Employer generosity in employer-matched 401(k) plans, 2002–03

The 401(k) plan affords workers the advantage that their contributions are untaxed until the workers withdraw money from the plan in their retirement; such plans exhibit considerable diversity in their generosity provisions, even when the provisions are combined into one summary measure of generosity

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Over the last few decades, the growth of defined contribution pension plans and the concomitant decline in defined benefit plans has been the most salient trend in the provision of retirement benefits by employers.[1] In particular, one type of defined contribution plan—the 401(k) plan—increasingly has become the primary way employers provide retirement benefits to their workers.[2] 401(k) plans are characterized by the feature that workers' contributions, together with any ensuing interest, are afforded the significant advantage of being untaxed until the workers withdraw money from the plan in their retirement. As 401(k) plans continue to grow in popularity, their generosity—the details of how employers contribute money to employee accounts—becomes of greater and greater interest to workers, employers, and policy analysts. This article builds on information provided in National Compensation Survey (NCS) publications to provide more details about 401(k) plan generosity.[3]

In particular, the article focuses on a type of 401(k) plan referred to in NCS publications as a savings and thrift plan. Such a plan determines employers' contributions by applying a matching formula to the contributions made by each employee; employees are required to contribute to the plan in order to receive the employer match. This type of plan is by far the most prevalent type of 401(k) plan offered today,[4] although a significant number of employers provide 401(k) plans in which they make (nonmatching) contributions, regardless of the employees' contributions, while other employers offer 401(k) plans as tax-advantaged savings vehicles for employees, but offer no employer contribution.[5] At the same time, virtually all savings and thrift plans are 401(k) plans.[6]

The 2002–03 NCS bulletin[7] shows the distribution of types of matching formulas among savings and thrift participants. Fully 68 percent of participants have plans in which the employer matches employee contributions at a "flat" rate. For example, one such plan might contribute 75 cents to the plan for every dollar the employee contributes, up to 6 percent of the employee's salary; in this case, the company's "match rate" is 75 percent, and the potential amount matched is 6 percent. Another 13 percent of savings and thrift plan participants are reported to have plans in which the match rate varies by the employee's contributions. For instance, a plan might match contributions up to the first 3 percent of the employee's salary at a 100-percent rate and then match additional employee contributions up to 6 percent of the employee's salary at a 50-percent rate. Yet another 3 percent of savings and thrift plan participants have plans in which either

the match rate or the amount of employee contributions to which it applies varies by the employee's tenure (length of service). For example, a plan might match 50 percent of less tenured employees' contributions up to 6 percent of the employees' salaries, and 100 percent of more tenured employees' contributions up to 6 percent of the employees' salaries. Finally, the remaining 19 percent of savings and thrift plan participants have plans with other formulas for determining the company match (such as formulas that vary by the company's profit level) or have plans in which the matching formula is unspecified in company materials.

Using data pooled from the 2002 and 2003 NCS samples, focusing solely on savings and thrift 401(k) plans, and defining the fractions according to plan access[8] instead of plan participation reveals that the distribution of matching formulas is similar to the distribution just described: an estimated 68 percent of workers with savings and thrift 401(k) plans have access to plans with a flat match, 14 percent have access to plans whose match varies by the employee's contribution, and 3 percent have access to plans in which the match provisions vary by the employee's tenure.

As this discussion illustrates, two provisions of savings and thrift 401(k) plans characterize the generosity of the plans: the match rate itself and the percentage of the employee's salary that is subject to the match. It is relatively straightforward to summarize the joint distribution of plans that have a flat match rate. Table 1 provides this information in a cross-tabulation in which both the match rates and the amounts to which they apply have been categorized into ranges. This categorization obscures somewhat the fact that most of the distribution is massed at several points; for example, the 51- to 75-percent match rate category contains primarily plans with match rates of 67 percent and 75 percent.

