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THE POWER OF SUGGESTION: INERTIA IN 401(k) PARTICIPATION AND SAVINGS BEHAVIOR*

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This paper analyzes the impact of automatic enrollment on 401(k) savings behavior. We have two key findings. First, 401(k) participation is significantly higher under automatic enrollment. Second, a substantial fraction of 401(k) participants hired under automatic enrollment retain both the default contribution rate and fund allocation even though few employees hired before automatic enrollment picked this particular outcome. This "default" behavior appears to result from participant inertia and from employee perceptions of the default as investment advice. These findings have implications for the design of 401(k) savings plans as well as for any type of Social Security reform that includes personal accounts over which individuals have control. They also shed light more generally on the importance of both economic and noneconomic (behavioral) factors in the determination of individual savings behavior.

I. INTRODUCTION

In this paper we analyze the 401(k) savings behavior of employees in a large U. S. corporation before and after an interesting change in the company 401(k) plan. Before the plan change, employees who enrolled in the 401(k) plan were required to affirmatively elect participation. After the plan change, employees were automatically enrolled in the 401(k) plan immedi-

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ately upon hire unless they made a negative election to opt out of the plan. Although none of the economic features of the plan changed, this switch to automatic and immediate enrollment dramatically changed the savings behavior of employees. We have two key findings. First, 401(k) participation is significantly higher under automatic enrollment. Second, the default contribution rate and default investment allocation chosen by the company for automatic enrollment has a strong influence on the savings behavior of 401(k) participants. A substantial fraction of 401(k) participants hired under automatic enrollment exhibit what we call "default" behavior—sticking to both the default contribution rate and fund allocation even though very few employees hired before automatic enrollment would have picked this particular outcome.

The results in this paper speak directly to much of the recent literature that either advocates or seeks to incorporate behavioral explanations into economic models of savings behavior [Thaler 1994; Akerlof 1991; Lusardi 1999; Bernheim 1997; Laibson, Repetto, and Tobacman 1998; O'Donoghue and Rabin 1998, 1999; Shefrin and Thaler 1988]. The first finding of the paper, that 401(k) participation is significantly higher after automatic enrollment is adopted at the study company, supports the contention made in much of this literature that procrastination is an extremely important factor in the widely perceived inadequacy of individual savings for retirement. The second finding, that of default savings behavior under automatic enrollment, is also consistent with procrastination in savings behavior, in this case procrastination in the reallocation of retirement assets. This finding also conforms with several other behavioral explanations for individual savings behavior, including anchoring around the default and a bias for the status quo. The paper also presents evidence that the default investment allocation under automatic enrollment may be perceived as advice on the part of the company, a result that speaks directly to the arguments made by Bernheim and others on the importance of investor education [Bernheim 1998; Bernheim and Garrett 1996].

The paper proceeds as follows. In Section II we describe the features of the 401(k) plan at the study company used in the analysis. This is followed in Section III with a description of the data that are used. Sections IV and V then present the empirical analysis of the effects of automatic enrollment on 401(k) savings behavior. Section VI explores the various explanations that can

account for the findings in Sections IV and V, and Section VII concludes.

II. Features of the 401(k) Savings Plan at a Large U. S. Corporation

To examine the importance of economic versus noneconomic factors in the savings behavior of individuals, we use employee-level data on 401(k) participation and savings behavior from a large, publicly traded Fortune 500 company in the health care and insurance industry. In March of 1999 the company had major locations in 38 states, the District of Columbia, and Puerto Rico. The company first implemented its 401(k) savings plan in 1985. This paper will consider the 401(k) savings decisions of employees at this company over approximately a two-year period from June of 1997 through June of 1999.

The company implemented a change in 401(k) enrollment and eligibility that took effect on April 1, 1998. Prior to this change, 401(k) participation was limited to individuals with one or more years of employment at the firm. Individuals eligible for participation had the option of contributing up to 15 percent of compensation to the 401(k) plan, with the first 6 percent of compensation contributed receiving a 50 percent employer match. In order to participate, individuals had to fill out an enrollment form or call the 401(k) record keeper to (1) authorize payroll deduction of their employee contributions, (2) select a contribution rate, and (3) choose the investment allocation of the combined employee and employer contributions.

Effective April 1, 1998, two substantive changes were made. The first was that *all* employees were made immediately eligible to participate in the 401(k) plan regardless of service, although the one-year service requirement was maintained to qualify for an employer match. The second change was that all *newly* hired employees were automatically enrolled in the 401(k) plan unless they affirmatively elected to opt out (a so-called "negative" election). Employees who did not decline 401(k) participation were automatically enrolled in the 401(k) plan with a 3 percent contribution rate allocated entirely to the money market fund that was part of the overall menu of fund options available to all 401(k) participants. However, as with all 401(k) participants hired prior to automatic enrollment, these employees had the option at any

TABLE I
401(k) PLAN FEATURES BY PLAN DATE

	Before 4/1/1998	After 4/1/1998
Eligibility		
Eligible employees	All except union and temporary employees	All except union and temporary employees
First eligible	After one year of employment	Immediately upon hire
Employer match eligible	After one year of employment	After one year of employment
Contributions		
Employee contributions	1 percent to 15 percent of compensation[a]	1 percent to 15 percent of compensation[a]
Employer match	50 percent of employee contribution up to 6 percent of compensation[a]	50 percent of employee contribution up to 6 percent of compensation[a]
Vesting		
Vesting of employee contributions	Immediate	Immediate
Vesting of employer contributions	2-year cliff	2-year cliff
Participation		
Default participation decision	No	Yes
Default contribution rate	None	3 percent of compensation
Default fund allocation	None	Money market fund
Other		
Loans	Available	Available
Hardship withdrawals	Available	Available
Investment choices	9 options	9 options

Source: Summary Plan Descriptions and personal communication with company officials.
a. Recognized compensation includes all compensation (base, bonus, commissions, etc.) up to IRC 401(a)(17) pay limitations.

time to change both their contribution rate and their fund allocation.

Table I summarizes the overall plan characteristics before and after the changes implemented on April 1, 1998. Beyond the aspects of the plan just described, other features of the 401(k) plan did not change: the employer-matching provisions, vesting of employer contributions, investment options, and the conditions for loans and hardship withdrawals remained the same both before and after April 1, 1998. Although the design features of

401(k) and other savings plans vary widely across employers, the features of the 401(k) plan in this company before the April 1998 plan change were typical of 401(k) plans in other large corporations.[1] While this company was by no means the first to implement automatic enrollment, such a plan feature is still relatively uncommon.[2] A recent survey of firms utilizing automatic enrollment suggests that the features of this company's automatic enrollment plan are very similar to the features of other automatic enrollment plans. A 3 percent default contribution rate seems to be standard, and the default investments tend to be fairly conservative, with money market funds, guaranteed income funds, stable value funds, or balanced funds cited as the most common options [Profit Sharing/401(k) Council of America 2000]. Although automatic enrollment is not currently a very typical feature of 401(k) plans, a recent survey of companies revealed that 28 percent of companies were considering automatic enrollment [Hays 1999].

The study company adopted automatic enrollment because it was consistently failing to satisfy the IRS nondiscrimination tests required for employee 401(k) contributions to be excluded from taxable income.[3] As a consequence, the firm was having to make ex post 401(k) contribution refunds to highly compensated employees in order to come into compliance with the nondiscrimination tests, a process that is time consuming, costly, and that generates uncertainty for a substantial number of the firm's employees. The firm believed that automatic enrollment would increase the 401(k) participation rate sufficiently to ensure compliance with the nondiscrimination tests.[4] No other significant changes in hiring, personnel, benefits administration, or compensation practices were made concurrent with the switch to automatic enrollment.

1. See Bureau of Labor Statistics [1998] for general 401(k) plan characteristics in medium and large firms.

2. A 1999 survey by Buck Consultants reports that 7 percent of 401(k) sponsors have plans with automatic enrollment. This number is likely too high, however, as the respondents to the surveys conducted by consulting firms tend to be very large firms, and large firms are usually the first to adopt innovative changes in benefit plan design [Hays 1999].

3. See Carrington, McCue, and Pierce [1999] for a succinct discussion of the nondiscrimination rules as they apply to pensions.

4. Indeed, since the switch to automatic enrollment, the firm has had no problems with nondiscrimination testing.

TABLE II
EMPLOYEE COHORTS FOR COMPARATIVE ANALYSIS

	OLD	WINDOW	NEW
Dates of hire[a]	4/1/1996 to 3/31/1997	4/1/1997 to 3/31/1998	4/1/1998 to 3/31/1999
First eligible to participate in 401(k) plan	One year after date of hire	4/1/1998	Date of hire
First eligible for employer match	One year after date of hire	One year after date of hire	One year after date of hire
Automatically enrolled in 401(k) plan	No	No	Yes
Default contribution rate	None	None	3 percent
Default fund allocation	None	None	Money market fund

a. For employees hired through the acquisition of other companies, eligibility for 401(k) plan participation and the employer match was determined by the date of hire at the acquired company. Employees hired through acquisitions on or after 4/1/1998 were subject to automatic enrollment under the same terms as newly hired employees, with eligibility for the employer match determined by the date of hire at the acquired company.

