

# Contribution Behavior of 401(k) Plan Participants

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Issue Brief

- This *Issue Brief* examines the 1999 contribution behavior of 1.7 million 401(k) plan participants drawn from the EBRI/ICI Participant-Directed Retirement Plan Data Collection Project. The findings in this paper build on previous academic research examining the contribution activity of 401(k) participants, by using a large sample of participants in a wide range of plan sizes and by examining in detail the factors that influence contribution activity.
- Eighty-five percent of participants in the sample only made before-tax contributions to their plans, and 97 percent of all dollars contributed by employees were contributed on a before-tax basis. On average, participants contributed 6.8 percent of their salaries on a before-tax basis.
- Before-tax contribution activity varied among participants. About 61 percent of participants contributed more than 5 percent of their salaries on a before-tax basis and about 21 percent set aside more than 10 percent of their salaries on a before-tax basis.
- Eleven percent of participants analyzed in this study earning more than \$40,000 a year contributed at the \$10,000 before-tax IRC limit in 1999. Thirteen percent of participants with salaries between \$70,000 and \$80,000 contributed at the cap, and 18 percent of those with salaries between \$80,000 and \$90,000 were at the limit. However, it appears that among participants not contributing at the IRC limit, 52 percent could not have done so because of formal plan-imposed contribution limits below the IRC limit.
- Older participants tended to contribute a higher percentage of their salaries to plans than did younger participants, even after factoring out differences in salary and job tenure. Participants tended to increase the share of their salary (and amounts) contributed to their 401(k) plan as their salaries rose until salaries reached \$80,000. For individuals with salaries above \$80,000, before-tax contribution rates (though not the amounts contributed) tended to fall as salaries rose because IRC, and possibly plan sponsor, contribution limits became binding for some participants.
- Giving employees the option of borrowing from their 401(k) accounts increased participant contribution rates. On average, a participant in a plan offering loans appeared to contribute 0.6 percentage point more of his or her salary to the plan than a participant in a plan with no loan provision.
- Total contributions—the sum of employee and employer contributions—were higher for participants who received an employer contribution as part of their 401(k) plan than for those who did not. The average total contribution rate was 10 percent of salary for employees in plans offering an employer contribution, compared with 7.4 percent for those in plans not offering an employer contribution.

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## Overview

For many American workers, 401(k) plan accounts have become an important part of

their retirement planning. The income that these accounts are expected to provide in retirement depends, in part, on the contributions that plan participants make during their wage-earning years. Contributions by plan participants depend on a variety of factors, including the regulatory framework under which 401(k) plans operate, personal participant characteristics, and the plan's overall design.

This *Issue Brief* examines the 1999 contribution behavior of 1.7 million 401(k) plan participants.<sup>1</sup> This sample of participants was drawn from data that the Employee Benefit Research Institute (EBRI)<sup>2</sup> and the Investment Company Institute (ICI)<sup>3</sup> have collected as part of the EBRI/ICI Participant-Directed Retirement Plan Data Collection Project.<sup>4, 5</sup>

The findings in this paper build on previous academic research examining the contribution activity of 401(k) participants, by using a large sample of participants in a wide range of plan sizes and by examining in detail the factors that influence contribution activity. Most previous research<sup>6</sup> into contribution activity has used either highly aggregated plan data,<sup>7</sup> individual firm and participant data from one or a few select firms,<sup>8</sup> administrative data on participants from one record keeper,<sup>9</sup> or household survey data.<sup>10, 11</sup> Using participant-level data from the 1999 EBRI/ICI database, this *Issue Brief* examines the roles that contribution limits, participant characteristics, and detailed plan design features play in the contribution decisions made by participants and employers in 401(k) plans. The principal findings of the analysis are as follows.

### Contributions to 401(k) Plans

- Before-tax contributions accounted for most of the

employee contributions to 401(k) plans in 1999. Eighty-five percent of participants in the sample only made before-tax contributions to their plans, and 97 percent of all dollars contributed by employees were contributed on a before-tax basis. On average, participants contributed 6.8 percent of their salaries on a before-tax basis.

- Before-tax contribution activity varied among participants. About 61 percent of participants contributed more than 5 percent of their salaries on a before-tax basis and about 21 percent set aside more than 10 percent of their salaries on a before-tax basis.
- Approximately 91 percent of the participants in this sample were in plans that featured an employer contribution.

### Influence of Internal Revenue Code Limits

- Eleven percent of participants analyzed in this study earning more than \$40,000 a year contributed at the \$10,000 before-tax Internal Revenue Code (IRC) limit in 1999.<sup>12</sup> Thirteen percent of participants with salaries between \$70,000 and \$80,000 contributed at the cap, and 18 percent of those with salaries between \$80,000 and \$90,000 were at the limit. However, it appears that among participants not contributing at the IRC limit, 52 percent could not have done so because of formal plan-imposed contribution limits below the IRC limit. This analysis could not identify the participants who were prevented from reaching the IRC \$10,000 limit because of nondiscrimination testing—IRC rules that are designed to ensure that employees of all income ranges attain the benefits of the 401(k) plan.
- Older workers were more likely to meet the before-tax IRC contribution limit than younger workers. Eighteen percent of the participants in their 60s and 15 percent of those in their 50s met this limit, while only 5 percent of those in their 20s did so.