Table 1 illustrates a pertinent point: plans that have lower match rates tend to offer those matches to a larger percentage of employees' salaries. For example, 13 percent (1.8/14.2) of workers with access to plans with the lowest match rates (25 percent and lower) had that match apply to the largest fractions of their salaries (contributions of 6 percent or more), while only 3 percent (1.1/35.5) of workers with the highest match rates (more than 75 percent) had it apply to the largest fractions of their salaries. The impression this observation gives is that employers compensate for lower match rates by allowing those match rates to apply to greater amounts.[9]

Another way to summarize the generosity of these plans is to multiply the match rate by the percentage of salary to which the match may be applied; the resulting measure shows the potential contribution to the plan by the employer as a percentage of salary. For instance, if, as before, the employer contributes 75 cents to the plan for every dollar the employee contributes, up to 6 percent of the employee's salary, then the potential employer contribution is 4 percent ($.75 \times 6$) of the employee's salary. Combining the two generosity provisions in this way incorporates the correlation between them appropriately and allows for a more succinct summary of plan generosity. The following tabulation shows the distribution of this maximum potential contribution measure among all workers with a flat-rate savings and thrift 401(k) plan during 2002–03 (values directly on the border between categories are classified into the smaller category; for example, plans with exactly 2 percent of salary potentially contributed are placed into the "1 to 2" row):

Maximum potential employer contribution (percent of salary)	Percent of workers covered
Total	100.0
1 or less	8.3
1 to 2	24.1
2 to 3	30.7
3 to 4	12.1
4 to 5	12.3
5 to 6	9.2
More than 6	3.2

The majority of the distribution lies within 1 percent and 3 percent of employees' salaries: almost 55 percent of workers with access to a flat-rate 401(k) plan receive a potential employer contribution in that range. Nonetheless, there is a substantial amount of variation in this measure; for instance, more than 12 percent have access to plans with a potential contribution of 5 percent or more of their salaries.

The generosity provisions of savings and thrift 401(k) plans having more complicated formulas for the employer's contribution are harder to summarize, but there are some measures of interest that are relatively straightforward. First, a significant fraction of these plans do not specify the applicable match rates, but instead stipulate that the rate is at the employer's discretion or will be determined in the future. Among workers having access to plans whose match rates vary by the employee's contribution, an estimated 22.6 percent have such "discretionary" employer matches.

Among plans that *do* specify a match rate which varies by the employee's contribution, a key feature is the match rate that is applied to the first dollar the employee contributes. Similarly, we can describe the match rate applied to

Table 1. Match rates and potential amount matched among all workers with a flat-rate savings and thrift 401(k) plan, 2002–03

[In percent]

Match rate	Employee contribution subject to match (percent of salary)						
	2 or less	2 to 3	3 to 4	4 to 5	5 to 6	More than 6	Total
25 or less.....................	0.7	0.7	3.6	1.6	5.9	1.8	14.2
26 to 50	1.7	3.2	8.5	3.2	21.4	5.3	43.3
51 to 75	(¹)	.6	.6	1.7	3.2	1.1	7.1
More than 75..............	2.8	7.2	5.5	7.1	11.7	1.1	35.5
Total...........................	5.2	11.6	18.2	13.5	42.2	9.3	100.0

¹ Less than 0.5 percent.

NOTE: Values directly on the border between categories are classified into the smaller category; for example, plans with exactly 3 percent of salary subject to the match are placed into the "2 to 3" category. Details may not sum to totals due to rounding.

the last dollar of employee contributions that is matched. Table 2 is a summary of the joint distribution of the first-dollar and last-dollar match rates for 401(k) plans which specify match rates that vary by the employee contribution. The table shows that match rates applied to the first dollar an employee contributes tend to be relatively high: almost three-fourths of workers with access to plans with rates that vary by employee contribution are presented with an initial match rate of more than 75 percent; among these workers are 27 percent who are offered a match rate of more than 100 percent.

At the same time, the rate that is applied to the last dollar matched tends to be relatively low: almost 90 percent of workers with access to plans with rates that vary by employee contribution face a final match rate of 50 percent or less. The most common match rate structure is one in which the match rate begins at 100 percent (dollar for dollar) on the first dollar contributed and declines to 50 percent on the last dollar matched. The group of numbers less than 0.5 percent in the upper-right portion of the table illustrates the fact that, among plans of this type, very few have match rates that increase as employee contributions rise.[10]

Plans with matching provisions that vary by the employee's tenure also include some fraction that leave matching contributions up to the discretion of the employer: about 10.3 percent of workers with access to varies-by-service plans face such an unspecified employer match. Among plans which *do* specify a match rate that varies by the employee's tenure, there are two principal ways in which match provisions vary: some 38.7 percent of plans have match rates that vary by tenure, and 50.3 percent vary in the amount of employee contributions that is eligible for the match. The remaining plans vary in other ways.