III. THE DATA

In our empirical analysis we use data on all employees at the study company from three points in time. For most of the analysis, we use data from June 30, 1999, fifteen months after the switch to automatic enrollment. We also make some limited use of data from June 30, 1998, and March 31, 2000. The data include information on 401(k) participation, contribution rates, and fund allocations, as well as some demographic information such as age, gender, race/ethnicity, tenure, and salary.[5]

For the purposes of analyzing the effects of automatic enrollment on the 401(k) savings decisions of employees, it is instructive to compare three particular subgroups of employees at the study company (Table II). The first is individuals who were hired between April 1, 1996, and March 31, 1997. At the time automatic enrollment was implemented, all of these employees had between one and two years of tenure and were eligible for the 401(k) plan with a company match. In the subsequent analysis, we shall refer to this cohort as the OLD group. The second group is employees hired between April 1, 1997, and March 31, 1998. When automatic enrollment was

5. Information on educational attainment and marital status is not available.

implemented on April 1, 1998, these recent hires were already employed by the study company but had less than one year of tenure and thus were not eligible to participate in the 401(k) plan. On April 1, 1998, however, all of these employees became immediately eligible to participate in the 401(k) plan, albeit without a company match until reaching one year of service. This group, however, was not automatically enrolled. We shall refer to this cohort of employees as the WINDOW group. The third group of employees is those who were hired between April 1, 1998, and March 31, 1999. These employees represent the first annual cohort of employees hired with immediate 401(k) eligibility and automatic enrollment absent a negative 401(k) election under the terms of the new 401(k) plan design. We shall refer to this cohort as the NEW group. Many of the tables and charts also present statistics for what is labeled as the "3+" cohort, which includes everyone hired prior to the OLD cohort.

In most of the analysis, we restrict the sample to employees who are not yet age 65 and to those with at least three months of tenure. The exclusion of employees over age 65 is made for two reasons: first, there are very few employees over age 65 who still work at the study company, and second, eligibility for Social Security and potentially pension benefits from other, former employers, could make the 401(k) savings decisions for this group very different from those for younger employees. We make the second exclusion in order to maintain a consistent one-year cohort size for the NEW, WINDOW, and OLD cohorts, the three primary groups in our analysis. In addition, we exclude about 900 employees who were acquired from other companies after the onset of automatic enrollment but who had been hired by their previous company before April 1, 1998. We do this because all employees acquired after April 1, 1998, were also automatically enrolled in the 401(k) plan, but their tenure within the company is determined by their original date of hire. Thus, in terms of overall tenure, these employees do not belong to the NEW cohort but nonetheless participate through automatic enrollment. In order to make the comparison of the 401(k) savings behavior of various cohorts of employees as clean as possible, we thus exclude these acquired employees who have a rightful claim to belong in more than one cohort.

The first three columns of Table III present comparative

TABLE III
COMPARISON OF WORKER CHARACTERISTICS

	Study company				
	OLD cohort	WINDOW cohort	NEW cohort	All workers	U. S. workforce
Average age (years)	37.2	36.0	34.5	37.6	38.8
Gender					
Male	25.4%	23.9%	22.0%	22.1%	53.1%
Female	74.6	76.1	78.0	77.9	46.9
Ethnicity[a]					
White	77.1%	71.7%	68.8%	75.1%	74.6%
Black	12.5	16.8	18.9	14.1	11.3
Hispanic	7.1	8.2	6.7	6.6	9.5
Other	3.3	3.4	5.6	4.2	4.6
Hours					
Full-time (HPW $>$ 35)	96.7%	95.6%	95.8%	94.6%	78.8%
Part-time (HPW $<$ 35)	3.3	4.4	4.2	5.4	21.2
Compensation[b]					
Mean	$41,970	$38,424	$34,264	$40,180	$28,248
Median	$33,470	$30,530	$26,519	$31,333	$20,400
Geography					
East	17.0%	13.7%	16.9%	21.7%	18.9%
Midwest	38.2	34.9	31.0	32.8	24.1
South	28.2	33.0	32.0	31.3	34.7
West	14.6	16.1	19.6	13.1	22.4
Other[c]	2.0	2.3	0.6	1.1	—
Number of employees	N = 3286	N = 4257	N = 5812	N = 29,267	—

Authors' calculations. The sample in the first four columns is individuals employed at the study company on June 30, 1999. The sample in the last column is all individuals in the March 1998 Current Population Survey who worked in the previous year (weighted).

a. Ethnicity in the CPS is coded from the questions on race and Spanish ethnicity. We code individuals as follows: "White" if their race is white and they do not report Spanish ethnicity, "Hispanic" if their race is white and they do report Spanish ethnicity, "Black" if their race is black regardless of Spanish ethnicity, "Other" if their race is anything other than white or black regardless of Spanish ethnicity.

b. Compensation is the sum of annual base pay, incentive payments, and commissions.

c. The "Other" region is comprised of employees living and working in Puerto Rico and a few employees who live in Canada but work in the United States.

demographic statistics on each of these cohorts as of March 31, 1999. Overall, the cohorts appear fairly similar—most of the differences in their characteristics can be explained by the aging of cohorts over time or the differential effects of turnover. As would be expected, the average age of the cohorts increases

with their tenure by a little over one year. That the age difference between consecutive cohorts is slightly more than a year can be explained by the fact that turnover rates vary inversely with age. Thus, in terms of age at their initial hire date, the individuals in these three cohorts are very similar. In terms of ethnicity, the fraction white increases slightly with tenure (77.1 percent for the OLD cohort versus 68.8 percent for the NEW cohort) while the fraction black falls (12.5 percent for the OLD cohort versus 18.9 percent for the NEW cohort). These differences appear to result both from differential turnover by ethnicity, and from higher levels of minority recruitment in the past couple of years. The fraction of employees working part-time is decreasing with tenure, and once again, this is consistent with the higher turnover rates for part-time workers, or the conversion of part-time into full-time workers. As would be expected, both mean and median compensation increase with the respective tenure of the three cohorts. This is consistent with both positive returns to labor market experience given the slightly higher age of the older cohorts, positive returns to tenure given the slightly higher tenure of the older cohorts, and higher turnover rates in the lower pay categories. The distribution of employment by region (and across business units, although not shown in Table III) is fairly similar for all three cohorts. Overall, the three cohorts appear to be very similar in terms of their characteristics.

Although the three cohorts at the study company appear very similar, the characteristics of the employees in this company vary from those of the U. S. workforce in several important ways. This can be seen in column 5 of Table III which gives the characteristics of the overall U. S. workforce calculated from the March 1998 Current Population Survey. Perhaps the most striking difference is in gender: almost 78 percent of the employees in this company are female, while only 47 percent of the U. S. workforce is female. In contrast, the racial and ethnic composition of this company's workforce mirrors that in the overall labor market fairly well. The average age of employees in the study company is very close to the average age in the workforce overall, although somewhat compressed with relatively fewer employees who are very young (<20) or older (>50), and more who are in their prime years (30–50). There are many fewer part-time workers (<35 hours per week) at the study company than in the U. S. workforce (6 percent relative

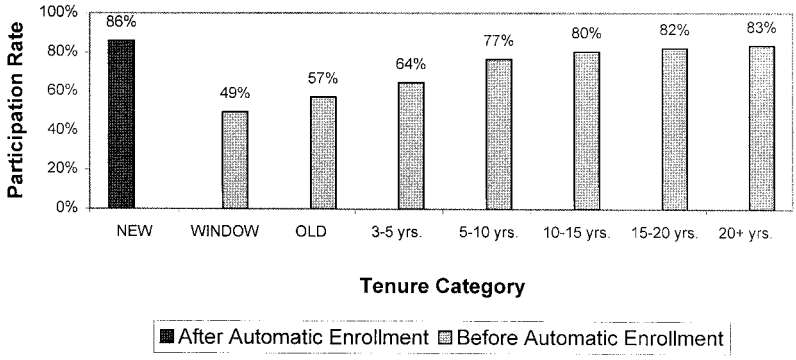

FIGURE I
401(k) Participation by Tenure

to 21 percent), and consequently compensation is higher at the study company than in the U. S. workforce. Finally, in terms of geography, employment at the study company is somewhat more concentrated in the East and Midwest relative to employment in the entire U. S. labor market, but, as noted earlier, the company is national and has over 200 offices located throughout the country.

