Volume Title: Research Findings in the Economics of Aging

Volume Author/Editor: David A. Wise, editor

Volume Publisher: The University of Chicago Press

Volume ISBN: 0-226-90306-0

Volume URL: http://www.nber.org/books/wise08-1

Conference Dates: May 10-13, 2007

Publication Date: February 2010

Chapter Title: The Impact of Employer Matching on Savings Plan Participation under Automatic Enrollment

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Chapter URL: http://www.nber.org/chapters/c8208

Chapter pages in book: (311 - 327)

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The Impact of Employer Matching on Savings Plan Participation under Automatic Enrollment

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Companies have used a variety of approaches to encourage participation in employer-sponsored savings plans. The most common approach, the provision of an employer matching contribution, is now offered by the vast majority of large firms (Profit Sharing Council of America 2006). Even with a match, however, savings plan participation rates are often surprisingly low (Choi, Laibson, and Madrian 2005), and empirical studies of matching contributions' effect on plan participation have uniformly found relatively small effects (Andrews 1992; Papke and Poterba 1995; Papke 1995; Bassett, Fleming, and Rodrigues 1998; Kusko, Poterba, and Wilcox 1998; Choi et al. 2002; Even and Macpherson 2005; Duflo et al. 2006; Engelhardt and Kumar 2007).

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The findings and conclusions expressed are solely those of the authors and do not represent the views of SSA, National Institute on Aging, the National Science Foundation, any other agency of the U.S. Federal Government, the RRC, or the NBER. We thank Hewitt Associates for their help in providing the data. We are particularly grateful to Pam Hess, Yan Xu, and Lori Lucas at Hewitt for their help with this project. Neel Rao provided excellent research assistance. We appreciate the helpful feedback of Dan McFadden and seminar participants at the National Bureau of Economic Research. The authors acknowledge financial support from the National Institute on Aging (grant R01-AG021650 and P01-AG005842) and the U.S. Social Security Administration (funded as part of the Retirement Research Consortium grant #10-M-98363-1-01). Beshears acknowledges financial support from a National Science Foundation Graduate Research Fellowship. Laibson also acknowledges support from the National Science Foundation (HSD 0527516).

Automatic enrollment is an alternative mechanism for increasing savings plan participation. In a standard opt-in enrollment scheme, employees must actively elect to participate in the plan if they wish to contribute. In contrast, under automatic enrollment, employees are enrolled in their employer's savings plan at a default contribution rate and asset allocation unless they actively make an alternative choice. Relative to the standard opt-in approach, automatic enrollment dramatically increases plan participation, particularly among younger, low-tenure, and lower-income employees (Madrian and Shea 2001; Choi et al. 2002, 2004; Beshears et al. 2008). The participation rate increase at one year of tenure is as much as 60 percentage points.

All of the companies in which automatic enrollment has been studied to date have also offered an employer matching contribution. In principle, the match gives most employees a strong reason not to opt out of participation (and indeed, few do). But some extensions of automatic enrollment, such as the Automatic individual retirement account (IRA) proposal in the United States, do not include a matching contribution. The extent to which automatic enrollment's effectiveness relies on the presence of a match is an open question. Without a match, the opt-out rate could be much higher, since participation incentives are greatly reduced. On the other hand, if employee inertia drives the automatic enrollment participation effect, we might expect high participation rates even without a matching contribution.

We estimate the employer match's impact on savings plan participation under automatic enrollment in two ways. First, we study a large firm (Company A) using automatic enrollment that replaced its employer match (25 percent on the first 4 percent of pay contributed) with an employer contribution equal to 4 percent of pay plus an annual profit-sharing contribution. The employer contribution in the new regime was not contingent on the employee's contributions. We find that among new hires with six months of tenure, savings plan participation rates decreased by, at most, 5 to 6 percentage points after the firm eliminated the employer match, and overall average employee contribution rates fell by 0.65 percent of pay.

Second, we pool data on savings plan participation at nine firms with automatic enrollment. We use variation in the match structure both across and within firms to identify the relationship between participation rates and the match. This analysis is potentially confounded by firm-level omitted variables but still offers suggestive evidence. We find that a 1 percentage point decrease in the maximum potential match as a fraction of salary is associated with a 1.8 to 3.8 percentage point decrease in plan participation at six months of eligibility. Thus, moving from a typical matching structure of 50 percent on the first 6 percent of pay contributed to no match at all would reduce savings plan participation under automatic enrollment by 5 to 11 percentage points. These results, along with those for Company A

discussed before, lead us to conclude that automatic enrollment participation rates are positively related to match generosity, but the magnitude of this effect is modest.

