar match rate	Integer from 0 to 100	Employer's match rate on the first dollar of employee's contribution (e.g 50 cents on the dollar or 50 percent).
Match percent	Integer from 0 to 100	The employer matches contributions up to this percentage of pay (e.g. employee's contribution is matched up to 6 percent of pay).
Potential match rate	Integer from 0 to 100	Maximum employer's contribution as a percentage of salary. Alternatively, the percentage of salary that the employer would contribute if the employee contributed enough to exhaust the employer's match offer. This is computed as: (first dollar match rate*match percent)/100.
Default percent	Integer from 0 to 100	In plans with automatic enrollment, the default employee contribution percentage.
Default match rate	Integer from 0 to 100	This is computed as: (first dollar match rate*min(default percent,match percent))/100.
Default max percent	Integer from 0 to 100	In plans with automatic enrollment, the default employee contribution percentage at the end of the escalation process
Default max match rate	Integer from 0 to 100	This is computed as: (first dollar match rate*min(default max percent, match percent))/100.
Employer Average Cost for Providing Benefits to Workers in a Given Job (from ECEC data)		
DCcost	$ per labor hour	Includes all DC plans.
Wages	$ per labor hour	Includes wages.
Health Insurance costs	$ per labor hour	Includes health insurance.
Legal costs	$ per labor hour	Includes Social Security, Medicare, state/federal unemployment insurance, and worker's compensation.
Leave costs	$ per labor hour	Includes vacation, holidays, sick leave, and other leave to workers in a given job.
Insurance costs	$ per labor hour	Includes life insurance and short-term and long-term disability.
Other costs	$ per labor hour	Include non-production bonuses, severance pay, and supplemental unemployment insurance.

Table 2. Distribution of Workers in Savings & Thrift Plans With and Without Autoenrollment by Establishment Characteristics, 2011

	All		Without autoenrollment		With autoenrollment		
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	
Autoenrollment	14.5%	35.2%					
Industry							
Agriculture, mining & construction	4.0%	19.5%	3.5%	18.3%	6.7%	25.1%	***
Manufacturing	15.0%	35.7%	14.6%	35.3%	17.1%	37.7%	*
Transportation & public utilities	4.3%	20.2%	4.1%	19.9%	5.0%	21.7%	
Wholesale trade	6.4%	24.4%	5.7%	23.2%	10.3%	30.4%	***
Retail trade	7.6%	26.4%	8.5%	27.9%	1.9%	13.5%	***
Financial, insurance & real estate	15.0%	35.7%	14.1%	34.8%	20.3%	40.3%	***
Other services	47.9%	50.0%	49.4%	50.0%	38.7%	48.7%	***
Size							
< 500	67.8%	46.7%	69.7%	46.0%	56.3%	49.6%	***
500-999	14.0%	34.7%	13.4%	34.1%	17.3%	37.9%	***
1,000-2,499	10.2%	30.3%	9.5%	29.3%	14.8%	35.5%	***
2,500-4,999	4.7%	21.1%	4.3%	20.4%	6.7%	25.0%	**
5,000+	3.4%	18.0%	3.1%	17.3%	4.9%	21.6%	**
Share of workers with DB plan	24.4%	42.9%	23.1%	42.2%	31.6%	46.5%	***
Share of full-time workers	89.0%	31.3%	88.1%	32.4%	94.1%	23.5%	***
Share of union workers	6.4%	24.4%	4.4%	20.6%	17.7%	38.2%	***
Wages (tercile)							
Bottom	12.0%	32.5%	13.4%	34.0%	4.0%	19.7%	***
Middle	34.0%	47.4%	33.7%	47.3%	35.9%	48.0%	
Top	54.0%	49.8%	52.9%	49.9%	60.1%	49.0%	***
Metropolitan area	91.1%	28.5%	90.5%	29.4%	94.8%	22.1%	***
Region							
Northeast	20.9%	40.7%	21.6%	41.2%	16.8%	37.4%	***
Midwest	20.5%	40.4%	20.3%	40.2%	21.5%	41.1%	
South	36.9%	48.3%	37.5%	48.4%	33.3%	47.2%	**
West	21.7%	41.3%	20.6%	40.5%	28.3%	45.1%	***

Note: All statistics represent percentage of workers who have jobs with DC plans. Statistical difference between those without and with autoenrollment is denoted by * p < .10, ** p < .05, and *** p <.01.