IV. The Effect of Automatic Enrollment on 401(k) Participation, Contribution Rates, and Fund Allocations

IV.A. The Effect of Automatic Enrollment on 401(k) Participation

The first aspect of the savings decision that we consider is the extent to which employees participate in the company-sponsored 401(k) plan. The overall 401(k) participation rate among 401(k) eligible employees on June 30, 1999, was 72.0 percent.[6] But this aggregate figure masks considerable variation in the participation rate by various demographic characteristics. By far the most important determinant of 401(k) participation is tenure. Figure I charts the 401(k) participation rate by tenure. There are two

6. The conventional wisdom gleaned from discussions with benefits practitioners, a casual perusal of practitioner-oriented benefits journals, and a handful of academic articles examining 401(k) participation is that between two-thirds and three-quarters of 401(k)-eligible employees participate in their company-sponsored 401(k) plan. See, for example, Poterba, Venti, and Wise [1994], Andrews [1992], and Bassett, Fleming, and Rodrigues [1998] for academic studies; Fidelity Investments [1999] for a consulting report, and Thompson [1997] for a more anecdotal discussion.

things to notice in Figure I. First, for employees hired prior to automatic enrollment, 401(k) participation is increasing in tenure. Much of the increase in participation occurs during the first ten years of employment, with only small increases in the participation rate after that. The second and more striking thing to notice about Figure I is that the highest participation rate by far is for the employees hired under automatic enrollment: approximately 86 percent of employees hired under automatic enrollment participate in the 401(k) plan. In contrast, only about half of the WINDOW cohort are 401(k) participants. The participation rate of those hired under automatic enrollment even exceeds the participation rate of highly tenured employees hired prior to automatic enrollment. Given that 401(k) participation is increasing in tenure for those hired prior to automatic enrollment, it is difficult to say what the long-run impact of automatic enrollment on 401(k) participation will be given that automatic enrollment at this company has only been in effect for a period of a little over one year. However, Figure I certainly suggests that in the short run, automatic enrollment has substantially increased 401(k) participation for recently hired employees.

One problem with comparing the participation rates of the NEW and WINDOW cohorts at the same point in time in assessing the effect of automatic enrollment on 401(k) participation is that the WINDOW group has higher average tenure, and 401(k) participation increases with tenure over the first several years of employment. However, with longitudinal data we can compare the 401(k) participation rate of the NEW cohort with that of the WINDOW cohort at a similar level of tenure. The first two columns of Table IV give such a comparison, showing the 401(k) participation rate of the NEW cohort on June 30, 1999, when these employees had 3–15 months of tenure, and that of the WINDOW cohort on June 30, 1998, when this group also had 3–15 months of tenure.[7] As anticipated, the differences between the 401(k) participation rates of these two groups are magnified relative to the differences in Figure I. The 401(k) participation rate of the WINDOW cohort at 3–15 months of tenure was 37 percent—less than half the 86 percent participation rate of the NEW cohort with a similar amount of tenure. Moreover, none of

7. A further comparison with the OLD cohort at a similar length of tenure is precluded by the fact that none of the OLD cohort were eligible for the 401(k) plan until they had reached one year of tenure because they were all hired under the old terms of the 401(k) plan.

TABLE IV
THE EFFECTS OF AUTOMATIC ENROLLMENT AND IMMEDIATE ELIGIBILITY ON 401(k) PARTICIPATION

	Automatic enrollment		Immediate eligibility	
	Participation rate of Window cohort on 6/30/98	Participation rate of New cohort on 6/30/99	Participation rate of Old cohort on 6/30/98	Participation rate of Window cohort on 6/30/99
Overall	37.4%	85.9%	48.7%	49.4%
Gender				
Male	42.3	85.7	56.1	55.9
Female	35.9	86.0	46.3	47.4
Race/ethnicity				
White	42.7	88.2	53.4	54.4
Black	21.7	81.3	30.7	32.6
Hispanic	19.0	75.1	27.8	34.5
Other	46.2	85.2	55.0	62.9
Age				
Age <20	—	73.6	25.0	33.3
Age 20–29	25.3	82.7	36.7	36.9
Age 30–39	37.2	86.3	47.9	50.3
Age 40–49	47.3	90.1	54.9	58.0
Age 50–59	51.8	90.0	64.3	64.3
Age 60–64	60.0	86.0	60.6	70.0
Compensation				
<$20K	12.5	79.5	20.0	21.2
$20–$29K	24.5	82.8	31.7	35.3
$30–$39K	42.2	88.9	50.1	55.4
$40–$49K	51.0	91.8	61.6	64.5
$50–$59K	61.6	92.8	70.2	75.2
$60–$69K	59.7	94.7	79.2	75.1
$70–$79K	57.9	91.5	76.3	71.6
$80K+	68.3	94.2	76.3	82.6
Sample size	N = 4249	N = 5801	N = 3275	N = 4247

Author's calculations. The sample is 401(k) eligible active employees belonging to the cohort and employed on the date listed in the column headings. The sample is restricted to employees under the age of 65 as of the date listed in the column headings.

this 49 percent difference can be accounted for by differences in the demographic characteristics of the NEW and WINDOW cohorts. The regression-adjusted impact of automatic enrollment on the 401(k) participation rate for these two groups of employees is in fact even slightly larger, at 50 percent (see Table VI for a comparison of the raw and regression-adjusted estimates and for more detail on the regression adjustment).

Table IV shows another interesting effect of automatic enrollment on 401(k) participation—that it equalizes participation rates across various demographic groups. The effects are largest among the groups with the lowest participation rate under the previous regime of affirmative elections: blacks and Hispanics, the young, and employees with low levels of compensation. For example, the difference between the black and the white participation rates of the WINDOW cohort is over twenty percentage points (43 percent versus 22 percent), while the difference for the NEW cohort is only seven percentage points (88 percent versus 81 percent). Moreover, the 81 percent black 401(k)-participation rate under automatic enrollment is extremely high in absolute terms. The disparity between the highest and lowest age-related participation rates is 35 percentage points for the WINDOW cohort (25 percent versus 60 percent), but only 16 percentage points for the NEW cohort (74 percent versus 90 percent). Similarly, the disparity between the highest and lowest pay-related participation rates is about 55 percentage points for the WINDOW cohort (13 percent versus 68 percent) and 15 percentage points for the NEW cohort (80 percent versus 95 percent).

IV.B. The Effect of Immediate Eligibility on 401(k) Participation

While we have been attributing all of the difference between the participation rates of the NEW and WINDOW cohorts in columns 1 and 2 of Table IV to the impact of automatic enrollment, there is one other aspect of the 401(k) plan that was changed at the same time automatic enrollment was implemented: the move from a one-year waiting period for 401(k) eligibility to immediate eligibility. To assess the impact of immediate eligibility on 401(k) participation as separate from the effect of automatic enrollment, we compare the 401(k) participation rate of the OLD cohort on June 30, 1998, with that of the WINDOW cohort on June 30, 1999 (columns 3 and 4 of Table IV). Each cohort had tenure ranging from 15–27 months on these dates of observation. Recall that the OLD cohort did not become 401(k) eligible until reaching one year of employment, while the WINDOW cohort became immediately eligible on April 1, 1998, when the 401(k) plan change was implemented. The WINDOW cohort, however, was not automatically enrolled upon becoming eligible. This comparison does not provide a completely untainted assessment of the impact of *immediate* eligibility on 401(k) participation because the 401(k) eligibility of the WINDOW cohort was not

immediate upon hire, but immediate upon April 1, 1998. Nevertheless, the comparison is at least illustrative of the effect of *earlier* 401(k) eligibility on participation. Interestingly, there is very little difference in the overall participation rates of these two cohorts at points of similar tenure: 48.7 percent participation for the OLD cohort with 15–27 months of tenure, and 49.4 percent participation for the WINDOW cohort for an overall difference of only 0.6 percent. The regression-adjusted impact of earlier 401(k)-eligibility is somewhat larger and statistically significant, at 4.1 percent (see column 2 of Table VI). This is small, however, relative to the overall combined impact of automatic enrollment and immediate eligibility shown in the first two columns of Table IV and the first column of Table VI. Thus, it seems likely that the 401(k) participation differences between the NEW and the WINDOW cohort can be attributed almost completely to the impact of automatic enrollment.

IV.C. The Effect of Automatic Enrollment on the 401(k) Contribution Rate

A second important aspect of the 401(k) savings decision is the contribution rate. In the study company, employees are allowed to contribute between 1 percent and 15 percent of their total compensation to the 401(k) plan. After the first year of employment, the first 6 percent of compensation contributed is eligible for a 50 percent employer match. Among 401(k) participants, the overall average contribution rate is 6.4 percent of compensation, but there is substantial variation in the contribution rates that are chosen by individuals.[8] Figure IIa illustrates this variation by plotting the distribution of contribution rates for various cohorts. The most striking thing to note about Figure IIa is that the distribution of contribution rates for the NEW cohort is quite different from that for the other cohorts. For the WINDOW, OLD, and 3+ cohorts, the most frequently chosen contribution rate is 6 percent, with slightly more than a third of all participants at this rate. In marked contrast, the most prevalent contribution rate among the NEW cohort is 3 percent, the default contribution rate, with 76 percent of 401(k) participants

8. The average contribution rate for 401(k) participants hired prior to automatic enrollment is 7.2 percent. This is similar to that reported both from surveys of individuals and from administrative records of 401(k) plan administrators (see, for example, Bassett, Fleming, and Rodrigues [1998]; Andrews [1992]; and Fidelity Investments [1999]).