Section 11.1 describes the savings plan and data for Company A. In section 11.2, we analyze the impact of Company A's change from a matching contribution to a noncontingent contribution. Section 11.3 examines the relationship between plan participation and the employer match amount at nine firms with automatic enrollment. Section 11.4 concludes.

11.1 Savings Plan and Data for Company A

Company A is a Fortune 500 company in the information sector. We will consider this firm's employee savings outcomes from January 1, 2002 through December 31, 2005. Table 11.1 lists the salient features of Company A's 401(k) plan. Plan eligibility is restricted to employees age twenty-one or older. Full-time employees who satisfy this age requirement are immediately eligible to participate, while part-time employees are eligible only after reaching one year of service and having worked 1,000 hours. Because of eligibility differences between full- and part-time employees, we restrict our analysis to full-time employees who are eligible for the plan.[1] Throughout the sample period, full-time employees were automatically enrolled in the 401(k) plan. After thirty days of service, employees who did not make an active enrollment election were enrolled at a contribution rate of 3 percent of salary allocated entirely to a money market fund. The plan offered six other investment options, including employer stock.

Until December 31, 2003, the company made matching contributions at a rate of 25 percent on employee contributions up to 4 percent of pay for employees who had attained at least one year of service and 1,000 hours of work (thus, the maximum possible employer match was 1 percent of pay). The maximum contribution rate over this time period was 25 percent of pay. On January 1, 2004, the company discontinued the employer match and replaced it with an employer contribution of 4 percent of pay plus an annual profit-sharing contribution that was not guaranteed in advance. In 2004 and 2005, this profit-sharing contribution was 5 percent of salary. The employer contributions in the new regime were not contingent upon the employee's contributions. The company also reduced the maximum employee contribution rate to 15 percent of pay at this time. Throughout the entire sample period, employees were also subject to IRS annual dollar

1. We do not observe full- or part-time status directly in our data. In order to screen out part-time employees, we eliminate those who did not become eligible for the plan within two months of hire. Even though full-time employees were immediately eligible upon hire, we keep employees with up to a two-month eligibility lag to allow for the possibility of administrative delays.

Table 11.1 401(k) Plan features at Company A

Eligibility	
Eligible employees	Age 21 +
Eligibility to make employee contributions	Full-time employees: Immediately upon hire Part-time employees: After 1 year of service and 1,000 hours
Eligibility for employer contributions	After 1 year of service and 1,000 hours
Automatic enrollment	Full-time employees automatically enrolled after 30 days at a 3% contribution rate allocated to a money market fund
Employee contributions	Before 1/1/2004: Up to 25% of pay After 1/1/2004: Up to 15% of pay
Employer contributions	Before 1/1/2004: Employer match of 25% on first 4% of pay contributed by employee Starting 1/1/2004: Noncontingent employer contribution of 4% of pay plus profit-sharing contribution
Match vesting	Immediate
Other	
Loans	Available
Hardship withdrawals	Available; limited to one per year
Investment choices	7 options including employer stock

Source: Summary Plan Descriptions.

contribution limits.[2] Those employees classified as "highly compensated" for IRS nondiscrimination testing purposes were potentially subject to stricter contribution rate limits, and for this reason we exclude them from the following analysis.

Our employee-level data come from Hewitt Associates, a large U.S. benefits administration and consulting firm. We have a series of year-end cross-sections of all Company A employees from 2002 through 2005. These cross-sections contain demographic information such as birth date, hire date, gender, and compensation. They also contain 401(k) variables such as the initial plan eligibility date, current participation status, initial plan participation date, a monthly contribution rate history, and year-end asset allocation and total balances.

Our analysis compares two Company A employee cohorts. The "match cohort" contains plan-eligible full-time employees hired between January 1, 2002 and June 30, 2003. The "no-match cohort" contains plan-eligible full-time employees hired between January 1, 2004 and June 30, 2005. We exclude employees hired between July 1, 2003 and December 31, 2003 because these

2. In the sample we analyze, only eight out of 645 employees contributed enough in a year to plausibly be constrained by the IRS annual dollar contribution limits. The results we report do not account for this censoring, but they are unaffected if we exclude these eight employees from the analysis.

employees were hired under the old regime (employer match), but the point at which we measure participation and contribution outcomes for our analysis is after the switch to the new regime (a noncontingent employer contribution). Because our primary outcome variables—plan participation and employee contribution rates—are measured at six months of tenure, both cohorts are further limited to include only individuals whose employment at the company lasted for at least six months.

Company A made several significant acquisitions during our sample period. Unfortunately, our data do not identify those employees who joined the firm as a result of these acquisitions. To minimize the potentially confounding influence of these acquisitions, we make three further restrictions to our sample. First, we exclude employees who lived in states where the acquired companies were headquartered. Second, we exclude employees whose initial appearance in our data set does not correspond to their year of hire (e.g., we exclude employees who are first observed in our data in the 2004 cross-section but who are listed as being hired before 2004).[3] Third, we exclude employees whose hire dates are revised by more than one calendar month across different year-end cross-sections.