Table 3 describes the distribution of the maximum and minimum match rates applying to plans which have provisions that vary by employee tenure. The table includes those plans which have nonvarying matches, but varying amounts of applicable employee contributions. On the one hand, these plans appear to be relatively generous to employees who meet the tenure requirements for receiving the highest matches: almost 70 percent of workers with access to such plans have access to plans with maximum match rates greater than 75 percent. On the other hand, these plans appear to be relatively *un*generous to those workers who have short tenures: most such workers have access to plans with minimum match rates of 50 percent or less.

Table 4 describes the distribution of the maximum and minimum levels of potentially matched employee contributions applying to plans which have provisions that vary by employee tenure. As in table 3, there is a significant concentration along the diagonal, representing the plans that vary along dimensions other than the potential amount matched. Unlike table 3, however, table 4 points up the relatively low generosity of these plans as regards the amount of contributions to which the match is applicable, even among high-tenure workers. For example, only 42 percent of high-tenure workers and 24 percent of low-tenure workers can receive matches on 5 percent or more of their salaries.

For a more concise summary of the generosity of 401(k) plans with variable match rates, it is possible to

Table 2.	Match rates on first and last dollar matched among all workers with a varies-by-contribution savings and thrift 401(k) plan, 2002–03				

[In percent]

Match rate on first dollar	Match rate on last dollar				
	25 or less	26 to 50	51 to 100	More than 100	Total
25 or less..	3.3	(1)	(1)	(1)	3.8
26 to 50	11.6	7.2	(1)	(1)	18.9
51 to 75	(1)	3.0	(1)	(1)	3.0
76 to 100	5.5	41.3	(1)	(1)	47.1
More than 100..	(1)	17.3	2.7	7.3	27.2
Total..	20.5	68.8	3.4	7.3	100.0

[1] Less than 0.5 percent.

NOTE: Details may not sum to totals due to rounding.

Table 3.	Maximum and minimum match rates among all workers with a varies-by-service savings and thrift 401(k) plan, 2002–03			

[In percent]

Maximum match rate	Minimum match rate			
	50 or less	51 to 100	More than 100	Total
50 or less..	25.6	(1)	(1)	25.6
51 to 75	4.7	(1)	(1)	5.5
More than 75..	24.2	32.6	12.2	69.0
Total..	54.5	33.4	12.2	100.0

[1] Less than 1 percent.

NOTE: Details may not sum to totals due to rounding.

calculate a form of the potential employer contribution measure described in the tabulation on page 27 for flat-rate plans. For plans whose match rates vary by the level of the employee's contribution, this calculation entails a direct application of the plan's matching provisions. For example, if a plan matches contributions at a 100-percent rate up to the first 3 percent of the employee's salary and then matches additional employee contributions at a 50-percent rate up to 6 percent of the employee's salary, then the potential contribution of the employer is $(1 \times 3) + (0.5 \times 3) = 4.5$ percent of the employee's salary. For plans whose match rates vary by the employee's tenure, the calculation is less straightforward, because different workers face different maximum potential employer contributions at any point in time. To combine these provisions into one number, a weighted average of the different maximum potential employer contributions may be calculated, with the weights determined by the percentage of workers in the job facing each set of provisions.[11]

Table 5 shows the distribution of potential employer contributions for 401(k) plans with varying provisions, broken out into subsets for plans that vary by employee contribution and plans that vary by employee tenure. Among plans in which the match rate varies by employee contribution, almost half of the distribution (49.6 percent) has a maximum potential employer contribution in the interval from 3 percent to 4 percent of salary;[12] these plans seem relatively generous compared with the flat-rate plans, for which (as shown in the tabulation on page 27) the most common range is in the interval from 2 percent to 3 percent of salary. Among plans in which the match rate varies by employee tenure, the distribution of maximum potential employer matches is spread relatively evenly among the categories between 1 percent and 6 percent of salary.