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## Influence of Personal Participant Characteristics

- Older participants tended to contribute a higher percentage of their salaries to plans than younger participants, even after factoring out differences in salary and job tenure. A 60-year-old participant with the same salary and job tenure as a 30-year-old participant is predicted to contribute nearly 2 percent more of his or her salary to a 401(k) plan.
- Participants tended to increase the share of their salary (and amounts) contributed to their 401(k) plan as their salaries rose until salaries reached \$80,000. For individuals with salaries above \$80,000, before-tax contribution rates (though not the amounts contributed) tended to fall as salaries rose because IRC, and possibly plan sponsor, contribution limits became binding for some participants. On average, individuals making more than \$100,000 per year tended to contribute a much smaller share of their salaries to their 401(k) plans than did individuals with salaries between \$20,000 and \$40,000.
- Contribution rates increased or decreased as job tenure rose, depending on whether a participant was early or late in his or her tenure. Holding other factors like age and salary constant, a participant's contribution rate rose slowly for the first 18 years of tenure and then declined.

## Influence of Plan Characteristics

- Giving employees the option of borrowing from their 401(k) accounts increased participant contribution rates. On average, a participant in a plan offering loans appeared to contribute 0.6 percentage point more of his or her salary to the plan than a participant in a plan with no loan provision.
- Total contributions—the sum of employee and employer contributions—were higher for participants that received an employer contribution as part of their

401(k) plans than for those who did not. The average total contribution rate was 10 percent of salary for employees in plans offering an employer contribution, compared with 7.4 percent for those in plans not offering an employer contribution.

- Employee before-tax contribution rates tended to be slightly lower for participants whose employer made a contribution. The average participant contribution rate in plans offering an employer contribution was 6.8 percent of salary. Contributing participants in plans not offering an employer contribution directed an average of 7.4 percent of salary to their plans.

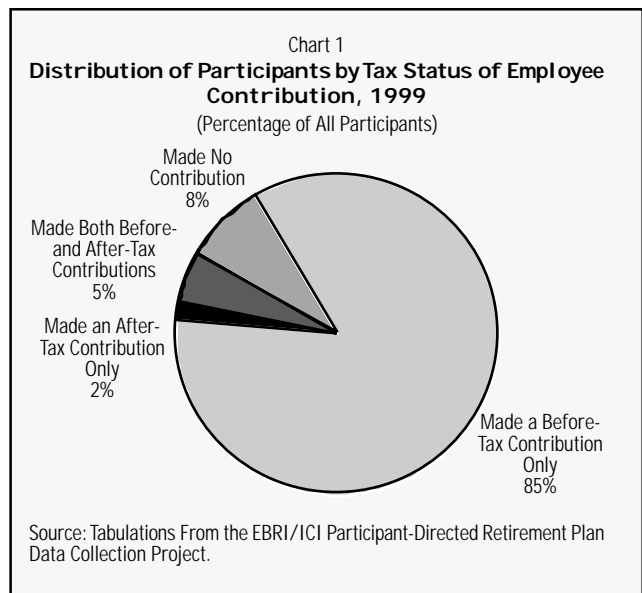
## Background

This *Issue Brief* examines the variation in contribution activity of 401(k) plan participants

during their wage-earning years. Contributions to 401(k) accounts play a crucial role in determining how much income individuals can expect to receive at retirement. Even small contributions early in an individual's career, through compounding, can become sizable balances by retirement. Participants themselves, as well as plan sponsors (or employers), can contribute to their 401(k) accounts.<sup>13</sup> According to data on the 1.7 million 401(k) participants drawn from the 1999 EBRI/ICI database, employee dollars accounted for two-thirds of the total dollars contributed to these retirement plans. Thus, given the importance of employee decision-making, this paper focuses primarily on what factors influence the percentage of income that 401(k) participants contribute annually.<sup>14</sup>

## Contributing on a Before- or After-Tax Basis

Employees may be able to choose whether to make before- and/or after-tax contributions to the 401(k) plan,



although many plans do not allow both options.<sup>15</sup> Among the participants studied here, 85 percent contributed only on a before-tax basis, another 5 percent made both before- and after-tax contributions, and another 2 percent made only an after-tax contribution (chart 1). On average, 97 percent of all dollars contributed by employees were contributed on a before-tax basis.