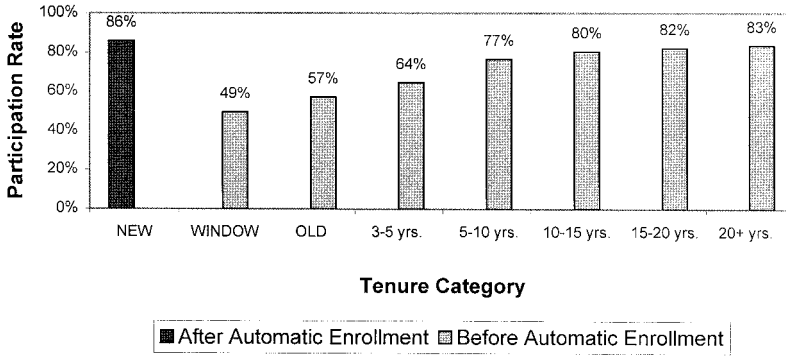

FIGURE IIa
Distribution of 401(k) Contribution Rates for 401(k) Participants

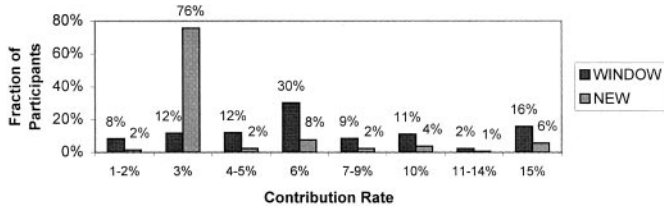

FIGURE IIb
Distribution of 401(k) Contribution Rates for the WINDOW and NEW Cohorts with Equivalent Tenure

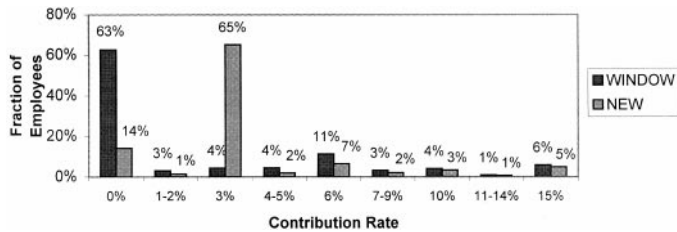

FIGURE IIc
Distribution of 401(k) Contribution Rates for the WINDOW and NEW Cohorts Including Nonparticipation

in the NEW cohort contributing at that rate (relative to around 10 percent of participants from the other cohorts).[9]

9. In an anecdotal discussion of the experience of Southland Corporation's experience with automatic enrollment, Youden [1999] reports that two years after the implementation of automatic enrollment, 80 percent of employees were still

One explanation for the substantial difference between the fraction of participants with a contribution rate of 6 percent or more in the other cohorts relative to the NEW cohort is that most of the NEW cohort is not yet match-eligible and thus they do not face the same incentive to contribute at least 6 percent of compensation to the 401(k) plan as do the match-eligible participants in the other cohorts. To ascertain the importance of match-eligibility (or lack thereof) on the distribution of contribution rates, we can compare the contribution rates of the NEW cohort with those of the WINDOW cohort one year earlier when they had an equivalent amount of tenure. This is done in Figure IIb. The lack of match-eligibility appears to account for surprisingly little of the difference in the distribution of contribution rates between the NEW and WINDOW cohorts when both cohorts are largely match-ineligible. Even when most of the WINDOW cohort is not match eligible, 30 percent of participants choose a 6 percent contribution rate, and only 12 percent choose a 3 percent contribution rate.

A second explanation for the substantial differences in the distribution of contribution rates for the NEW cohort and the other cohorts could be one of composition arising from the substantially higher participation rate of the NEW cohort relative to the other cohorts. A simple way to ascertain whether a shift in the composition of 401(k) participants is driving the contribution rate differences is to include nonparticipation as a contribution rate category. This is done in Figure IIc for the NEW and WINDOW cohorts when both cohorts have the same level of tenure (3–15 months). The difference between the WINDOW and NEW cohorts in the fraction of employees with a 0 percent contribution rate (nonparticipation) is 48.5 percentage points. If we assume that (1) 48.5 percent of the employees in the NEW cohort are at a contribution rate of 3 percent simply because they have become participants through automatic enrollment and this is the automatic enrollment default, and (2) that the distribution of contribution rates for the NEW cohort would be the same as that for the WINDOW cohort if automatic enrollment had not impacted par-

contributing at the default contribution rate of 3 percent. Similarly, Thompson [1997] reports that about one year after implementing automatic enrollment, 65 percent of enrollees at Freddie Mac were still contributing at the default contribution rate. Thus, the experiences of the study company documented in this paper are supported, at least anecdotally, by those of other companies that have implemented automatic enrollment.

ticipation, then we would predict that 52.9 percent of the NEW cohort would have a contribution rate of 3 percent under automatic enrollment (48.5 percent + 4.4 percent, the latter being the fraction of the WINDOW cohort with a 3 percent contribution rate at 3–15 months of tenure). In fact, however, 65.1 percent of the NEW cohort has a contribution rate of 3 percent when nonparticipation is included as a contribution category. Thus, an additional 12.2 percent of employees in the NEW cohort are at a 3 percent contribution rate over what we would predict even if *all* of the incremental 401(k) participants under automatic enrollment were contributing at 3 percent. This suggests that automatic enrollment has had the effect of moving a substantial fraction of employees who would have participated in the 401(k) plan even in the absence of automatic enrollment to a contribution rate of 3 percent, although they would have chosen a different contribution rate otherwise.

Table V compares the average contribution rates of 401(k) participants from the NEW and the WINDOW cohorts by various demographic characteristics. To account for any possible effects of increases in tenure on the average 401(k) contribution rate, the first two columns of Table V compare the 401(k) contribution rate of the WINDOW cohort on 6/30/98 with that of the NEW cohort on 6/30/99. As in Table IV, both cohorts had between three and fifteen months of tenure at these measurement dates. The comparison between these two groups suggests that automatic enrollment results in a decline in the average contribution rate by 2.9 percentage points among those newly eligible (from 7.3 percent to 4.4 percent), and that this decline is pervasive across virtually all demographic subgroups. This result is not surprising given the distribution of contribution rates shown in Figure IIa. The regression-adjusted impact of automatic enrollment on the average 401(k) contribution rate of these two groups is slightly smaller in magnitude at 2.2 percentage points (see Table VI). This reduction in the magnitude of the regression-adjusted estimate of the effect of automatic enrollment on the 401(k) contribution rate relative to the raw difference between the NEW and WINDOW cohort results from the fact that automatic enrollment increases 401(k) participation the most for those demographic groups who are likely to have lower contribution rates when they do participate.

Automatic enrollment does not appear to have the same equalizing effect on the variation in contribution rates by demo-

TABLE V
THE EFFECTS OF AUTOMATIC ENROLLMENT AND IMMEDIATE ELIGIBILITY ON 401(k) CONTRIBUTIONS

	Automatic enrollment		Immediate eligibility	
	Contribution rate of Window cohort on 6/30/98	Contribution rate of New cohort on 6/30/99	Contribution rate of Old cohort on 6/30/98	Contribution rate of Window cohort on 6/30/99
Overall	7.3%	4.4%	7.3%	7.2%
Gender				
Male	7.6	4.9	7.9	7.4
Female	7.1	4.2	7.0	7.1
Race/ethnicity				
White	7.5	4.7	7.4	7.5
Black	5.0	3.3	5.4	5.0
Hispanic	6.8	3.7	6.6	6.1
Other	8.9	5.0	9.2	8.8
Age				
Age <20	5.9	3.2	—	4.5
Age 20–29	7.1	3.8	6.4	6.0
Age 30–39	7.6	4.4	6.9	6.9
Age 40–49	8.8	4.9	7.8	7.6
Age 50–59	9.5	5.4	8.2	9.0
Age 60–64	6.0	6.9	9.5	9.7
Compensation				
<$20K	6.3	3.4	6.0	5.7
$20–$29K	5.5	3.5	5.9	5.7
$30–$39K	6.9	4.6	6.6	6.9
$40–$49K	7.7	5.2	7.8	7.7
$50–$59K	8.3	6.2	8.4	8.4
$60–$69K	8.7	7.1	8.6	9.1
$70–$79K	10.0	8.0	8.8	9.9
$80K+	8.8	6.6	7.7	8.2
Sample size	N = 1589	N = 4983	N = 1598	N = 2099

Authors' calculations. The sample is 401(k) participants belonging to the cohort and employed on the date listed in the column headings. The sample is restricted to employees under the age of 65 on the date listed in the column headings.

graphic characteristics as it had on the variation in participation rates. As shown in columns 1 and 2 of Table VI, the absolute differences in 401(k) contribution rates across demographic subgroups are not that different for the NEW cohort relative to the WINDOW cohort, and because the absolute level of the average contribution rates of the NEW cohort is much lower, the relative

TABLE VI
RAW AND REGRESSION-ADJUSTED EFFECTS OF AUTOMATIC ENROLLMENT AND IMMEDIATE ELIGIBILITY

	Effect of Automatic enrollment: Window cohort on 6/30/98 vs. New cohort on 6/30/99	Effect of Immediate eligibility: Old cohort on 6/30/98 vs. Window cohort on 6/30/99
401(k) Participation rate		
Raw difference	48.5%*	0.6%
Regression-adjusted difference	50.4%*	4.1%*
401(k) Contribution rate		
Raw difference	−2.9%*	−0.1%
Regression-adjusted difference	−2.2%*	0.2%

Authors' calculations. The sample in the first two rows is 401(k) eligible employees belonging to the cohorts listed. The sample in the second two rows is 401(k) participants belonging to the cohorts listed. The sample is restricted to employees under the age of 65 as of the date listed in the column headings. The raw differences come from the first row of Tables V and VI. The regression-adjusted differences are estimated from OLS regressions which include categorical controls for gender, race, age, compensation, and months of tenure. An asterisk indicates statistical significance.

differences for the NEW cohort are even larger. For example, the absolute difference between the highest and lowest 401(k) contribution rate with respect to age for the WINDOW cohort is 3.6 percentage points (9.5 percent for those 60–64 minus 5.9 percent for those <20), while that for the NEW cohort is 3.7 percentage points (6.9 percent for those 60–64 minus 3.2 percent for those <20). In percentage terms, however, the relative differences are 61 percent for the WINDOW cohort and 116 percent for the NEW cohort (using the lower average contribution rate as the base). Similar characterizations can be made for the differences across pay categories and racial/ethnic groups.