Table 3. Participation and Plan Provisions Among Workers in Savings & Thrift Plans by Autoenrollment, 2011

	All		Without autoenrollment		With autoenrollment		
	Mean	**Std. Dev.**	**Mean**	**Std. Dev.**	**Mean**	**Std. Dev.**	
Participation rate	68.7	26.0	67.3	26.2	77.1	23.3	***
Potential match rate	3.5	1.7	3.5	1.7	3.2	1.4	***
First dollar match rate	71.1	31.8	72.1	32.3	65.4	28.3	***
Match percent	5.0	1.4	5.0	1.5	5.1	1.2	
Default percent					2.8	1.1	
Default max percent					3.4	1.7	
First dollar match rate							
< 25	1.1%	10.5%	1.3%	11.4%	0.0%	0.0%	***
>=25 and <50	15.7%	36.4%	15.7%	36.3%	16.0%	36.7%	
>=50 and <75	34.8%	47.6%	33.2%	47.1%	44.1%	49.7%	***
>=75 and <100	2.8%	16.6%	2.0%	14.1%	7.5%	26.3%	***
>=100	45.5%	49.8%	47.8%	50.0%	32.4%	46.8%	***

Note: All statistics represent percentage of workers who have jobs with DC plans. Statistical difference between those without and with autoenrollment is denoted by * p < .10, ** p < .05, and *** p <.01.

Table 4. Average Wages and Benefits of Workers in Savings & Thrift Plans by Autoenrollment, 2011

	All		Without autoenrollment		With autoenrollment		
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	
Defined contribution	$1.2	$1.3	$1.2	$1.3	$1.1	$1.0	
Total non-DC costs	$36.9	$27.5	$36.4	$27.1	$39.7	$29.7	***
Wages	$26.2	$18.9	$26.0	$18.5	$27.7	$20.9	**
Defined benefit	$0.5	$1.5	$0.5	$1.5	$0.6	$1.3	
Health insurance	$3.0	$1.8	$2.9	$1.7	$3.8	$2.0	***
Leave	$3.1	$3.0	$3.1	$2.9	$3.4	$3.2	**
Insurance	$0.2	$0.2	$0.2	$0.3	$0.2	$0.2	***
Legal	$2.8	$1.4	$2.7	$1.4	$2.9	$1.3	***
Other	$1.0	$9.3	$1.0	$9.1	$1.1	$10.7	
Non-wage	$10.7	$12.1	$10.4	$11.9	$12.1	$13.1	***
Voluntary	$7.9	$11.3	$7.7	$11.1	$9.1	$12.3	***
Other voluntary	$4.9	$10.8	$4.8	$10.6	$5.3	$11.8	
Total DC + non-DC costs (quintile)							
Bottom	3.1%	17.4%	3.7%	18.8%	0.1%	2.6%	***
Second	10.7%	30.9%	12.2%	32.7%	2.2%	14.8%	***
Middle	17.3%	37.8%	17.3%	37.9%	17.2%	37.8%	
Fourth	33.9%	47.3%	33.2%	47.1%	37.8%	48.5%	**
Top	34.9%	47.7%	33.6%	47.2%	42.7%	49.5%	***

Note: Compensation includes vacations, holidays, sick leave, other leave, life insurance, health insurance, and short-term disability. It excludes defined benefit pensions and defined contribution plans. It is the average cost per employee per hour worked. Statistical difference between those without and with autoenrollment is denoted by * p < .10, ** p < .05, and *** p <.01.