Participants making before-tax contributions set aside, on average, 6.8 percent of their salaries in their 401(k) accounts. Among those participants who made before-tax contributions, however, 61 percent contributed more than 5 percent of their salaries and 21 percent contributed more than 10 percent of their salaries. Before-tax contribution rates varied widely among both highly compensated employees<sup>16</sup> and non-highly compensated employees (chart 2).<sup>17</sup>

## Employer Contributions

Approximately 91 percent of all participants in the sample were in plans offering employer contributions. For

employees receiving employer contributions, the employer contributed, on average, 3.3 percent of participant salary. The total contribution to a participant's account was the sum of the employee (before- and after-tax) and employer contributions. Among participants whose accounts received any contribution—from the employer, the employee, or both—the average total contribution was 9.7 percent of the participant's salary.

Forty-three percent of participants had a total contribution of more than 10 percent of salary and 19 percent had a total contribution of more than 15 percent of salary. Total contribution rates varied widely among participants, although more non-highly compen-

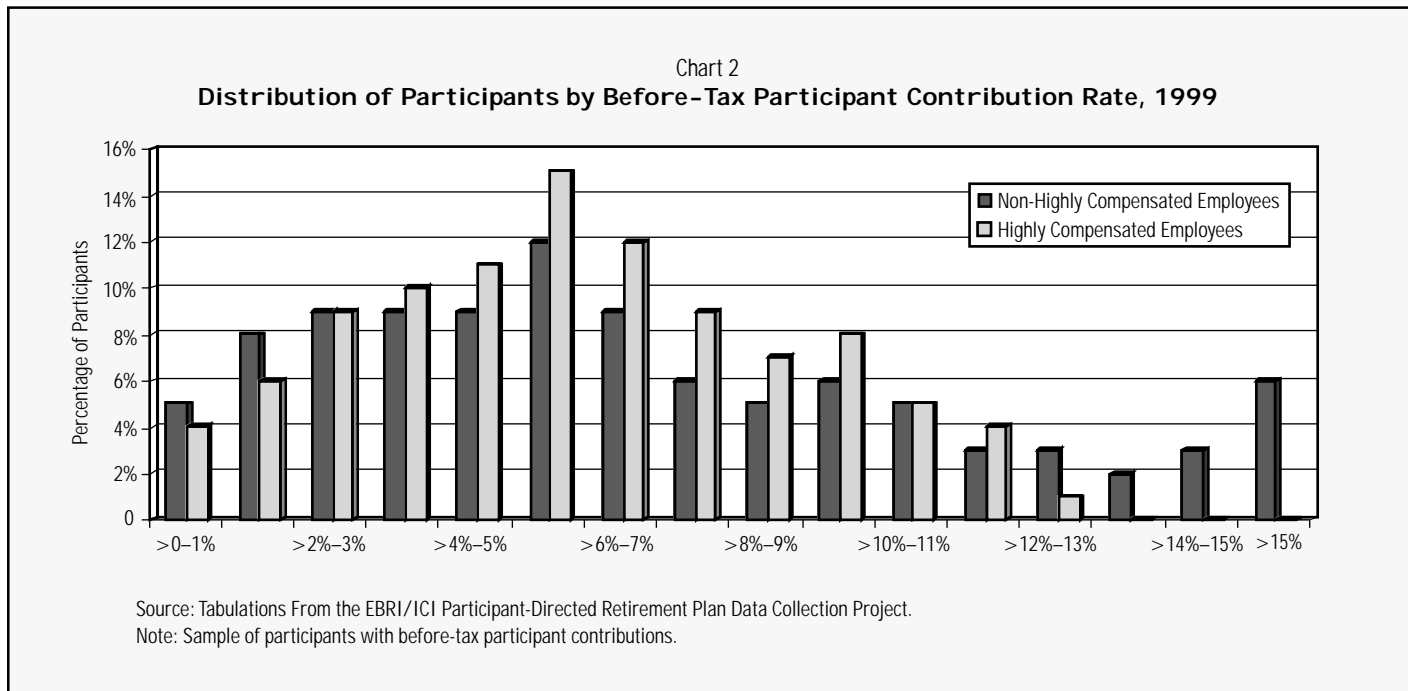
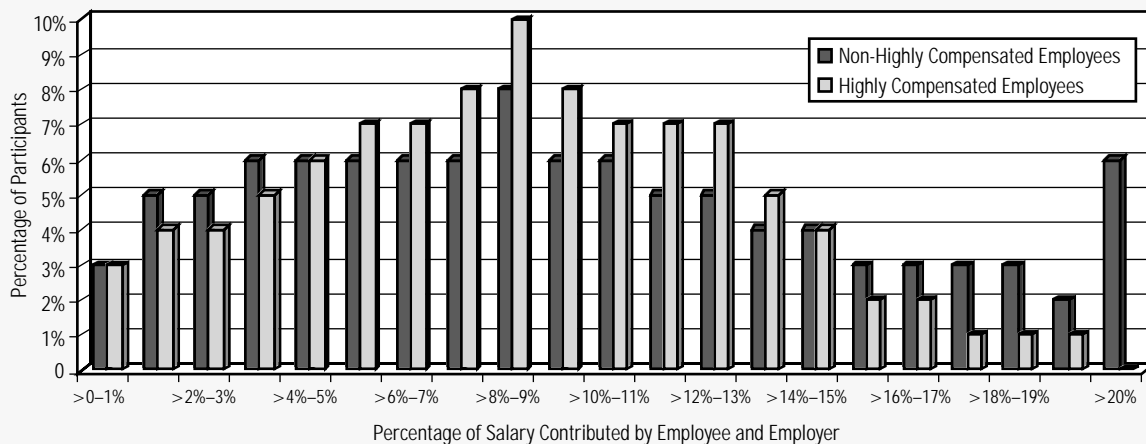