A comparison of the aforementioned tabulation with table 5 reveals that flat-rate plans and variable-rate plans differ somewhat in generosity, with variable-rate plans tending to be more generous, on average. A natural ques-

Table 4. Maximum and minimum potential amount matched among all workers with a varies-by-tenure savings and thrift 401(k) plan, 2002–03

[In percent]

Maximum potential amount	Minimum potential amount			
	2 or less	2 to 5	More than 5	Total
2 or less..	13.9	(1)	(1)	13.9
2 to 5	(1)	44.5	(1)	44.6
More than 5..	6.0	11.2	24.3	41.5
Total...	20.0	55.7	24.3	100.0

1 Less than 0.5 percent.

NOTE: Values directly on the border between categories are classified into the smaller category; for example, plans with exactly 3 percent of salary potentially contributed are placed into the "2 to 3" category. Details may not sum to totals due to rounding.

Table 5. Maximum potential employer contribution as a percentage of salary among all workers with a varying-rate savings and thrift 401(k) plan, by type of formula, 2002–03

[In percent]

Maximum potential employer contribution (percent of salary)	Varies by contribution	Varies by tenure	All variable-rate plans
Total	100.0	100.0	100.0
1 or less..	1.6	10.6	3.7
1 to 2	9.7	19.5	11.9
2 to 3	18.3	23.2	19.4
3 to 4	49.6	19.3	42.7
4 to 5	2.0	16.2	5.3
5 to 6	1.3	10.5	3.4
More than 6..	17.4	.7	13.6

NOTE: Values directly on the border between categories are classified into the smaller category; for example, plans with exactly 2 percent of salary potentially contributed are placed into the "1 to 2" category. Details may not sum to totals due to rounding.

tion to ask is, Are these average differences significant? Wald tests that incorporate the complex design of the NCS data can be used to answer this question.[14] Table 6 shows the results of several such tests. In the first row of the table, the potential employer contribution among flat-rate plans is seen to be 3.28 percent of the employee's salary, while among variable-rate plans it is 3.50 percent of salary; this difference is statistically significant,[14] with a p-value of .005. To understand whence the difference originates, it suffices to look at the second and third rows of the table, where the first- and last-dollar match rates are compared across flat- and variable-rate plans.[15] Among flat-rate plans, the average match rate was 64.8 percent; among variable-rate plans, the average match rate went from 109.9 percent on the first dollar matched to 73.6 percent on the last dollar matched. On the first-dollar rate, the difference between flat-rate plans and variable-rate plans was statistically significant. In addition, even the last-dollar rate among variable-rate plans was significantly higher than the flat-rate average, despite the fact that variable rates generally declined from the initial match to the last-dollar match. By contrast, no significant

Table 6.	Mean potential employer contributions, match rates, and amounts covered among all workers with a specified-rate (flat-rate or variable-rate) savings and thrift 401(k) plan, 2002–03			
[In percent]				
Generosity measure	Flat-rate plans	Variable-rate plans	p-test for equivalence	All specified-rate plans
Potential employer contribution, percent of salary	3.28	3.50	0.005	3.31
Match rate on first dollar matched, percent of employee contribution...	64.76	109.89	.000	71.42
Match rate on last dollar matched, percent of employer contribution	64.76	73.57	.075	66.06
Maximum applicable employer contribution, percent of salary	5.21	5.14	.614	5.20

differences appeared upon a consideration of the total amount of employee contributions subject to a match: the amount for flat-rate plans (5.21 percent of employees' salaries) and the amount for variable-rate plans (5.14 percent of employees' salaries) were nearly identical.

Another advantage of the measures depicted in table 6 is that summary statistics can be computed for flat- and variable-rate plans combined. For example, the last column of the table shows averages across all workers with access to specified-rate plans (flat- and variable-rate plans in which the rates are specified in plan materials, rather than being left to the employer's discretion). Then, table 7 breaks out these averages by various broad characteristics. The two tables reveal a number of differences in 401(k) generosity by industry and occupation. For example, financial occupations and industries tend to have access to significantly more generous plans than do health care occupations and industries, and workers in the Western United States tend to have access to significantly more generous plans than workers in the South. Somewhat surprisingly, the generosity of plans accessible to lower wage workers is not significantly different from that among plans of higher wage workers. The difference between unionized and nonunionized workers in average potential employer contributions also is not statistically significant, although the amount of applicable employee contributions is significantly higher among unionized workers.