Table 5. OLS Estimates of the Relationship Between Participation Rate and Automatic Enrollment , 2011

	Y= Participation Rate	
Potential match rate	0.161	
Default match Rate		0.812
Autoenrollment	6.990 ***	
Industry (omitted=Wholesale trade)		
Agriculture, mining & construction	-7.887 *	0.955
Manufacturing	-3.927 *	-5.140
Transportation & public utilities	-1.993	9.909
Retail trade	-3.380	14.201 **
Financial, insurance & real estate	1.745	5.171
Other services	-4.460 *	1.481
Size of 500 or more participants	-0.530	-3.309
Share of workers with DB plan	1.229	3.623
Share of full-time workers	18.202 ***	6.282
Share of union workers	2.846	-2.080
Average wage per hour	0.226 ***	0.219 ***
Metropolitan area	-3.888	-5.571
Region (omitted=Northeast)		
Midwest	-3.707 *	-8.028 **
South	-0.813	-5.646
West	-3.111 *	-4.216
Flag for imputed participation	-3.577 **	-7.548 ***
Flag for imputed plan	4.542	1.911
Constant	54.264 ***	76.715 ***
Adjusted R-squared	0.123	0.138

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

Table 6. OLS Estimates of the Relationship between Match Rates and Automatic Enrollment, 2011

	Y= Potential match	Y= First dollar match	Y= Match percent
Autoenrollment	-0.380 ***	-8.262 ***	0.013
Industry (omitted=Wholesale trade)			
Agriculture, mining & construction	-0.206	-0.767	-0.155
Manufacturing	0.322	-3.939	0.462 *
Transportation & public utilities	0.334	6.909	-0.152
Retail trade	0.358	18.691 **	-0.772 ***
Financial, insurance & real estate	1.088 ***	15.173 **	0.123
Other services	-0.018	1.658	-0.500 ***
Size of 500 or more participants	0.206 *	4.902 **	-0.113
Share of workers with DB plan	0.086	-4.344 *	0.344 ***
Share of full-time workers	-0.223	1.028	-0.249 **
Share of union workers	-0.183	-2.400	0.090
Metropolitan area	0.263 *	-2.662	0.430 ***
Region (omitted=Northeast)			
Midwest	-0.147	-1.923	-0.121
South	-0.276 *	-4.258	-0.074
West	0.071	-0.577	0.159
Flag for imputed plan	-0.111	-3.041	-0.025
Constant	3.426 ***	74.797 ***	5.030 ***
Adjusted R-squared	0.082	0.071	0.083

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

Table 7. Seemingly Unrelated Regression Results of Establishment Costs on Automatic Enrollment, 2011

	Y= Total costs	Y=DC costs	Y=Total Non-DC costs	Y=DC cost share	Y=DC cost share
Autoenrollment	1.418	0.028	1.337	0.001	0.001
Industry (omitted=Wholesale trade)					
Agriculture, mining & construction	8.831 ***	0.266	8.531 **	0.003	-0.001
Manufacturing	1.032	-0.022	1.159	-0.002	-0.002
Transportation & public utilities	16.506 ***	0.921 ***	15.559 ***	0.007 **	0.003
Retail trade	-3.209	0.023	-3.146	0.003	0.005 **
Financial, insurance & real estate	7.790 **	0.493 ***	7.391 **	0.009 ***	0.007 ***
Other services	3.343	0.281 *	3.110	0.004 **	0.003
Size (omitted=< 500)					
500-999	0.769	0.115	0.639	0.002	0.001
1,000-2,499	3.686 *	0.312 ***	3.431 *	0.004 **	0.002
2,500-4,999	9.085 **	0.298 **	8.841 ***	0.003	0.001
5,000+	12.587 ***	0.543 ***	12.124 ***	0.003	0.000
Share of workers with DB plans	3.755 **	-0.226 ***	4.082 **	-0.005 ***	-0.007 ***
Share of workers with health benefits	-1.198	0.040	-1.019	0.003	0.004
Share of workers with leave	-0.194	-0.266	-0.181	-0.011 **	-0.011 **
Share of workers with insure	6.336 ***	0.372 **	6.084 *	0.007 ***	0.004 *
Share of workers with other costs	7.035 ***	0.257 ***	6.764 ***	0.002	0.000
Has other DC plan	2.381 **	0.330 ***	2.027	0.006 ***	0.005 ***
Share of full-time workers	15.192 ***	0.587 ***	14.349 ***	0.006 *	0.001
Share of union workers	0.770	0.091	0.607	0.000	-0.001
Metropolitan area	6.606 ***	0.450 ***	6.208 ***	0.006 ***	0.004 ***
Region (omitted=Northeast)					
Midwest	-14.408 ***	-0.556 ***	-13.854 ***	-0.005 ***	-0.002
South	-12.491 **	-0.458 ***	-12.101 ***	-0.003 *	-0.001
West	-8.050	-0.362 ***	-7.695 ***	-0.004 ***	-0.003 **
Flag for imputed costs	0.139	-0.092	-1.274	0.001	0.001
Total costs quintile (omitted=bottom)					
Second					0.001
Middle					0.006 *
Fourth					0.012 ***
Top					0.017 ***
Constant	10.660 *	-0.118	12.068 *	0.012 **	0.013 **
R-squared	0.277	0.227	0.272	0.173	0.238