Our final sample contains 645 employees: 293 in the match cohort and 352 in the no-match cohort.

11.2 Savings Plan Outcomes under Automatic Enrollment with and without an Employer Match: Company A

We begin our analysis by comparing means across the match and no-match cohorts. We first consider plan participation, which we define as having a positive (nonzero) employee contribution rate. The first row of table 11.2 shows that 89.1 percent of match-cohort employees were participating in the savings plan at six months of tenure. In contrast, the six-month participation rate for the no-match cohort is 80.7 percent. This 8.4 percentage point difference in participation rates across the two cohorts is statistically significant and relatively stable from two months of tenure onward. The second row of table 11.2 shows average employee contribution rates at six months of tenure (including nonparticipants with a contribution rate of 0). Given the decline in plan participation, it is not surprising that the average contribution rate also falls from 3.60 percent to 2.89 percent of salary after the elimination of the employer match. This 0.71 percent drop is statistically significant and driven both by the participation decline and a reduction in the average contribution rate conditional on participation from 4.04 percent to 3.58 percent of pay. The 0.46 percent drop in the conditional average

3. We make one exception to this second criterion. There are twenty-two employees who first appear in our data in the year-end 2003 cross-section with December 2002 hire dates. We include these employees in the sample because their absence from the 2002 data is likely due to administrative delays in processing new employees at year-end rather than due to an acquisition.

Table 11.2 **Summary statistics on savings plan outcomes and demographic characteristics for employees at Company A**

	Match cohort (Hired 1/1/2002 through 6/30/2003)	Nonmatch cohort (Hired 1/1/2004 through 6/30/2005)	*t*-statistic for difference
Savings plan outcomes (at six months tenure)			
Participation rate	89.1%	80.7%	2.95
Average contribution rate (all employees)	3.60%	2.89%	3.01
Average contribution rate (participants only)	4.04%	3.58%	1.86
Demographic characteristics			
Fraction female	51.5%	45.7%	1.47
Average age	33.21	31.83	2.07
Annual salary (2004 dollars)	$49,167	$40,343	2.93
Sample size	$N = 293$	$N = 352$	

Source: Authors' calculations. The sample includes non-highly-compensated, full-time, savings-plan-eligible employees. Growth in seasonally adjusted average weekly earnings for private sector workers from the Current Employment Statistics survey is used to deflate employee salaries to 2004 dollars.

contribution rate, however, is only statistically significant at the 10 percent level and is partly explained by the concurrent reduction in the maximum allowable contribution rate from 25 percent to 15 percent of pay.

Figure 11.1 shows the distribution of employee contribution rates at six months of tenure for the two cohorts separately. We see that the transition from the employer match to the noncontingent contribution was associated with a decrease in the fraction of employees contributing, at most, positive rates.[4] More than two-thirds of employees in both cohorts contribute at the 3 percent default contribution rate, consistent with previous research on how automatic enrollment affects the employee contribution rate distribution (Madrian and Shea 2001; Choi et al. 2002, 2004; Beshears et al. 2008). In contrast to previous research, we observe very few employees contributing at the 4 percent match threshold (only 2 percent of employees in the match cohort and 1 percent of employees in the nonmatch cohort for whom the match threshold is no longer relevant). There are several plausible explanations for why so few employees in the match cohort are at the match threshold. First, the employees at Company A are observed at only six months of tenure, which does not give them much time to switch from the default contribution rate to the match threshold (or another contribution rate of their choosing). Second, because the match threshold was only 1 percentage point above the default rate, participants' incentive to increase their contribution rate to the match threshold was much weaker than in other

4. The decline in the fraction of employees contributing at a rate greater than 15 percent in the nonmatch cohort is an artifact of the reduction in the maximum allowable contribution rate from 25 percent to 15 percent of pay that coincided with the switch from a matching contribution to a noncontingent contribution.