IV.D. The Effect of Immediate Eligibility on the 401(k) Contribution Rate

The effect of immediate eligibility on the 401(k) contribution rate can be inferred from the last two columns of Table V which compare the 401(k) contribution rates of the OLD and WINDOW cohorts on 6/30/98 and 6/30/99, respectively, when, as in Table IV, both groups had between 15 and 27 months of tenure. The same caveats given in the earlier discussion of the effect of immediate

eligibility on the 401(k) participation rate also apply here. As with 401(k) participation, it appears that the 401(k) contribution rates of these two cohorts are very similar when measured at the same level of tenure (and also when measured at different levels of tenure). Moreover, the regression-adjusted estimate of the difference in contribution rates between these two groups (Table VI) is small and not statistically different from zero. Thus, immediate eligibility appears to have little effect on either 401(k) participation or the 401(k) contribution rate conditional on participation.

IV.E. The Effect of Automatic Enrollment on 401(k) Fund Allocations

A final aspect of 401(k) savings considered in this paper is the allocation of 401(k) contributions among the various fund options available to participants. At the study company, nine funds are available for the majority of employees (executives participating in a supplemental nonqualified savings plan have an additional two funds to choose from). Among the fund choices are a money market fund, a bond fund, a stable value fund, a combination stock/bond balanced fund, several stock mutual funds, and a foreign stock fund.

One simple aspect of the 401(k) fund allocation decision is the number of funds to which individuals contribute. Among the WINDOW, OLD, and 3+ cohorts, less than 25 percent of employees have their 401(k) balances invested in only one fund. In contrast, 85 percent of participants in the NEW cohort have their balances invested in only one fund. As with the fraction of participants contributing at 3 percent in the NEW relative to the other cohorts, the fraction of participants contributing to only one fund in the NEW relative to the other cohorts cannot be explained entirely by a shift in the composition of participants due to the substantial effects of automatic enrollment on 401(k) participation.

Table VII gives some summary statistics on the allocation of contributions among the various types of funds. Contributions have been aggregated into three broad categories: money market, stocks (including the foreign stock mutual fund), and bonds. The one balanced fund containing a mix of both stocks and bonds was divided between these two categories according to the relative mix of stocks and bonds in the fund as communicated to employees (60 percent stocks, 40 percent bonds).

The last row grouping in Table VII shows the average frac-

TABLE VII
401(k) Asset Allocation and Contribution Statistics by Broad Fund Classification

	Tenure/cohort					
	ALL	3+	OLD	WINDOW	NEW: All	NEW: Nondefault
Fraction with balances in fund type:						
Any money market	49.6%	42.0%	18.2%	17.0%	90.8%	71.3%
Any stocks	71.1	86.3	91.8	90.9	24.1	67.7
Any bonds	46.9	61.1	52.1	53.4	13.5	37.6
Fraction with balances in fund type:						
Only money market	24.3%	6.5%	5.2%	6.1%	75.3%	30.8%
Only stocks	22.3	24.1	39.5	38.9	5.0	15.5
Only bonds	2.2	3.3	2.3	2.0	0.2	0.5
Sample size	N = 19,935	N = 10,544	N = 1979	N = 2207	N = 5205	N = 1664
Fraction with contributions to fund type:						
Any money market	35.2%	19.3%	13.9%	13.9%	82.5%	39.3%
Any stocks	69.1	86.0	91.8	90.2	19.6	68.1
Any bonds	41.4	54.4	48.2	50.6	10.1	35.1
Fraction with contributions to fund type:						
Only money market	25.5%	5.1%	5.0%	6.4%	80.0%	30.6%
Only stocks	31.4	37.9	44.8	42.3	9.4	32.6
Only bonds	3.8	6.3	2.6	2.3	0.3	0.9
Average contribution allocation to fund type:						
Any money market	28.5%	9.8%	7.3%	8.2%	80.5%	32.5%
Any stocks	54.9	67.1	75.0	73.3	16.4	56.7
Any bonds	16.6	23.1	17.8	18.5	3.1	10.8
Sample size	N = 18,468	N = 9492	N = 1877	N = 2107	N = 4992	N = 1440

Authors' calculations. The sample for fund balance allocations is all active employees with nonzero 401(k) fund balances on 6/30/99. The sample for contribution allocations is all active 401(k) plan participants on 6/30/99. The sample is restricted to employees under the age of 65 and with three or more months of tenure.

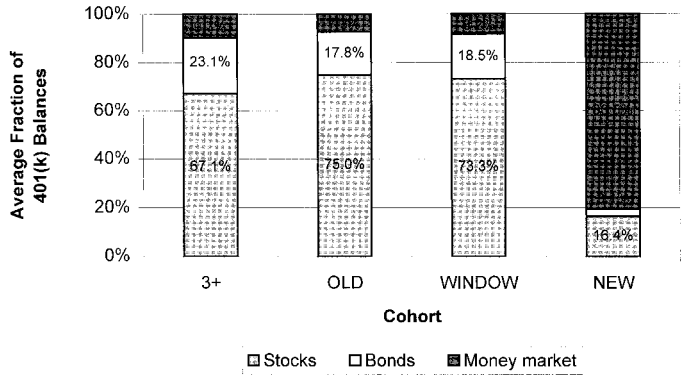

FIGURE III
401(k) Asset Allocation by Cohort

tion of 401(k) contributions allocated to the various fund categories. These numbers are also plotted in Figure III showing quite starkly the difference in the savings behavior of the NEW cohort relative to the other cohorts. For the NEW cohort, 80 percent of 401(k) contributions are allocated to the money market fund, while only 16 percent of contributions go into stock funds. In contrast, the other cohorts allocate roughly 70 percent of their 401(k) contributions to stock funds, with less than 10 percent earmarked for the money market fund.

The first four row groupings in Table VII give more detail on what is driving the differences in the average contribution allocation across cohorts just described. The first three rows of Table VII show the fraction of employees who have *any* of their fund balances in the various fund types. Overall, about half of employees have some of their fund balances in the money market, 71 percent have some of their fund balances in stocks, and 47 percent have some of their fund balances in bonds. The WINDOW and OLD cohorts are much less likely to have any of their balances in the money market (less than 20 percent of participants in these two cohorts), and much more likely to have any of their balances in stock funds (over 90 percent of participants). The next three rows of Table VII show the fraction of employees who have *all* of their fund balances in a specific fund type. For the WINDOW and OLD cohorts, almost 40 percent of employees have all of their fund balances invested solely in stocks. A much smaller fraction, about 6 percent, have all of their balances in the money

market, and only about 2 percent have all of their balances invested in bonds.

In contrast, the distribution of fund balances of the NEW cohort is completely different from that of the other cohorts: over 90 percent of the NEW cohort have some of their 401(k) balances in the money market, and 75 percent have *all* of their fund balances in the money market. Furthermore, only one-quarter of the NEW cohort has any 401(k) balances in the stock market, and a mere 5 percent have all of their balances allocated to stock funds. These statistics in Table VII confirm an emerging pattern: the vast majority of NEW cohort 401(k) participants have a contribution rate of 3 percent (Figure II) that is invested in only one fund, and that fund happens to be the money market fund (Table VII) which is the default fund under automatic enrollment.

The third and fourth row groupings in Table VII give the fraction of employees with any contributions allocated to the various fund categories, and with all of their contributions allocated to the various fund categories. The overall percentages are quite similar to those for the fund balances just described.

V. The "Default" Effect of Automatic Enrollment

The results summarized in Sections IV suggest that an extremely important consequence of automatic enrollment is that individuals unfortunately become passive savers—the vast majority of 401(k) participants hired under automatic enrollment do nothing to move away from the default contribution rate (3 percent) or fund allocation (100 percent in the money market fund). How prevalent is this type of inertia in the 401(k) savings behavior of the NEW cohort of employees who were subject to automatic enrollment?