Chart 3  
Distribution of Participants by Total Contribution Rate, 1999



Source: Tabulations From the EBRI/ICI Participant-Directed Retirement Plan Data Collection Project.  
Note: Sample of participants with before- and/or after-tax employee contributions, and/or employer contributions.

sated employees achieved a total contribution in excess of 15 percent of salary (chart 3).<sup>18</sup>

The variation in contribution rates raises questions about the factors that lead to the differences in contribution activity among participants. The remaining sections of this *Issue Brief* examine the influence that IRC limits, personal participant characteristics, and plan characteristics have on participants' before-tax contribution behavior. The contribution behavior of participants grouped by age, salary, and/or tenure is also examined. In addition, statistical regression analysis is used to isolate the effect of individual factors on participant contribution behavior.

## Tax Code Limits

The Internal Revenue Code (IRC) applies two broad limits<sup>19</sup> on participants' contributions to

401(k) plans: individual participant-based and 401(k) plan-based.

### IRC Rules Governing Contributions to 401(k) Plans

The key IRC provision that applies to participants is IRC §402(g), which in 1999 capped an individual's annual before-tax contributions to all 401(k) plans at \$10,000.<sup>20</sup> This cap applies to the aggregate before-tax contribution of an individual participant regardless of the number of

jobs and associated 401(k) accounts maintained by the individual.

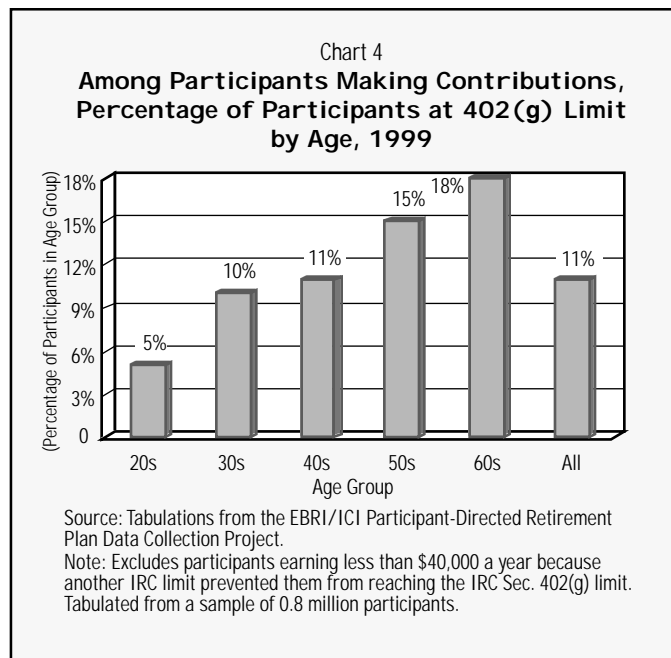
IRC §415(c) imposes limits on the total contributions that may be made to a participant's account in a given 401(k) plan. Under this provision, the sum of employee before- and after-tax contributions and employer contributions for a participant to a given plan could not exceed, in 1999, the lesser of \$30,000 or 25 percent of total compensation.<sup>21, 22</sup>

Furthermore, an individual employee's contribution may be limited as a result of the contribution activity of other participants in the plan. In order to ensure that employees of all income ranges attain the benefits of the 401(k) plan, several provisions of the IRC provide for a framework by which firms must carry out nondiscrimination testing. Actual Deferral Percentage (ADP) nondiscrimination tests essentially require that before-tax contributions by highly compensated employees<sup>23</sup> (as a percentage of their eligible compensation<sup>24</sup>) do not exceed the contributions of non-highly compensated employees (as a percentage of their eligible compensation) by more than a specified amount. In cases where a plan may not meet nondiscrimination testing requirements, highly compensated employees who originally made higher contributions (possibly at the IRC limits) may have a portion of their contributions returned or recharacterized after year-end to move the plan into compliance.<sup>25</sup> As a result, some participants in these plans were unable to contribute at the IRC §402(g) limit. In addition, some plans impose formal contribution limits that fall below the IRC limits for some participants.<sup>26</sup>

## Influence of the IRC §402(g) Limit

This section examines the participant and plan characteristics that influence whether a participant contributed at the 402(g) limit imposed on individual before-tax contributions. Because participants earning less than \$40,000 a year cannot reach the \$10,000 limit,<sup>27</sup> these individuals were not included in the analysis of the influence of the 402(g) limit. In the sample of about 0.9 million participants earning more than \$40,000 a year, 11 percent contributed at the \$10,000 limit.<sup>28</sup> However, it appears that among participants not contributing at the 402(g) limit, 52 percent could not have contributed at the IRC limit because the plan-imposed limit was lower.<sup>29</sup> This analysis could not identify the participants who, because of nondiscrimination testing required by the IRC, were prevented from reaching the 402(g) limit.