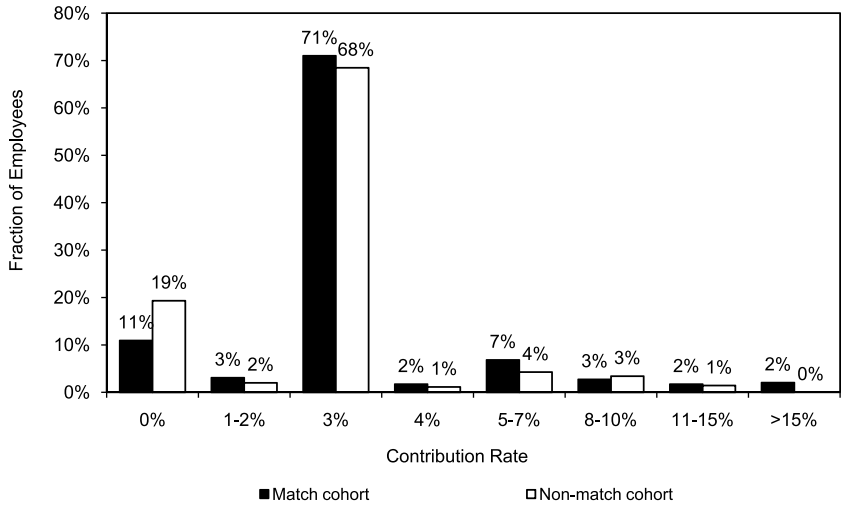

Fig. 11.1 Distribution of contribution rates with and without and employer match at six months of tenure: Company A

firms studied (Carroll et al. 2009). Finally and perhaps most importantly, employees were not eligible to receive matching contributions until having completed one year of service, so most of the benefits from contributing at the match threshold did not accrue to employees at six months of tenure.

Of course, the transition from an employer match to a noncontingent contribution may have been accompanied by other changes at Company A that caused the savings plan choice differences between the two cohorts. Table 11.2 shows that relative to the nonmatch cohort, the match cohort was disproportionately female, somewhat older, and had a higher average salary.[5] Not controlling for these differences could make the participation decline due to the employer match elimination look larger than it really was.

Table 11.3 shows the results of regressions that include demographic explanatory variables. The first two columns show the coefficients from a linear probability regression of savings plan participation at six months of tenure on an indicator for having been hired with an employer match in place, gender, age, and income in 2004 dollars. In column (1), we control linearly for age and income, whereas in column (2) we include age and income

5. We deflated the salaries of employees in both cohorts to 2004 dollars using the growth in seasonally adjusted average weekly earnings for private sector workers from the Current Employment Statistics survey. Part of the difference in average age and income between the cohorts might be the result of an internship program that took place in the second half of the sample period. Compared to other employees, interns probably have weaker motives to participate in the 401(k) plan. To make sure that the presence of interns is not driving our results, we drop the twenty-nine employees in the sample with incomes of less than $10,000 and redo our analysis. The qualitative results do not change.

Table 11.3 **Effect of the employer match on savings plan outcomes under automatic enrollment: Company A**

	Participation (OLS) (1)	Participation (OLS) (2)	Participation (probit) (3)	Participation (probit) (4)	Employee contribution rate (tobit) (5)	Employee contribution rate (tobit) (6)
Match cohort	0.0670**	0.0603**	0.0653**	0.0543**	0.6769**	0.6394**
	(0.0284)	(0.0271)	(0.0274)	(0.0251)	(0.2725)	(0.2679)
Female	0.0750***	0.0353	0.0679**	0.0268	0.5159**	0.3860
	(0.0284)	(0.0275)	(0.0275)	(0.0244)	(0.2738)	(0.2720)
Age						
Years	0.0003		–0.0007		0.0056	
	(0.0019)		(0.0018)		(0.0181)	
Linear spline	No	Yes	No	Yes	No	Yes
Income (2004 USD)						
$1,000	0.0014***		0.0020***		0.0214***	
	(0.0004)		(0.0005)		(0.0040)	
Linear spline	No	Yes	No	Yes	No	Yes
Sample size	$N = 645$	$N = 645$	$N = 645$	$N = 645$	$N = 645$	$N = 645$

Source: Authors' calculations.

Notes: Standard errors are in parentheses. The sample includes non-highly-compensated, full-time, savings-plan-eligible employees. Growth in seasonally adjusted average weekly earnings for private sector workers from the Current Employment Statistics survey is used to deflate employee salaries to 2004 dollars. All specifications include a constant. The dependent variable in columns (1) to (4) is a binary indicator for savings plan participation. The dependent variable in columns (5) to (6) is the employee's (censored) savings plan contribution rate (including zeros). Columns (3) to (4) report the marginal effects from a probit regression holding all variables fixed at their means. Columns (5) to (6) report the marginal effects from a tobit regression holding all variables fixed at their means. In the case of binary variables, the marginal effects in columns (3) to (6) are reported for a change from zero to one. The age spline has knots at thirty, forty, and fifty years, and the income spline has knots at $20,000, $40,000, $60,000, and $80,000. When linear splines for age and income are included in a regression, marginal effects are calculated holding age and income at their means (as opposed to holding the variables that make up the splines each fixed at their individual means).