In Table VIII we summarize what we call the 401(k) "default" rate: the fraction of employees whose 401(k) savings behavior corresponds to the default under automatic enrollment. In column 1 the "default" is defined as (1) participation in the 401(k) plan at (2) a 3 percent contribution rate that is (3) invested 100 percent in the money market fund. The overall default rate for the NEW cohort is 61 percent: six out of ten employees do nothing to change their savings behavior from the default specified by the company if no other action is taken. For the sake of comparison, only 1 percent of the WINDOW, OLD, and 3+ cohorts are participating in the 401(k) plan at a contribution rate of 3 percent

TABLE VIII
"DEFAULT" 401(k) PARTICIPATION AND INVESTMENT BEHAVIOR

	"Default" Rate		Nondefault 401(k) participation rate
	"Default" includes participation	"Default" conditional on participation	
Overall	61.1%	71.2%	24.8%
Gender			
Men	51.5	60.1	34.2
Women	63.8	74.3	22.1
Race/Ethnicity			
White	58.8	66.7	29.4
Black	71.2	87.8	10.0
Hispanic	57.4	76.5	17.7
Other	59.6	69.9	25.6
Age			
<20	66.7	90.6	6.9
20–29	64.3	77.8	18.3
30–39	60.9	70.6	25.3
40–49	59.2	65.7	30.9
50–59	53.7	59.7	36.6
60–64	37.2	43.2	48.8
Compensation			
<$20K	70.9	89.3	8.5
$20–$29K	69.0	83.3	13.8
$30–$39K	59.6	67.0	29.3
$40–$49K	51.5	56.1	40.4
$50–$59K	39.3	42.4	53.5
$60–$69K	38.5	40.1	56.3
$70–$79K	28.7	31.4	62.8
$80K+	34.2	36.3	60.0
Sample size	N = 5801	N = 4983	N = 5801

Authors' calculations. The sample is active 401(k) eligible employees belonging to the NEW cohort as of 6/30/99. The sample excludes employees who are aged 65 and over. In the first column, "Default" is defined as participating in the 401(k) plan at a 3 percent contribution rate invested 100 percent in the money market fund. In the second column the sample is restricted to 401(k) participants, and "Default" is defined as a 3 percent contribution rate invested 100 percent in the money market fund. In the third column the "Nondefault participation rate" is the fraction of employees participating in the 401(k) plan with a contribution rate other than 3 percent or an investment allocation other than 100 percent in the money market fund.

with 100 percent of contributions allocated to the money market fund. Thus, almost all of the 61 percent default rate for the NEW cohort represents participant inertia rather than a duplication of savings choices that many would have made regardless of the default. The second column of Table VIII calculates the default rate conditional on 401(k) participation. In this case, "default" refers to a 3 percent contribution rate that is allocated 100 per-

cent in the money market fund. As would be expected, the default rate rises in column 2 relative to column 1. Conditional on participation, 71 percent of the NEW cohort 401(k) participants are at the default contribution rate and fund allocation. A final measure of default behavior is found in the third column of Table VIII. This measure is the nondefault participation rate: the fraction of employees who are participating in the 401(k) plan at a contribution rate other than 3 percent or who have allocated their contributions in part or in whole to something other than the money market fund. Overall, the nondefault participation rate of the NEW cohort is 25 percent.

Table VIII also illustrates how the default and nondefault participation rates vary by demographic characteristics. Men have a lower default rate than women, older employees have a lower default rate than younger employees, and the default rate declines quite significantly with compensation. For example, over 70 percent of those earning less than $20,000 per year exhibit participant inertia relative to less than one-third of those earning between $70,000 and $79,000. It is interesting to note that the nondefault participation rates of the various demographic groups in the third column of Table VIII are highly correlated with the 401(k) participation rates of the WINDOW cohort in the first column of Table IV (the correlation coefficient is 0.94), although the nondefault participation rate of the NEW cohort tends to be less than the participation rate of the WINDOW cohort with a similar length of tenure. One interpretation of this finding is that individuals who were inclined to save prior to automatic enrollment are also more likely to change their savings behavior from the default under automatic enrollment.

In addition, just as the 401(k) participation rate of employees hired prior to automatic enrollment increases quite substantially with tenure (Figure I), so does the nondefault participation rate of employees hired under automatic enrollment. Data from March 31, 2000, show a nondefault 401(k) participation rate of about 10 percent for employees with only one month of tenure. This increases quite substantially to about 35 percent for employees with one year of tenure, and to 50 percent for employees with two years of tenure.[10] Thus, given some time, many individuals do appear to recognize that the automatic enrollment default is not

10. Interestingly, the nondefault participation rate increases at a fairly steady rate from the first month of employment. It does not appear that the

their optimal savings strategy, and they opt to change their contribution rate or their investment allocation. Nevertheless, even after one year, over half of the 401(k) participants hired under automatic enrollment are at the default, and after two years, 40 percent are still at the default. It is difficult to say whether the default savings behavior of 401(k) participants hired under automatic enrollment will continue to dissipate, and if so, how long the process will take. But, the limited data available appear to show the fraction of automatic enrollees moving away from the default slowing over time.

Moreover, even among the nondefault participants hired under automatic enrollment who have made some sort of an active savings decision, there is evidence that the automatic enrollment default continues to color their savings behavior. As noted earlier, less than one-quarter of the WINDOW, OLD, and 3+ cohorts have their contributions allocated to only one fund, relative to 85 percent of the NEW cohort as a whole. While the nondefault participants of the NEW cohort are more likely to be diversified than the NEW cohort taken as a whole, almost half of them still have all of their balances invested in only one fund, a fraction much higher than that for any of the cohorts hired before automatic enrollment. As the last column of Table VII shows, this is the result of nondefault participants changing their contribution rate but maintaining the default investment allocation of 100 percent in the money market fund. Nondefault 401(k) participants under automatic enrollment are more likely to be invested in the stock market and less likely to be invested in the money market than are the NEW cohort taken as a whole. But they are, nonetheless, about five times more likely to have all of their 401(k) balances invested in the money market than are members of the WINDOW or OLD cohorts (30 percent versus about 6 percent).

The automatic enrollment default also appears to affect the investment decisions of even some employees hired before the firm's adoptions of automatic enrollment. Figure IV shows the asset allocation behavior of 401(k) participants by cohort based on when they initially became 401(k) participants. Individuals in the 3+, WINDOW, and OLD cohorts who became plan participants

incidence of match eligibility at one year of service is the factor that precipitates a change in the savings behavior of individuals under automatic enrollment.

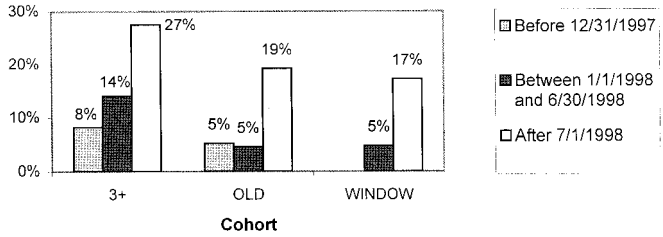

FIGURE IVa
Asset Allocation by Date of Initial 401(k) Participation: Average Money Market Allocation

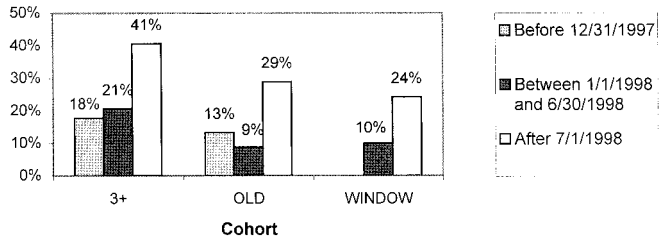

FIGURE IVb
Asset Allocation by Date of Initial 401(k) Participation: Any Money Market Contributions

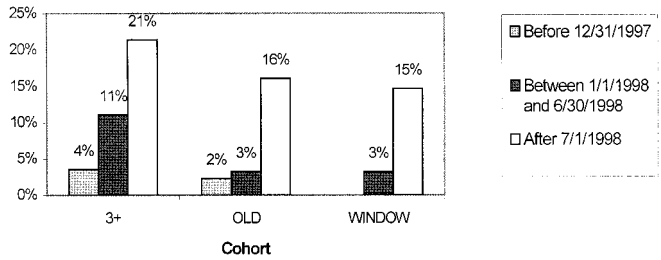

FIGURE IVc
Asset Allocation by Date of Initial 401(k) Participation: Only Money Market Contributions

before the switch to automatic enrollment for new employees have a low probability of having any balances in the money market fund or of having all of their contributions allocated to the money market fund. In contrast, individuals belonging to these cohorts (none of whom was subject to automatic enrollment) who delayed plan participation until *after* the switch to automatic

enrollment are much more likely to have some of their balances invested in the money market fund and to have all of their balances invested in the money market fund. In fact, in terms of investment behavior, they look very similar to the nondefault participants hired under automatic enrollment.

VI. Explaining the Effect of Automatic Enrollment on 401(k) Savings Behavior

This paper has documented several interesting features of 401(k) savings behavior in the presence of automatic enrollment:

- Automatic enrollment dramatically increases the average 401(k) participation rate.
- The 401(k) participation rate increases with tenure in the absence of automatic enrollment but is relatively constant under automatic enrollment.
- A substantial fraction of 401(k) participants hired under automatic enrollment exhibit default savings behavior, with a contribution rate and asset allocation corresponding to the automatic enrollment default.
- The fraction of automatic enrollees exhibiting default savings behavior declines with tenure, but is still large after two years.
- 401(k) participants hired under automatic enrollment who change their savings behavior are substantially more likely to invest in the automatic enrollment default fund than employees hired before automatic enrollment.
- 401(k) participants hired *before* automatic enrollment who do not become participants until *after* the switch to automatic enrollment are substantially more likely to invest in the automatic enrollment default fund.