Many of the between-group differences shown in table 7 also are evident in employer cost data for defined contribution plans, published quarterly in the *Employer Costs for Employee Compensation* bulletins of the Bureau of Labor Statistics. The data underlying these bulletins are collected in the NCS as well, but unlike the data summarized in table

7, they are, in substantial part, not specific to particular plans; instead, these data often reflect employer costs accrued at the job level for defined contribution plans, rather than costs associated with individual plans. Nonetheless, it is apparent that a correlation exists between employer costs accrued for defined contribution plans and the measures of generosity compiled here.

To explore the strength of this relationship, linear regressions were performed for the employer's cost for defined contribution plans on various measures of plan generosity, for all workers with a specified-rate savings and thrift 401 (k) plan for 2002–03. The following tabulation shows the results of these regressions—in particular, the slope coefficient and R square for three different regression equations:

Explanatory variable	Slope coefficient	R square
Potential employer contribution (percent of salary)	0.086	0.043
Potential employer contribution (dollars)	.517	.284
Potential employer contribution per participant (dollars)	.818	.430

The first row shows the results of cost regressions when the independent variable is the potential employer contribution, the measure we have described in the tables in this article. A 1-percentage-point increase in the potential employer contribution corresponds to only an 8.6-cent increase in the employer's cost per hour worked for defined contribution benefits. Further, variation in the potential employer match can account for only 4.3 percent of the variation in employer costs.

| Table 7 | Mean potential employer contributions, match rates, and amounts covered among all workers with a specified-rate savings and thrift 401(k) plan, by selected categories, 2002–03 | | | | | | | |

Category	Potential employer contribution		Match rate on first dollar matched		Match rate on last dollar matched		Applicable employee contribution	
	Percent	Standard error	Percent	Standard error	Percent	Standard error	Percent	Standard error
Total......................................	3.31	0.05	71.42	1.14	66.06	1.09	5.20	0.06
Industry:								
Mining, utility, and construction............................	2.98	.08	61.00	2.10	56.92	1.89	5.24	.13
Manufacturing	3.31	.13	61.62	1.76	57.04	1.72	5.62	.10
Wholesale trade	3.02	.13	69.11	3.73	67.21	3.69	5.05	.15
Retail trade..............................	3.45	.10	77.30	1.95	64.13	1.81	5.28	.07
Transportation	3.06	.15	73.33	3.07	72.79	3.09	4.50	.18
Information	3.77	.11	67.01	1.69	61.77	1.59	5.88	.07
Finance, insurance, and real estate	4.00	.08	83.25	1.84	78.25	1.98	5.20	.04
Professional, managerial, and administrative...............	3.47	.14	66.24	2.18	63.25	2.15	5.80	.20
Education	3.85	.25	86.17	5.11	82.49	4.39	4.78	.34
Health and social services	2.62	.11	62.24	3.38	60.83	3.31	4.58	.15
Entertainment and hospitality	2.97	.13	75.99	5.18	66.07	7.85	4.54	.52
Other.......................................	3.82	.20	142.08	18.97	140.45	19.18	4.03	.25
Size of establishment:								
Fewer than 100 workers	3.10	.07	68.50	2.27	65.09	2.24	5.33	.07
100 or more workers	3.42	.06	72.98	1.29	66.58	1.24	5.13	.08
Region:								
Northeast	3.60	.13	72.97	1.53	68.19	1.39	5.40	.08
Midwest...................................	3.21	.07	69.28	1.57	63.80	1.53	5.19	.14
South.......................................	3.01	.09	67.46	2.77	63.66	2.64	4.98	.07
West..	3.69	.08	79.99	3.23	72.02	3.09	5.37	.11
Occupation:								
Management............................	3.76	.11	75.58	2.13	70.87	2.18	5.44	.08
Financial operations................	3.78	.07	80.59	2.54	73.63	2.35	5.24	.09
Computer	3.37	.13	64.24	2.07	60.56	1.66	5.49	.12
Engineering and science.........	3.66	.14	69.64	2.46	66.75	2.38	5.59	.17
Education	3.16	.16	73.18	5.82	72.40	5.75	4.87	.24
Health care..............................	2.70	.14	64.37	3.24	62.11	3.20	4.49	.16
Other services.........................	3.22	.15	75.13	4.02	69.54	4.15	5.02	.36
Sales	3.33	.08	76.46	2.16	64.06	2.00	5.22	.10
Office support..........................	3.45	.07	73.97	1.79	69.63	1.64	5.33	.09
Construction and repair...........	3.20	.09	70.00	4.42	67.48	4.46	5.25	.10
Production...............................	3.26	.16	62.89	2.19	57.07	2.27	5.58	.13
Transportation	2.97	.08	65.32	1.64	62.04	1.38	4.86	.11
Union status:								
Covered by collective bargaining agreement	3.45	.09	68.71	1.74	64.50	1.59	5.41	.10
Not covered.............................	3.30	.05	71.65	1.26	66.19	1.16	5.19	.06
Average hourly wage:								
$15 or less	3.26	.06	72.66	1.74	66.27	1.66	5.13	.09
More than $15..........................	3.36	.06	70.16	1.08	65.85	1.01	5.28	.05