***Significant at the 1 percent level.

**Significant at the 5 percent level.

splines.[6] The estimated 6.0 to 6.7 percentage point participation impact of having a match is statistically significant and somewhat lower than the raw 8.4 percentage point difference seen in table 11.2. A probit specification (columns [3] and [4]) yields estimated employer match marginal effects of 5.4 to 6.5 percentage points, also statistically significant. Columns (5) and (6) list the marginal effects from a tobit regression of employee contribution rates, which are censored below at zero and above at 25 percent (the match cohort) or 15 percent (the nonmatch cohort). Eliminating the employer match at Company A is associated with a contribution rate decline of about 0.66 percent of salary, an effect that is statistically significant and only slightly less than the 0.71 percent raw effect in table 11.2.

In summary, controlling for demographic differences between the match and nonmatch cohorts reduces but does not eliminate the estimated impact of the employer match under automatic enrollment. Note that these estimates represent the *combined* effect of removing the match and replacing it with a noncontingent contribution. The replacement of a match with a (relatively larger) noncontingent contribution generates a substitution effect that discourages employee contributions and a *net* income effect that also discourages employee contributions. Employee contributions are no longer subsidized and the employee has more total savings (employee plus employer contributions) for any given employee contribution.[7] Our estimates provide an *upper bound* of the effects due *solely* to the removal of the employer match, since the simultaneous introduction of the noncontingent employer contribution generates an income effect that suppresses employee contributions.[8]

Our analysis also sheds light on the question of savings crowd-out. Our estimates provide an upper bound on the negative participation effects due *solely* to the introduction of the noncontingent contribution, since the simultaneous elimination of the match is likely to have discouraged employee participation.[9]

One limitation of many savings studies that use administrative data is the inability to address potentially offsetting (or reinforcing) changes in savings

6. The age spline has knots at thirty, forty, and fifty years, and the income spline has knots at $20,000, $40,000, $60,000, and $80,000.

7. The employee loses a 25 percent match on contributions up to 4 percent of income but gains both a noncontingent employer contribution equal to 4 percent of income and a noncontingent profit-sharing contribution.

8. On the other hand, there are some plausible reasons that the introduction of the noncontingent contribution could *increase* employee contributions. Employees might view it as a signal that their expected future income growth has fallen. Alternatively, employees could interpret the noncontingent contribution as implicit advice that their optimal savings rate is higher than they previously believed.

9. A match unambiguously increases participation in a two-period model. Opposite effects are possible in models with more periods. However, the empirical literature on matching generally finds positive participation effects. Note that even in a two-period model, matching need not increase the average employee contribution due to the substitution effect.

behavior *outside* of the account being studied. This caveat applies here as well. Employees have additional assets outside their 401(k) plan, and some employees also have other savings plan assets within Company A, which has an employee stock ownership plan (ESOP). However, most of the employees in our nonmatch sample are not eligible to participate in the ESOP (employees must have one year of service to be eligible). Moreover, the plan is nonelective; the company makes ESOP contributions on an annual basis to all employees who are eligible. With more years of data, it might be possible to assess the extent to which changes in ESOP balances across the two cohorts affect employees' 401(k) choices at Company A.[10] Unfortunately, the data are not presently available to undertake such an analysis, and we do not observe any other financial assets of this company's employees.

11.3 Employer Matching Level and Savings Plan Participation under Automatic Enrollment at Nine Companies

We now broaden our analysis to explore the relationship between the generosity of the employer match and savings plan participation under automatic enrollment at nine companies. We use variation in the employer match structure both within and across firms for identification. However, because of the potential existence of firm-level omitted variables, the following results must be interpreted with caution.

Table 11.4 describes the match structure at the nine companies used in our analysis. The match rate varies from no match at Company A (beginning in 2004 for the nonmatch cohort) to a 133 percent match on the first 6 percent of pay at Company I. Conditional on offering a match, the match threshold ranges from 2 percent of pay for employees with less than one year of tenure at Company F to 7 percent of pay at Company B. Two companies have changes in their employer match over our sample period: Company A (analyzed in sections 11.2 and 11.3), which replaced its employer match of 25 percent on the first 4 percent of pay contributed with a noncontingent employer contribution in January 2004; and Company B, which gradually increased its match rate from 60 percent to 62 percent to 65 percent on the first 7 percent of pay contributed.

For this section's analysis, we use data that are identical in structure to the Company A data described in section 11.2. We pool employees at the nine firms who are observed in at least one of the year-end cross-sections from 2002 through 2005.[11] Our sample is limited to employees at these firms

10. Madrian and Shea (2001), who first documented large participation increases following automatic enrollment in a 401(k) savings plan, find no evidence of offsetting savings behavior in the Employee Stock Purchase Plan (ESPP) of the company they studied.

11. Three firms did not have data available for all four years. We drop three additional firm-years because different employees within a company were offered different matches in these years and we are unable to identify which employees were offered which match.