From the perspective of an economist, these findings are particularly interesting because there were no changes in the economic features of the 401(k) plan when automatic enrollment was implemented. Moreover, the direct transactions costs involved in initiating 401(k) participation or changing the 401(k) contribution rate or fund allocation are small—changes along all of these dimensions could be made on a daily basis throughout this period with a simple phone call. How, then, can we reconcile the considerable differences in savings behavior of employees hired before and after automatic enrollment?

One explanation for at least the first four of the broad find-

ings noted above is a status quo bias resulting from employee procrastination in making or implementing an optimal savings decision. In the absence of automatic enrollment, procrastination is evidenced by 401(k) participation rates that are lower initially than under automatic enrollment but that increase over time. Under automatic enrollment, procrastination is evidenced by the high initial fraction of 401(k) participants with a contribution rate and asset allocation that corresponds to the automatic enrollment default along with the decline over time in the fraction of automatic enrollees that exhibit this type of default savings behavior.

There are several different reasons why individuals might procrastinate. Samuelson and Zeckhauser [1988] note that it may be rational to stick with the status quo when there are transaction costs involved in switching to another alternative. In the case of 401(k) savings behavior, the transaction costs are twofold: (1) there is the direct cost of implementing a desired change, and (2) there are the indirect costs of learning about 401(k) plan features and evaluating the various saving options. Although the direct transaction costs are small, if the cost of gathering and evaluating the information needed to make a 401(k) savings decision exceeds the short-run benefit from doing so, individuals will procrastinate.

There are at least two sources of complexity involved in making an optimal 401(k) savings decision. First, the array of participation options is immense. Individuals must first choose what fraction of compensation to contribute to the 401(k) plan, anything from 1 to 15 percent. They must then choose how to allocate that contribution between the nine available fund options. For some employees, a second source of complexity is learning *how* to evaluate this myriad of 401(k) savings options. For example, young newly hired employees may not know what a "401(k)" plan is, or what a "mutual fund" is, or what the difference is between a "money market fund," a "stable value fund," and a "small cap value stock fund." The psychological literature has documented this notion that increasing the complexity of a decision-making task leads to procrastination [Tversky and Shafir 1992; Shafir, Simonson, and Tversky 1993].

One of the likely reasons why 401(k) participation is so much higher under automatic enrollment for young and low income employees who have less financial experience is that automatic enrollment decreases the complexity of the 401(k) savings decision by decoupling the participation decision from the investment

decision. The initial participation decision is simplified from one that involves evaluating a myriad of options to a simple comparison of two alternatives: nonparticipation (consumption or saving outside of the 401(k) plan) versus a 3 percent contribution that is allocated entirely to the money market fund.

Several of the savings patterns noted previously are consistent with procrastination resulting from the transactions costs involved in making an optimal savings decision. As Figure I shows, 401(k) participation rises quite dramatically with tenure for those employees hired prior to automatic enrollment. As employees have more time to become financially literate, to gather information on the details of the 401(k) plan, and to evaluate the options that are available, we would expect to see increases in 401(k) participation such as those shown in Figure I. Moreover, although not shown, the increase in 401(k) participation with respect to tenure is greatest for younger employees, and is particularly large for those under age 30. We would expect general financial literacy to increase with age and life experience, and the steeper 401(k) participation gradient with respect to tenure for younger individuals is consistent with this type of financial learning by doing.[11] The relationship between income and 401(k) participation before automatic enrollment and nondefault 401(k) participation after automatic enrollment is also suggestive of transactions costs as an explanation for procrastination. As column 1 of Table IV shows, the 401(k) participation rate increases quite dramatically with income prior to automatic enrollment. Similarly, as column 3 of Table VIII shows, high income individuals are less likely to be at the default than are low income individuals under automatic enrollment. The cost of delay in making an optimal 401(k) participation decision prior to automatic enrollment or of increasing one's contribution rate after automatic enrollment are twofold: first, the forgone tax benefit associated with 401(k) participation, which increases with income; and second, the value of the employer match, which also

11. Note that there are factors other than procrastination that can account for the increase in 401(k) participation with respect to tenure under the old provisions of the 401(k) plan, and for a flatter tenure-related 401(k) participation gradient with respect to age. Liquidity constraints that become less binding with time as individual incomes increase would also lead to the tenure-related increases in 401(k) participation just described. Thus, the increase in 401(k) participation with respect to tenure, and the slope of the tenure gradient with respect to age, are consistent with both rational procrastination and with liquidity constraints.

increases with income. Thus, in weighing the costs and benefits of deferring the 401(k) participation decision, the costs are larger for high income individuals while the benefits are arguably the same because the number of 401(k) participation options does not vary with respect to income.[12]

Note that there is no evidence of procrastination in the opt-out decision under automatic enrollment. After one month, the 401(k) participation rate of employees hired under automatic enrollment remains fairly constant at around 85 percent. Despite the arguments just made for why we would expect to see procrastination in other savings decision, the lack of procrastination in this decision is not as surprising as it may initially appear. First, the decision to opt out of the 401(k) plan is not a complicated one—it simply involves a comparison of nonparticipation to the default under automatic enrollment. Thus, the rationale to defer making this decision is not very large. Moreover, in the short run, to the extent that individuals would prefer consumption to savings, postponing this decision is costly because liquidating 401(k) assets entails the normal payment of income taxes plus an additional 10 percent tax penalty for early withdrawal of 401(k) balances. The small benefits from procrastination relative to the nontrivial costs imply that individuals who opt out do so immediately.

The type of procrastination discussed so far is a rational result of individuals weighing the costs and benefits of making a decision today versus putting it off until tomorrow. Recent research in behavioral economics has fingered another reason for procrastination in savings decisions—individual problems with self-control [O'Donoghue and Rabin 1998; Diamond and Köszegi 2000; Laibson, Repetto, and Tobacman 1998]. O'Donoghue and Rabin [1998] propose a model in which, under certain conditions (specifically, naïveté about time-inconsistent preferences), individuals may *never* reallocate their portfolios away from poor-performing investments even when the direct transactions costs of doing so are relatively small. These individuals continue to persist in their belief that they will find a better allocation and change their portfolio *tomorrow,* but when tomorrow comes they decide to put the task off for another day, and so on. A similar type of argument can be made for procrastination in the decision

12. Higher income individuals could, of course, have a higher time cost of money which would impart a higher benefit to procrastination as well.

to save in the first place. Unfortunately, there is no way to disentangle the magnitude of rational, transaction costs motivated procrastination from behavioral, self-control motivated procrastination in the data. The possibility of the latter, however, is suggested by the fact that the 401(k) participation rate prior to automatic enrollment never exceeds that under automatic enrollment, even at very high levels of tenure, and by the substantial fraction of automatic enrollees who remain at a 3 percent contribution rate even after one year when they become eligible for a 50 percent employer match on 401(k) contributions of up to 6 percent of pay.

Another behavioral explanation that may account for some of the findings enumerated above (specifically the first, third, and fifth findings) is a bias for the status quo driven by what Thaler [1980] has termed the "endowment effect." Automatic enrollment may increase 401(k) participation because once individuals have become 401(k) participants, they may actually value 401(k) participation more than they would have as nonparticipants. This is driven by an asymmetry in the way individuals perceive losses and gains relative to the status quo. When comparing an alternative that involves equivalent gains and losses relative to what an individual already has, the losses will be more heavily weighted, and this will lead the individual to prefer "the bird in the hand." For automatic enrollees, the gain from opting out is increased current consumption, while the loss is reduced retirement savings. The endowment effect will lead individuals under automatic enrollment to place greater weight on the loss in retirement saving than would individuals contemplating 401(k) participation under the old plan provisions. Thus, automatic enrollment, by conferring ownership of a 401(k) savings account on individuals who would otherwise not have participated, may actually increase the value that these individuals place on saving. This type of endowment effect could also explain a preference for the default contribution rate and default investment option under automatic enrollment.

Another type of status quo bias that may help explain the default savings behavior seen among automatic enrollees derives from the complexity of the 401(k) savings decision. Samuelson and Zeckhauser [1988] note that when faced with a complicated array of decision options, a reasonable strategy to pursue is to reduce the choice set, ignoring some options altogether. But individuals are unlikely to completely dismiss the default because it

is the only option with which they have any direct experience. So, in a complicated decision, the default will assume an asymmetric position in the decision-making process relative to other outcomes, and consequently, will be more likely to be picked as the chosen alternative. Several studies have documented the tendency of individuals to stick with the status quo (when one is available) as decisions become more complicated [Tversky and Shafir 1992; Shafir, Simonson, and Tversky 1993; Redelmeier and Shafir 1995; Samuelson and Zeckhauser 1988]. The evidence in this paper on default savings behavior is certainly consistent with this previous research.