**Participant Age**—Older 401(k) plan participants were more likely to reach the 402(g) limit than younger participants. For example, while 5 percent of participants in their 20s contributed at the limit, 15 percent of



participants in their 50s and 18 percent of participants in their 60s were at the limit (chart 4). However, this positive correlation between age and contributions at the 402(g) limit may have resulted from other factors

tied to age, such as salary or tenure. To control for these other factors, a statistical regression model was used.<sup>30</sup> This model showed that even after controlling for these other factors, older participants were more likely to be at the 402(g) contribution limit.

**Participant Salary**—The likelihood that a participant contributed at the \$10,000 limit rose with salary. Thirty-nine percent of participants with annual salaries greater than \$100,000 contributed at the limit, while 7 percent earning between \$60,000–\$70,000 a year did so (chart 5).<sup>31</sup> After controlling for other factors, the regression analysis also found that participants with higher salaries were more likely to be at the limit. However, the positive

relationship was not the result of highly compensated individuals contributing a higher percentage of their salaries.<sup>32</sup> Even with lower contribution rates, they were more likely to reach the limit because of their higher salaries.

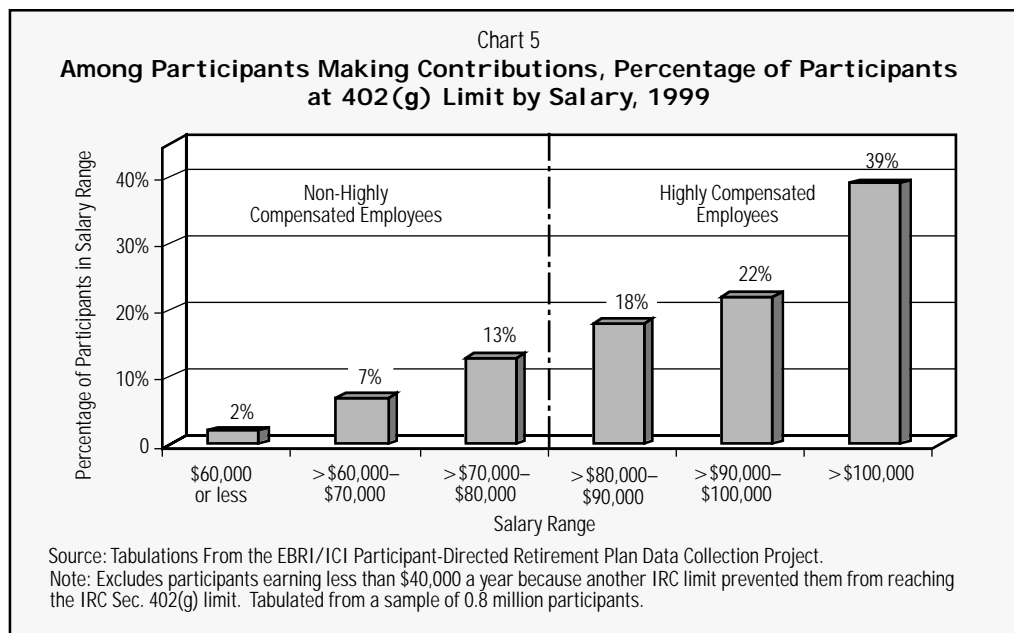


Table 1  
**Average Participant Before-Tax Contribution Rates, by Age and Salary, 1999**  
 (Percentage of Salary Contributed)

Age	Salary Range				
	\$20,000 –\$40,000	>\$40,000 –\$60,000	>\$60,000 –\$80,000	>\$80,000 –\$100,000	>\$100,000
20s	5.3%	6.8%	7.4%	6.8%	4.8%
30s	6.2	6.8	7.2	6.9	5.1
40s	6.7	7.1	7.3	6.8	5.0
50s	7.6	8.3	8.2	7.3	5.1
60s	8.5	9.3	9.0	7.9	5.1

Source: Tabulations From the EBRI/ICI Participant-Directed Retirement Plan Data Collection Project.

Note: Average calculated among all participants making before-tax contributions.

### Plan Characteristics—

The regression analysis found that participants were more likely to

contribute at the 402(g) limit if the plan offered a loan provision. This result is consistent with prior research and the results presented below, which found, in general, that offering a loan provision increased participant contributions to 401(k) plans.