Table 11.4 **401(k) Eligibility and match structure at nine companies with automatic enrollment**

Firm	Eligibility	Match structure	Maximum match	Auto. enroll. details	Years	Demographics
A	Must be age 21 +. FT: immediately eligible. PT: eligible after 1 yr. and 1,000 hrs. Match or noncontingent contribution after 1 yr. and 1,000 hrs.	Before 01/04: 25% on first 4% of pay After 01/04: None; 4% noncontingent contribution + profit-sharing contribution	Before 01/04: 1% After 01/04: 0%	Default: 3% rate, money market fund When: 30 days	2002–2005	Yes
B	FT: immediately eligible. PT: 1,000 hrs. in a 12-month period. All participants eligible for match.	Before 01/04: 60% on first 7% of pay 01/04–01/05: 62% on first 7% of pay After 01/05: 65% on first 7% of pay	Before 01/04: 4.2% 01/04–01/05: 4.34% After 01/05: 4.55%	Default: 3% rate, pre-mixed portfolio When: 30 days	2003–2005	Yes
C	All employees immediately eligible. Participants eligible for match after 1 year.	75% on first 6% of pay	4.5%	Default: 3% rate, balanced fund When: 30 days	2002–2005	Yes
D	FT: immediately eligible. PT: 1,000 hrs. in a 12-month period. All participants eligible for match.	$<$ 1 yr. tenure: 35% on first 6% of pay $\geq$ 1 yr. tenure: 70% on first 6% of pay	4.2%	Default: 3% rate, balanced index fund When: 31 days	2002–2005	Yes
E	All employees immediately eligible to contribute and receive a match.	100% on first 3% of pay	3%	Default: 2% rate, money market fund When: 30 days	2002–2004	No
F	All employees immediately eligible to contribute and receive a match.	$<$ 1 yr. tenure: 100% on first 2% of pay $\geq$ 1 yr. tenure: 100% on first 6% of pay	6%	Default: 2% rate, money market fund When: Immediate	2003–2005	Yes
G	All employees immediately eligible to contribute and receive a match.	60% on first 6% of pay	3.6%	Default: 4% rate When: 30 days	2002	Yes
H	All employees immediately eligible. Participants eligible for match after 1 yr.	100% on first 6% of pay	6%	Default: 6% rate, money market fund When: Immediate	2002–2004	No
I	FT: immediately eligible. PT: ineligible. All participants eligible for match.	133% on first 6% of pay	8%	Default: 3% rate, near-term portfolio When: 60 days	2002 2004 2005	No

Note: FT: Full-time employees; PT: Part-time employees.

who meet the following criteria: they became eligible for their employer-sponsored savings plan between January 1, 2002 and June 30, 2005; they became eligible when they were between twenty-one and sixty-five years of age; they became eligible when automatic enrollment was in effect; and they did not leave the company within six months of becoming eligible. Unlike the analysis in sections 11.2 and 11.3, we do not attempt to filter out part-time employees because we are unable to identify them for some of the companies.

To assess the relationship between the employer match and savings plan participation under automatic enrollment, we run a linear probability regression[12] of savings plan participation at six months of eligibility[13] on age, income in 2004 dollars, gender, and the generosity of the employer match. Our key dependent variable of interest is the maximum employer match (as a fraction of income) that a participant can receive by contributing at the match threshold and fulfilling all match-related service requirements, given the match structure in place at six months of eligibility. The maximum employer match does not necessarily correspond to the matching contribution an employee could receive after only six months of eligibility. For example, the maximum employer match as just defined at Company D is 4.2 percent of pay (a 70 percent match on the first 6 percent of pay), even though employees with less than one year of tenure can receive a match of at most 2.1 percent of pay (a 35 percent match on the first 6 percent of pay). Table 11.4 lists the maximum employer match used in our regression for each of the nine firms.

Our employer match variable definition rests on the assumption that employees are forward-looking with respect to the match when making their decision about whether to opt out of savings plan participation under automatic enrollment. Given that the service requirement to obtain the maximum employer match is at most one year in our sample, we feel that this assumption is appropriate. Only three of our nine firms (companies A, C, and H) have matches linked to tenure. We also assume that the match rate changes within companies A and B were surprises that were not known to employees in advance, since we define the maximum employer match using the match structure in place at the time we measure participation.

Because our maximum employer match variation is largely across-firm variation, we are precluded from putting firm-level fixed effects in these regressions. We do, however, calculate Huber-White standard errors with clustering at the firm level.

12. Even though our dependent variable is binary, we use a linear probability regression rather than a probit in order to facilitate the graphical display of the results in figure 11.2.