A related behavioral explanation for the predominance of the money market fund as an investment option even among automatic enrollees who have changed some aspect of their 401(k) savings behavior (the nondefault participants) is anchoring [Tversky and Kahneman 1974]. In some decision-making contexts, individuals may use an initial starting value as a reference point from which they then make adjustments. Numerous studies have shown that while individuals tend to move in the right direction away from their initial reference point (in the case of decisions that have a right or a wrong answer), their adjustments tend to be incomplete [Plous 1993; Mussweiler and Strack 1999]. So, for example, if asked to determine the selling price for a house, respondents will give an answer that is too high if they are given a reference point that is higher than the actual selling price, and a price that is too low if they are given a reference point that is lower than the actual selling price [Northcraft and Neale 1987]. In the absence of automatic enrollment, there is no reference point for the investment allocation, and a likely reference point for the 401(k) contribution rate is 6 percent, the point at which the employer match is maximized. Under automatic enrollment, however, the primary reference point is clearly the default. Anchoring could help explain (1) why the predominant contribution rate before automatic enrollment is 6 percent; (2) why the predominant contribution rate for automatic enrollees is 3 percent; (3) why a 3 percent contribution rate is more likely to be chosen by nondefault 401(k) participants hired under automatic enrollment than by participants hired prior to automatic enrollment; (4) why the money market fund is the predominant allocation option for employees hired under automatic enrollment; and (5) why the money market fund is still such a common

fund choice even among nondefault 401(k) participants hired under automatic enrollment.

A final behavioral explanation for the higher 401(k) participation rates under automatic enrollment is the framing of the 401(k) participation decision. Prior to automatic enrollment, the default is nonparticipation, while under the automatic enrollment, the default is participation. A growing body of research has documented the effects of such types of framing on individual choices. For example, Johnson et al. [1993] describe the effects of recent legislative changes in New Jersey and Pennsylvania that give motorists the option of purchasing lower cost insurance policies with restricted, rather than full, rights to sue. The actual fraction of insurance policies with full rights to sue are dramatically different in the two states: 20 percent in New Jersey where policies with restricted rights to sue are the default, versus 75 percent in Pennsylvania where full rights to sue are the default. This anecdote suggests that the impact of framing on decisions can be large indeed. The differential 401(k) participation behavior before and after automatic enrollment would certainly not be inconsistent with this type of a framing effect.

None of the explanations discussed so far helps to explain the final finding of this paper noted above—that 401(k) participants hired before automatic enrollment who do not become participants until after the switch to automatic enrollment are substantially more likely to invest in the automatic enrollment default fund. The most likely explanation for this type of behavior is that employees view the default investment allocation under automatic enrollment as implicit advice from the company on "the best" allocation of one's retirement assets. The other aspects of the default—a 3 percent contribution rate and participation in the 401(k) plan—could be viewed as advice as well. Employee perceptions of the default as advice could also help explain the higher 401(k) participation rate among automatic enrollees and their default savings behavior.

There is one final explanation for the higher 401(k) participation rates under automatic enrollment that should be considered but which we believe has little merit. Although automatic enrollment clearly increases 401(k) participation, it could have no impact on savings overall if the incremental 401(k) savings of individuals who would not have been 401(k) participants in the absence of automatic enrollment is merely a reallocation of assets

from other savings vehicles.[13] One piece of evidence that is inconsistent with the notion that the higher 401(k) participation rate under automatic enrollment is driven by a reshuffling of other assets is that participation in the only other savings vehicle offered by the company, the employee stock purchase plan (ESPP),[14] is completely unaffected by the switch to 401(k) automatic enrollment. The ESPP participation rate is around 18 percent for employees of both the NEW and the WINDOW cohort with 3–15 months of tenure, and the average ESPP contribution rate is just shy of 5 percent for both groups. Prior to automatic enrollment, almost one-third of ESPP participants in the WINDOW cohort were not enrolled in the 401(k) plan.[15] It does not appear, however, that automatic enrollment transformed these ESPP-only participants under the old provisions of the 401(k) plan into 401(k)-only participants under automatic enrollment. Rather, these employees appear to have become joint ESPP/401(k) participants under automatic enrollment with little or no change in their ESPP contribution rate. Unfortunately, lacking information on the other assets of employees at the study company, we cannot definitively rule out the possibility that the differential 401(k) participation rate before and after automatic enrollment is driven by reallocated non-ESPP savings. However, given the substantial costs associated with saving outside of a 401(k) plan when a 401(k) plan is available, it seems unlikely that the much lower participation rates prior to automatic enrollment could have been optimal: if individuals had significant other assets prior to automatic enrollment, they should have been

13. Indeed, there is a contentious debate within the economics profession over this exact issue—whether 401(k) savings in general represents "new" savings, or relabeled "old" savings (see Poterba, Venti, and Wise [1996, 1998] and Engen, Gale, and Scholz [1995, 1996] for the two sides of this debate, and Hubbard and Skinner [1996] and Bernheim [1997] for a discussion of the debate).

14. Participation in the employee stock purchase plan (ESPP) entails an elective payroll deduction of between 1 percent and 10 percent of compensation that is used to purchase the stock of the study company. In contrast to 401(k) contributions, ESPP contributions are not tax deductible. The value of ESPP participation is derived from the fact that shares in the company are purchased at a 15 percent discount and that, if held long enough, the stock appreciation is taxed at capital gains rates rather than ordinary income tax rates.

15. It is actually a bit of a puzzle why employees would choose to contribute to the ESPP plan without first contributing to the 401(k) plan, as the tax deductibility of 401(k) contributions coupled with the employer match are likely to make the 401(k) a better investment option than the ESPP. The complexity of the 401(k) participation decision relative to the ESPP participation decision may explain part of this anomaly.

reallocating them to the 401(k) in the first place in order to take advantage of the tax benefits and the employer match.

VII. Conclusions

This paper has documented significant changes in the 401(k) savings behavior of employees in a large U. S. corporation before and after a switch to automatic enrollment, even though none of the economic features of the 401(k) plan changed. There are two key findings: first, 401(k) participation is significantly higher under automatic enrollment; second, the default contribution rate and investment allocation chosen by the company under automatic enrollment have a strong influence on the savings behavior of 401(k) participants. We explore a variety of explanations for these results, almost all of which point to the notion that economically significant changes in savings behavior can be motivated simply by the "power of suggestion." The "suggestion" of 401(k) participation through automatic enrollment leads to a large increase in the 401(k) participation rate. The "suggestion" of a 3 percent contribution rate through the automatic enrollment default leads to a dramatic shift in the distribution of contribution rates among plan participants, away from 6 percent and higher contribution levels to exactly 3 percent. And the "suggestion" of the money market fund as the default fund allocation leads to a substantially more conservative investment portfolio, one dominated by the money market fund rather than by stocks.

While we discuss a variety of economic and noneconomic explanations for these results, further research is necessary to disentangle the importance of these various factors on the savings behavior of employees. It is important, however, to understand *why* we observe such dramatic differences in savings behavior, even when the economic incentives to save appear to be the same, because the reasons underlying the behavioral differences will inform the discussion of how best to create savings incentives. For example, if procrastination either in 401(k) participation or investment reallocation results from the complexity of making an optimal savings decision, then the right response is to find ways to make the savings decision less complicated, perhaps by offering a menu of popular options. Alternatively, if procrastination results from employees having inadequate information, or if employees take the automatic enrollment default as

investment advice, then a more appropriate response is investment education.

In addition to speaking more generally to the issue of what motivates individuals to save, this paper also speaks specifically to the economic effects of automatic enrollment as a way to encourage 401(k) participation. Automatic enrollment appears to be a win-lose approach to changing 401(k) savings behavior. The win aspect is that automatic enrollment dramatically increases 401(k) participation, with particularly large effects among the groups who would otherwise tend to have the lowest participation rates (blacks and Hispanics, the young, and those with lower compensation). Automatic enrollment also serves to partially equalize participation differences with respect to gender, race/ethnicity, age, and compensation. The lose aspect of automatic enrollment is that it generates a tremendous amount of participant inertia. The vast majority of plan participants stick with the default contribution rate and investment allocation, even though only a tiny fraction of participants not subject to automatic enrollment voluntarily choose that particular allocation within this company. Simulation results reported in a previous version of this paper [Madrian and Shea 2000] show that default savings behavior under automatic enrollment may actually lead to lower total 401(k) savings after only a few years relative to more traditional 401(k) plans that require an active savings decision on the part of participants.

To turn automatic enrollment from a win-lose proposition to a win-win proposition, employers must find ways to move employees into higher contribution rates and more aggressive investment strategies. One approach would be participant education. Another approach, suggested by the favorable aspects of automatic enrollment, would be to improve the default, either initially or over time. One concern of plan administrators with increasing the initial contribution rate is that this may induce employees to opt out of 401(k) participation, and just as there is participant inertia, there is nonparticipant inertia as well. A viable alternative may be to initially automatically enroll employees at a low contribution rate, but automatically increase the contribution rate in small increments in the future. While employers may be wary of choosing default fund allocations that are too aggressive because of the potential negative repercussions of doing so if returns fall or are negative, alternatives to very conservative investment choices should at least be considered.

The results discussed in this paper also have implications for the design of public policies to encourage saving. For example, the results in this paper suggest that if Social Security reform were to include the adoption of wholly or partially self-directed individual accounts, a substantial fraction of individuals would end up at the default plan specified by the Social Security administration or legislated by Congress. In this case, getting the default "right" could have a tremendous impact on the distribution of retirement savings available to individuals.

Overall, this paper raises far more interesting and important questions than it answers. We hope that the results documented in this paper will generate further research into the issue of what motivates individual savings behavior.

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