Another plan characteristic, the presence of an employer contribution, lowered the likelihood of a participant being at the 402(g) limit. However, the average total (employee and employer) contribution rate in plans with employer contributions was higher than in plans without employer contributions, as discussed in detail below.

## Participant Characteristics

Although the average before-tax contribution rate by 401(k) plan participants was 6.8 percent

of salary in 1999, individual contribution rates varied widely around that figure. This section analyzes the variations, focusing on how personal participant characteristics influenced participant contributions.

Specifically, it examines the average behavior of several groupings of participants and uses regression analysis<sup>33</sup> to isolate the effect of each personal participant characteristic. Both the “average” and regression analyses found that participant contribution rates varied with age, salary, and tenure.<sup>34</sup>

### Influence of Participant Age

Average contribution rates tended to rise with age among participants making before-tax contributions, within any given salary grouping. For example, contributing participants in their 20s earning between \$40,000 and \$60,000 a year contributed an average of 6.8 percent of salary, while similarly salaried participants in

their 60s contributed 9.3 percent of salary (table 1).

The regression analysis also confirmed that the

percentage of salary contributed by the participant rose with participant age.<sup>35</sup> For example, after controlling for tenure and other factors, the regression estimated that a 25-year-old participant with five years of job tenure and \$40,000 in salary per year would contribute 5.8 percent of his or her salary to a 401(k) plan. Meanwhile, a 65-year-old participant with otherwise similar characteristics would contribute 8.5 percent of his or her salary to the plan.<sup>36</sup> The regression estimated that, all other factors being equal, participants in their mid-40s or younger increased their before-tax contribution rate by about 0.06 percentage point for each additional year of age. Older participants, those between their mid-40s and mid-60s, increased their before-tax contribution rate by 0.07 percentage point for each additional year of age.<sup>37</sup>

This positive correlation between contribution rates and age was expected for two reasons. First, economic theory suggests that individuals experience a life-cycle pattern of saving.<sup>38</sup> In other words, younger people may save less because school expenses, the costs of acquiring a home, and the expenses of raising a family may be of more immediate concern. Older individuals usually can save more because their living expenses typically decrease relative to income. Second, another theory indicates that many individuals find it difficult to focus on long-term concerns.<sup>39</sup> Younger workers are more likely to consider retirement a vague and far-off event. Retirement and its requisite planning typically become more prominent concerns as people age.

### Influence of Participant Salary

Average before-tax contribution rates tended to rise among higher-salary groups of 401(k) plan participants, but only until IRC, and possibly plan-sponsor, contribution limits restrained some participants' contributions. Within any given age group, the average contribution rate tended to rise for salaries up to \$80,000 a year, and



fall thereafter. For example, contributing participants in their 40s and earning \$20,000–\$40,000 per year contributed an average of 6.7 percent of salary (table 1). The same age group contributed an average of 7.3 percent of salary when earning \$60,000–\$80,000 per year, and an average of 5.0 percent when salary exceeds \$100,000 per year.

IRC and plan sponsor limits

complicate the analysis of the effect of salary on contribution rates. Because these constraints primarily limited the contribution behavior of highly compensated employees, the regression analysis in this section focused on non-highly compensated employees making contributions. Among contributing non-highly compensated employees, the percentage of salary contributed by participants rose as salary rose.<sup>40</sup> For example, the regression analysis estimated that a 40-year-old participant with 10 years' tenure and earning \$20,000 annually would contribute 6.6 percent of salary. An otherwise identical participant earning \$70,000 a year would contribute 7.9 percent of salary.<sup>41</sup>

## Influence of Participant Job Tenure

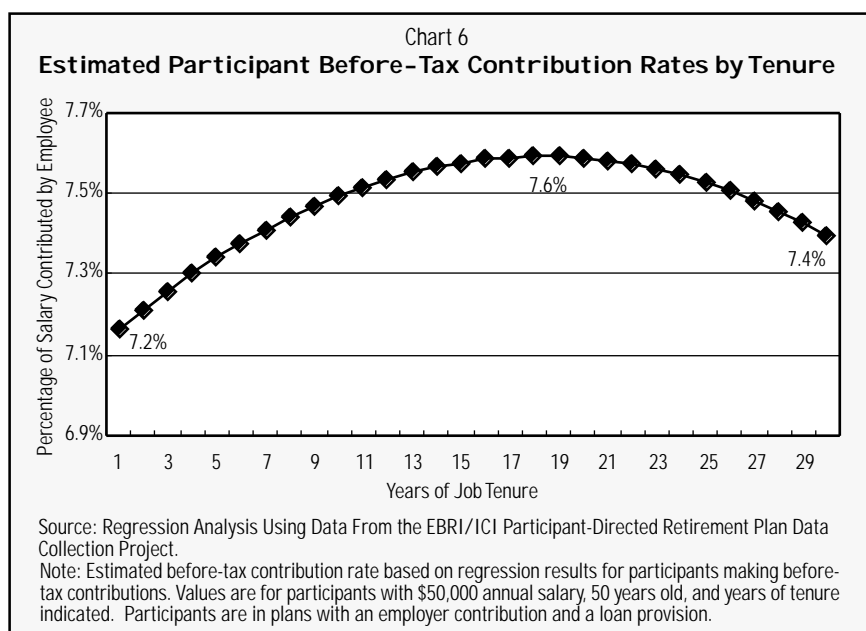
Up to a point, plan participants tended to increase their contribution rates the longer they stayed in a job. However, contribution rates tended to drop off among long-tenured employees. For example, contributing