13. Instead of measuring participation at six months of tenure, as done earlier for Company A, we measure participation after six months of eligibility because some firms' employees are not immediately eligible upon hire. For most employees in the sample, however, six months of tenure and six months of eligibility are equivalent.

Table 11.5 **The effect of the employer match on savings plan participation under automatic enrollment**

	Full sample		Companies with control data	
	(1)	(2)	(3)	(4)
Maximum match	2.7818***	2.1995***	3.7519***	1.7784***
	(0.6131)	(0.3257)	(0.2623)	(0.4290)
Gender				
Female	No	0.0021	No	0.0075
		(0.0059)		(0.0072)
Indicator for gender missing	No	–0.3254	No	No
		(0.6318)		
Age				
Linear spline	No	Yes	No	Yes
Indicator for age missing	No	–0.4109	No	No
		(0.2125)		
Income (2004 USD)				
Linear spline	No	Yes	No	Yes
Indicator for income missing	No	0.4882***	No	No
		(0.1128)		
Constant	0.7778***	0.1722	0.7536***	0.2281
	(0.0271)	(0.1254)	(0.0028)	(0.1265)
Sample size	N = 44,279	N = 44,279	N = 35,895	N = 35,895

Source: Authors' calculations.

Notes: Huber-White robust standard errors with clustering by firm are reported in parentheses. The sample includes savings plan-eligible employees ages twenty-one to sixty-five. All regressions are linear probability regressions. The dependent variable is a binary indicator for savings plan participation. The maximum match is the maximum fraction of income an employee can receive in matching contributions by contributing at the match threshold and fulfilling all service requirements, given the match structure in place when the employee had six months of 401(k) eligibility. The coefficient on the maximum match represents the percentage point increase in the participation rate when employees are offered an additional 1 percent of their salary in matching contributions. The spline for age has knots at thirty, forty, and fifty years, and the spline for income has knots at $20,000, $40,000, $60,000, and $80,000. Growth in seasonally adjusted average weekly earnings for private sector workers from the Current Employment Statistics survey is used to deflate employee salaries to 2004 dollars.

***Significant at the 1 percent level.

Column (1) in table 11.5 gives the coefficient estimates from the regression previously described when no other control variables are included. In this specification, decreasing the maximum employer match by 1 percent of salary is associated with a plan participation reduction at six months of eligibility under automatic enrollment of 2.8 percentage points. This is somewhat smaller than the 5 to 6 percentage point decline observed at Company A when it eliminated its employer match. However, as noted earlier, the Company A estimate is an upper bound on the true effect of match removal, since the match was replaced with a noncontingent employer contribution that is theoretically expected to decrease participation.

Figure 11.2 displays the regression results from the first column of table

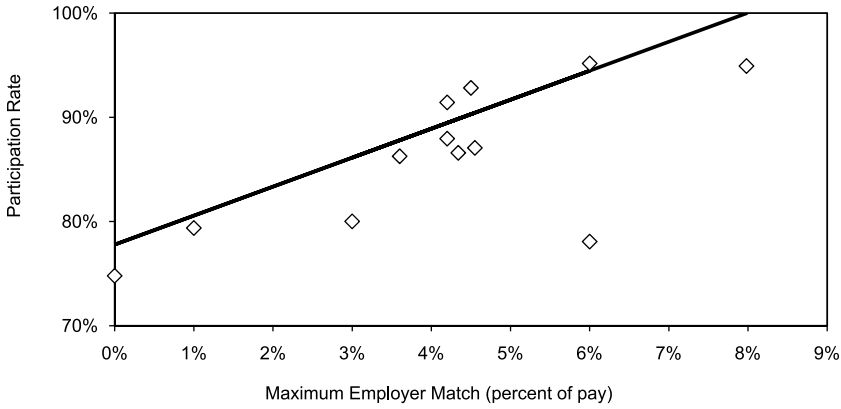

Fig. 11.2 Relationship between the employer match and savings plan participation under automatic enrollment at nine firms

Notes: Each point represents the raw participation rate among individuals who are employed by a given firm with the specified match amount. Participation is defined as having a positive employee contribution rate at six months of eligibility. The match amount is defined as the maximum fraction of income an employee can receive in employer matching contributions by contributing at the match threshold and fulfilling all service requirements, given the match structure in place when the employee had six months of 401(k) eligibility. The slope and intercept of the fitted line are given by the coefficients on the match amount and the constant in column (1) of table 11.5.

11.5 graphically. Every data point in figure 11.2 corresponds to a group of employees that shares the same firm and maximum employer match (firms whose match changes over time are represented in the graph by more than one data point). The maximum match is on the *x*-axis, and the raw savings plan participation rate is on the *y*-axis. The regression line from the first column of table 11.5 is also shown. Figure 11.2 shows that the positive relationship between the maximum match and participation estimated in table 11.5 is robust and does not seem to be driven by outliers.