Notes: Significance is denoted by * p < .10, ** p < .05, and *** p <.01. Breusch-Pagan test of independence: chi2 = 296.060, Pr = 0.0000

Table 8. Seemingly Unrelated Regression Results of Establishment Costs on Automatic Enrollment, 2011

	Y=DC costs	Y=Wages	Y=Legal costs	Y=HI costs	Y=DB costs	Y=Leave costs	Y=Insure costs	Y=Other costs
Autoenrollment	0.030	0.875	0.072	0.308 ***	-0.171 **	0.266 *	0.013	0.173
Industry (omitted=Wholesale trade)								
Agriculture, mining & construction	0.239	5.970 **	0.834 ***	0.304	0.182	0.233	0.017	0.040
Manufacturing	-0.023	0.207	0.185	0.549 **	0.021	0.291	0.025	0.138
Transportation & public utilities	0.888 ***	9.751 ***	1.158 ***	1.531 ***	1.137 ***	1.804 ***	0.133 ***	0.156
Retail trade	-0.035	-2.439	-0.351 *	-0.359	-0.290	-0.387	-0.039	-0.093
Financial, insurance & real estate	0.516 ***	3.675 *	0.088	0.736 ***	-0.049	0.950 ***	0.080 **	2.455
Other services	0.264	2.465	0.097	0.490 **	-0.128	0.589 *	0.002	-0.771
Size (omitted=< 500)								
500-999	0.147	0.439	0.047	0.320 **	-0.153	0.313	0.042 *	0.035
1,000-2,499	0.339 ***	2.465 **	0.198 **	0.447 ***	-0.113	0.649 ***	0.087 ***	0.067
2,500-4,999	0.369 ***	5.196 ***	0.394 ***	0.287 *	0.084	1.247 ***	0.074 ***	3.234 ***
5,000+	0.577 ***	7.341 ***	0.565 ***	0.541 ***	0.185	1.425 ***	0.058 **	3.235 **
Share of workers with DB plan	-0.317 ***	1.570	0.174 *	0.267	2.296 ***	0.591 ***	0.047 **	0.375
Has other DC plan	0.384 ***	1.966 **	0.206 ***	0.401 ***	0.081	0.305 **	0.051 ***	-0.133
Share of full-time workers	0.829 ***	13.286 ***	0.992 ***	1.558 *	0.037	2.061 ***	0.139 ***	0.668
Share of union workers	0.076	-1.377	0.310 **	2.043 **	-0.025	0.010	0.100 ***	-1.279
Metropolitan area	0.486 ***	5.437 ***	0.455 ***	0.145 ***	0.024	0.780 ***	0.047 **	-0.002
Region (omitted=Northeast)								
Midwest	-0.568 ***	-8.004 ***	-0.799 ***	-0.959 ***	-0.178	-1.383 ***	-0.085 ***	-2.695 ***
South	-0.469 ***	-6.984 ***	-0.703 ***	-0.658 ***	-0.179 *	-1.269 ***	-0.099 ***	-2.276 **
West	-0.350 ***	-3.602 ***	-0.327 ***	-0.507 ***	-0.009	-0.599 ***	-0.060 ***	-2.222 **
Constant	-0.099	8.887 ***	1.494	1.048 ***	0.116	0.132	0.022	1.368
R-squared	0.225	0.264	0.325	0.415	0.485	0.348	0.227	0.052