Table 2  
**Average Participant Before-Tax Contribution Rates, by Age and Tenure, 1999**  
(Percentage of Salary Contributed)

Age	Tenure (Years)					
	0–2	>2–5	>5–10	>10–20	>20–30	>30
20s	5.7%	6.4%	6.0%			
30s	6.4	6.8	6.7	6.3%		
40s	6.8	7.2	7.1	6.7	6.6%	
50s	7.5	7.9	8.0	7.6	7.4	
60s	8.5	8.7	8.7	8.4	8.1	8.0%

Source: Tabulations From the EBRI/ICI Participant-Directed Retirement Plan Data Collection Project.  
Note: Average calculated among all participants making before-tax contributions.

participants in their 50s with two or fewer years' tenure contributed 7.5 percent of salary, while similarly aged participants with five to 10 years' tenure contributed 8.0 percent of salary, and those with more than 20 years' tenure contributed 7.4 percent of salary (table 2). Regression analysis found that tenure was positively correlated with participant contribution rates for



participants with up to about 18 years' tenure; a negative correlation began for participants with more than 18 years' tenure.<sup>42</sup> For example, the regression estimated that, while a 50-year-old participant earning \$50,000 a year with only one year of tenure would contribute about 7.2 percent of salary to a 401(k) plan, an otherwise identical person with 18 years' tenure would contribute 7.6 percent of salary (chart 6).<sup>43</sup> However, an otherwise identical person with 30 years of job tenure would contribute about 7.4 percent of salary.

## Plan Design

Existing research has indicated that, among other things, two 401(k) plan design characteristics—plan loan features and employer contributions—influenced participant contributions.<sup>44, 45</sup>

Table 3  
**Average Participant Before-Tax Contribution Rates,<sup>a</sup> by Age and Employer Contribution Status, 1999**  
 (Percentage of Salary Contributed)

Age	Plan Has Employer Contributions <sup>b</sup>	Plan Does Not Have Employer Contributions <sup>b</sup>
20s	5.7%	6.9%
30s	6.5	7.1
40s	6.8	7.3
50s	7.6	8.2
60s	8.4	9.5
All	6.8	7.4

Source: Tabulations From the EBRI/ICI Participant-Directed Retirement Plan Data Collection Project.

<sup>a</sup>Average calculated among participants making before-tax contributions.

<sup>b</sup>Plans may or may not permit participants to take out loans.

Table 4  
**Average Total Contribution Rates,<sup>a</sup> by Age and Employer Contribution Status, 1999**  
 (Percentage of Salary Contributed by Both Employer and Employee)

Age	Plan Has Employer Contributions <sup>b</sup>	Plan Does Not Have Employer Contributions <sup>b</sup>
20s	8.5%	6.9%
30s	9.6	7.2
40s	10.1	7.3
50s	11.1	8.3
60s	11.8	9.5
All	10.0	7.4

Source: Tabulations From the EBRI/ICI Participant-Directed Retirement Plan Data Collection Project.

<sup>a</sup>Average calculated among participants with any contribution. Includes before- and/or after-tax employee contributions, and/or employer contributions.

<sup>b</sup>Plans may or may not permit participants to take out loans.

## Influence of Loan Provision

Contribution rates tended to be higher in 401(k) plans that permitted loans to participants, a feature available to 84 percent of participants analyzed in this study.<sup>46</sup> Statistical regression analysis found that participant contribution rates were higher when plans allowed borrowing.<sup>47</sup> Indeed, a participant in a plan offering loans was expected to contribute 0.6 percentage point more of his or her salary to the 401(k) plan than a participant with no borrowing privileges.<sup>48</sup> The availability of plan assets in the event of financial need seems to encourage participants to contribute more to their accounts.

Despite the availability of plan loans to participants, only 18 percent of the participants offered borrowing privileges in the 1999 EBRI/ICI database actually had a loan outstanding. In addition, for participants with loans outstanding, loan balances amounted to only 14 percent of total account balances (net of the unpaid loan balance).<sup>49</sup>

## Influence of Employer Contributions

The typical 401(k) plan allows an employee to choose whether to contribute a portion of his or her salary to a 401(k) plan account. Plan sponsors usually make a contribution matching a portion of the participant's contribution. However, the plan sponsor is not required to offer contributions to employees, and some offer no contribution or a contribution whether the employee contributes or not.<sup>50</sup> This section examines how employer contributions affected employee contributions, without considering how the contribution amount was determined.