In column (2) of table 11.5, we add control variables, using linear splines for age and income as well as indicator variables for missing gender, age, and income data.[14] The inclusion of demographic controls reduces the estimated impact of the employer match slightly: decreasing the maximum employer match by 1 percent of salary is associated with a 2.2 percentage point decline in participation, rather than the 2.8 percentage point decline shown in column (1).

Most of the individuals for whom gender, age, or income data are missing come from three firms. Therefore, we restrict the sample in column (3)

14. The results are qualitatively similar if we use linear controls for age and income rather than splines.

to the six firms for which we can construct demographic controls.[15] When we run the regression without control variables—as in column (1)—on this restricted sample, the estimated impact of the employer match increases relative to that in column (1); participation declines by 3.8 percentage points when the maximum match decreases by 1 percent of pay. This suggests that there are some differences between the companies in our sample for which we do and do not have demographic data.

Finally, in column (4), we add the demographic control variables to the regression restricted to companies with demographic information. Just as in the full sample, adding demographic controls to this restricted sample reduces the estimated impact of the employer match. Across all of the specifications in table 11.5, the coefficient on the maximum employer match ranges from 1.8 to 3.8, indicating that decreasing the maximum employer match by 1 percent of salary reduces savings plan participation at six months of eligibility under automatic enrollment by 1.8 to 3.8 percentage points.

11.4 Conclusions

Automatic enrollment is an increasingly important feature of the retirement savings landscape. A recent survey of large U.S. firms found that 36 percent already automatically enroll new employees, and 55 percent of firms without automatic enrollment say that they are very likely or somewhat likely to adopt it within a year (Hewitt Associates 2007). To date, all the automatic enrollment savings plans that have been studied have had an employer match. The U.S. pension regulations encourage the use of matching through safe harbor clauses; firms can avoid nondiscrimination testing if they have a sufficiently generous match. However, there is *also* a safe harbor for noncontingent employer contributions.[16]

This chapter aims to address how effective automatic enrollment might be in the absence of an employer match. Using two estimation strategies, one based on the substitution of the employer match with a noncontingent employer contribution, and the other based primarily on variation in the employer match across firms, we find that participation rates under automatic enrollment decline only modestly when the employer match is eliminated or reduced. The switch from a matching contribution to a noncontingent contribution at Company A caused the plan participation rate at six months of tenure to drop by 5 to 6 percentage points. In a sample of nine

15. Even within those companies for which we have demographic information, some employees are nonetheless missing this information. We drop these employees with missing demographic data from the regressions in columns (3) and (4).

16. To obtain safe harbor status, the plan must provide either a matching contribution equal to 100 percent of contributions up to 1 percent of pay and 50 percent of contributions for the next 5 percent of pay, or a noncontingent contribution of 3 percent of pay.

firms with automatic enrollment, decreasing the employer match amount 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. Collectively, these results imply that moving from a typical matching structure of 50 percent on the first 6 percent of pay contributed to no match at all would reduce savings plan participation under automatic enrollment by 5 to 11 percentage points. Interestingly, these results are similar to the employer match effect on participation estimated by Engelhardt and Kumar (2007) in a sample of older employees, most of whom were not subject to automatic enrollment.

Therefore, the success of automatic enrollment at increasing participation in employer-sponsored savings plans does not appear to rely much on having an employer match. It thus seems likely that automatic enrollment will also be effective at increasing participation in other contexts that do not naturally lend themselves to a matching contribution.

These results also suggest that companies with automatic enrollment need not offer a match in order to achieve broad-based participation. However, the employer match may be valuable for reasons other than the inducement that it creates to participate. For example, as a tax-favored form of compensation, the employer match may be important in the recruiting and retention of employees even if it does not have a large impact on savings plan participation.

However, the experience of Company A suggests that some of the purposes served by an employer match could be achieved with a noncontingent employer contribution as well. The merits of an employer match versus a noncontingent contribution likely hinge not only on their average impact on savings plan outcomes (e.g., lower participation with a noncontingent contribution), but also on their distributional impact. For example, a noncontingent contribution will likely increase total savings for those employees least inclined to save, but its effects elsewhere in the savings distribution are ambiguous, since a match tends to cause herding at the match threshold. This herding may either increase or decrease savings, depending on how high the match threshold is and what savings rate employees would have chosen in the absence of a match.

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Comment

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The rise of 401(k) plans as a channel for providing retirement incomes to employees makes enrollment in these plans increasingly important for the welfare of future retirees. The authors utilize persuasive natural experiments to quantify behavioral response to key 401(k) plan features: whether the default is automatic enrollment unless the employee opts out or nonenroll-

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