The predictive power of the potential employer match is strengthened considerably by expressing it in dollar terms. The second row of the tabulation shows the results of regressions run on "potential dollar match," a measure calculated by multiplying by the average wage of the as-sociated job. A 1-dollar increase in a job's potential dollar match is associated with a 52-cent increase in the cost of the job's defined contribution plan, and 28.4 percent of the observed variation in cost is accounted for by this relationship. Most of the relationship reflects the correla-

tion between the cost of wages and the cost of benefits, documented elsewhere,[16] but the strong predictive power of the potential dollar match is still notable. One possible reason this relationship isn't even stronger is that participation in savings and thrift 401(k) plans is optional and the take-up rate is significantly less than 100 percent.[17] To take the investigation a step further, the potential dollar match was multiplied by the job's participation rate in the plan. The resulting measure can account for 43 percent of the variation in employer costs for defined contribution plans, and its estimated effect on costs is close to 1 for 1. (The slope coefficient is 0.82.)

Overall, there is quite a bit of diversity among the generosity provisions of 401(k) plans, even when only savings and thrift plans are considered, as is done here. The struc-

ture of the match can vary along different dimensions or remain flat. It can be prespecified or left to the employer's discretion, and among prespecified plans, the match rates and amounts eligible for the match can vary substantially. These provisions compensate for each other to some extent: plans with lower match rates tend to have higher amounts eligible to be matched, but there is a great deal of variation among plans even when the provisions are combined into one summary measure of generosity. Of course, a key detail that has not been addressed in this article is the extent to which these generosity provisions are availed of; in the end, the actual contribution of the employer is known only after the participation rate of employees, as well as the extent of the contributions of employees who participate, is determined.[18]   □

Notes

[1] "Retirement plans are classified as either defined benefit or defined contribution plans. Defined benefit plans determine payments according to a fixed formula based on salary, years of service, and age. Defined contribution plans determine payouts on the amount of money contributed and the rate of return on the money invested" (*National Compensation Survey: Employee Benefits in Private Industry in the United States*, 2003, Bulletin 2577 (Bureau of Labor Statistics, January 2006), p. 49); on the Internet at **www.bls.gov/ncs/ebs/sp/ebbl0021.pdf**.

[2] See, for example, Stephanie Costo, "Trends in retirement plan coverage over the last decade," *Monthly Labor Review,* February 2006, pp. 58–64; and William Wiatrowski, "Medical and retirement plan coverage: exploring the decline in recent years," *Monthly Labor Review,* August 2004, pp. 29–36.

[3] The NCS, a survey of employers conducted by the Bureau of Labor Statistics, measures employer costs for wages and benefits, as well as many other characteristics of employer-provided benefits.