Notes: Significance is denoted by * p < .10, ** p < .05, and *** p <.01. Breusch-Pagan test of independence: chi2 =5077.233, Pr = 0.0000
Other controls include dummies for imputed costs. Joint test of significance of autoenrollment: chi2 = 19.84, Pr = 0.0109

Table 9. Seemingly Unrelated Regression Results of Establishment Cost Shares on Automatic Enrollment, 2011

	Y=DC cost share	Y=Wage share	Y=Legal cost share	Y=HI cost share	Y=DB cost share	Y=Leave cost share	Y=Insure cost share
Autoenrollment	0.002	0.00	-0.001	0.003	-0.003 **	0.003 **	0.000
Industry (omitted=Wholesale trade)							
Agriculture, mining & construction	0.003	0.01	0.011 ***	-0.009	0.001	-0.012 ***	-0.001
Manufacturing	-0.002	-0.02 ***	0.003	0.014 *	-0.002	0.004	0.000
Transportation & public utilities	0.007 **	-0.03 ***	-0.003	0.005	0.012 ***	0.012 ***	0.000
Retail trade	0.002	0.03 ***	-0.001	-0.008	-0.009 **	-0.006	-0.001 *
Financial, insurance & real estate	0.009 ***	-0.03 ***	-0.013 ***	0.011 *	-0.004	0.014 ***	0.001 *
Other services	0.005 *	0.00	-0.006 ***	0.008	-0.004	0.012 ***	-0.001
Size (omitted=< 500)							
500-999	0.003	-0.01 **	-0.002	0.009	-0.003	0.007	0.001
1,000-2,499	0.005 ***	-0.01 **	-0.004 ***	0.004	-0.002	0.008	0.001
2,500-4,999	0.004 **	-0.01	-0.004 ***	-0.005	-0.001	0.011	0.001
5,000+	0.004 *	-0.02 ***	-0.007 ***	-0.001	-0.001	0.012	0.000
Share of workers with DB plan	-0.007 ***	-0.04 ***	-0.006 ***	-0.006	0.049	0.003	0.001
Has other DC plan	0.007 ***	-0.01 **	-0.002 *	0.003	0.000	0.003	0.001
Share of full-time workers	0.010 ***	-0.04 ***	-0.024 ***	0.021 ***	-0.003	0.032 ***	0.003 ***
Share of union workers	0.000	-0.05 ***	0.003 *	0.047 ***	0.001	0.003	0.002 ***
Metropolitan area	0.007 ***	0.01 **	-0.003 *	-0.015 ***	-0.001	0.006 **	0.000
Region (omitted=Northeast)							
Midwest	-0.005 ***	0.02 ***	0.000	-0.005	-0.002	-0.007 ***	-0.001 **
South	-0.003 **	0.01 ***	-0.002 *	0.002	-0.001	-0.005 ***	-0.001 ***
West	-0.004 **	0.01 *	0.001	-0.001	0.000	-0.002	-0.001 ***
Constant	0.009 *	0.76 ***	0.115 ***	0.079 ***	0.009 *	0.029 ***	0.002 **
R-squared	0.162	0.425	0.410	0.171	0.605	0.382	0.216

Notes: Significance is denoted by * p < .10, ** p < .05, and *** p <.01. Breusch-Pagan test of independence: chi2 = 792.335, Pr = 0.0000. Other controls include dummies for imputed costs. Joint test of significance of autoenrollment: chi2 = 13.19, Pr = 0.0676.

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