[4] According to NCS data for 2002–03, 88.2 percent of workers who had access to a 401(k) plan in which the employer offered some contribution had access to a savings and thrift 401(k) plan. In comparison, 15.2 percent had access to a deferred profit-sharing 401(k) plan (in which possibly irregular employer contributions are made so that the employee can share in the employer's profits), and 4.6 percent had access to a money purchase 401(k) plan (in which employers contribute regularly according to a predetermined formula). Note that these numbers sum to more than 100 percent because some workers have access to more than one type of 401(k) plan.

[5] Recent data on the incidence of such "zero-match" plans have been collected by the NCS, which estimates that 16 percent of private-industry workers had access to such benefits in 2005 and 2006. The 16-percent figure seems broadly consistent with those obtained by other sources. For example, Olivia S. Mitchell, Stephen P. Utkus, and Tongxuan Yang, *Turning Workers Into Savers? Incentives, Liquidity, and Choice in 401(k) Plan Design*, NBER Working Paper 11725, October 2005, report that zero-match plans make up 18 percent of their sample of 2001 Vanguard clients; and Alicia H. Munnell, Annika E. Sundén, and Catherine Taylor, "What Determines 401(k) Participation and Contributions?" *Social Security Bulletin*, vol. 64, no. 3,

2002, pp. 64–75, report that zero-match plans constitute 12 percent of 401(k) plans in the 1998 Survey of Consumer Finances.

[6] In the NCS data for 2003, a very small fraction (less than 0.5 percent) of savings and thrift plans do not allow pretax contributions and, accordingly, are not 401(k) plans.

[7] *National Compensation Survey: Employee Benefits in Private Industry in the United States, 2002–2003*, Bulletin 2573 (Bureau of Labor Statistics, January 2005), table 93, p. 114.

[8] In the NCS data, workers are defined as having access to a plan if they are "potentially" eligible to participate in the plan. For example, if a plan is available to workers of a particular job category in an establishment, subject to some eligibility criteria, all workers in that job category in that establishment are considered to have access to the plan, regardless of whether they meet the eligibility criteria and regardless of whether they actually participate in the plan.

[9] The relationship between match rates and the amount to which the match applies is more rigorously evidenced by a correlation coefficient of −.181. (The negative sign indicates that higher match rates tend to coincide with lower applicable employee contributions. The magnitude indicates a relatively weak relationship: a coefficient of −1 would indicate that the variables predict each other perfectly, while a coefficient of 0 would mean that the variables were completely independent.)

[10] An estimated 97.4 percent of workers with access to plans with match rates that vary with the employee contribution had a higher rate on the first dollar matched than on the last dollar matched.

[11] Distributions of tenures at each job were estimated from the distributions present at the time the job was first sampled by the NCS or, in cases where this information was unavailable, from the overall job distribution of the relevant occupation.

[12] This and other such intervals include the upper, but not the lower, bound.

[13] For a discussion of the Wald test and its role in hypothesis testing, see William H. Greene, *Econometric Analysis*, 4th ed. (Upper Saddle River, NJ, Prentice Hall, 2000), pp. 153–56.

¹⁴ Tests of significance in this article are carried out at the 10-percent level of significance, in accordance with Office of Compensation and Working Conditions standards.

¹⁵ For flat-rate plans, the first- and last-dollar match rates are the same as the flat rates described in table 2. For plans whose rates vary by employee tenure, the average first- and last-dollar rates across workers in corresponding jobs were calculated.

¹⁶ See, for example, William J. Carrington, Kristin McCue, and Brooks Pierce, "Nondiscrimination Rules and the Distribution of Fringe Benefits," *Journal of Labor Economics,* April 2002, pp. S5–S33.

¹⁷ According to Allan Beckmann, "Access, Participation, and Take-Up Rates in Defined Contribution Retirement Plans among Workers in Private Industry, 2006," *Compensation and Working Conditions Online* (Bureau of Labor Statistics, 2006), the take-up rate for all workers with access to defined contribution plans was 81 percent in 2006. This rate would likely be smaller if the analysis were limited to savings and thrift plans, in which participation is markedly voluntary.

¹⁸ For information on how the generosity of savings and thrift 401(k) plans affects the participation of employees in those plans, see Keenan Dworak-Fisher, "New Evidence on the Determinants of 401(k) Participation," unpublished manuscript (Bureau of Labor Statistics, 2007).