In the EBRI/ICI database sample of 1.7 million participants, 91 percent of participants were in 401(k) plans offering an employer contribution.<sup>51</sup> In plans with employer contributions, participants contributed an average of 6.8 percent of salary to their plans on a before-tax basis (table 3). On the other hand, participants in plans with no employer contributions directed an average of 7.4 percent of salary into their plans. Although participants themselves contributed less on average in plans with an employer contribution, the total amount going into participants' accounts was higher in those plans. Indeed, the total (employer and employee) contribution rate among participants in plans with employer contributions averaged 10 percent of salary, compared with 7.4 percent among participants in plans with no employer contributions (table 4).

After controlling for all other factors, the regression analysis estimated that a participant in a plan with an employer contribution would contribute 0.4 percentage point less of his or her salary to the plan than would a participant in a plan with no employer contributions.<sup>52</sup> However, the regression analysis estimated that total contribution rates for participants in plans with employer contributions were 2.8 percentage points<sup>53</sup> higher than total contribution rates for participants in plans without employer contributions.<sup>54</sup> Furthermore, other research has shown that offering an employer contribution increased participation in the 401(k) plan.<sup>55</sup>

## Influence of Employer Match Rate and Match Level

This section examines the employer contribution feature in more detail, considering the design of employer matching contributions and its effect on participant

Table 5  
**Distribution of Participants by Plan Match Level and Plan Match Rate,<sup>a</sup> 1999**  
 (Percentage of Participants)

		Match Rate <sup>b</sup>							Total
		\$0.25	\$0.33	\$0.50	\$0.67	\$0.75	\$1.00	Other	
Match Level <sup>c</sup>	2%	0%	0%	2%	0%	0%	3%	2%	8%
	3%	4	1	1	0	0	5	1	12
	4%	1	0	4	0	1	2	2	9
	5%	1	0	1	0	2	5	5	13
	6%	2	4	27	5	3	4	5	49
	7%	0	0	4	0	0	0	0	5
	8%	0	0	1	0	0	0	0	2
	9% or more	0	0	1	0	0	0	1	2
	Total	8	5	41	5	6	20	15	100

Source: Tabulations From the EBRI/ICI Participant-Directed Retirement Plan Data Collection Project.

<sup>a</sup>Sample of nearly 1 million participants for whom employer matching contribution information was provided or derived.

<sup>b</sup>Match rate is the percentage of each dollar contributed by the employee for which the employer makes a matching contribution (shown as cents on the dollar).

<sup>c</sup>Match level is the percentage of salary up to which employee contributions will be matched by the employer.

contribution activity. When designing a matching contribution policy, the employer must determine: (1) the percentage of each dollar contributed by the employee that the employer will match—i.e., the *match rate*; and (2) the percentage of the employee's salary up to which contributions will be matched—i.e., the *match level*. These two plan components can have a significant impact on participants' contribution rates. For example, a participant contributing up to a 6-percent-of-salary match level in a plan offering a 50 percent match rate receives the same amount in employer matching contribution as a participant contributing up to a 3-percent-of-salary match level where the plan sponsor has a 100 percent match rate. However, the participant in the second example obtains a match equivalent to the first, despite a lower personal contribution rate.

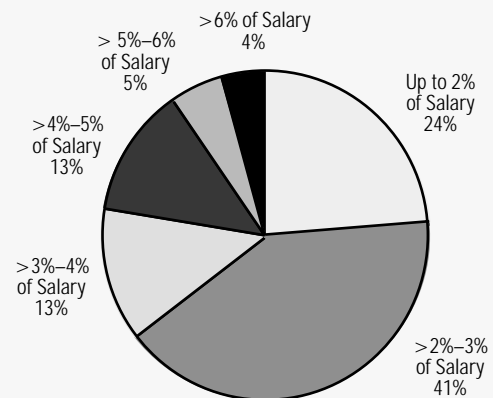
Match rates and match levels in this study were provided or derived<sup>56</sup> for a subset of nearly 1 million participants. Among plans offering a matching employer contribution, the most common match rate offered was 50 cents on the dollar: 41 percent of participants were offered a matching contribution of 50 cents on the dollar (table 5). The most common match level was 6 percent of salary: 49 percent of participants were offered matching employer contributions of up to 6 percent of salary contributed. A little more than one-quarter of participants were offered a combination of 50 cents on the dollar on contributions up to 6 percent of salary.<sup>57</sup>

It is the combination of the *match rate* and the *match level* that determines the *effective match rate*—that is, the percentage of salary that the employer would contribute for the participant, if the participant contributed at least up to the match level. For example, a plan with a match rate of 50 cents on the dollar and a match

level of 6 percent of salary would provide a participant with an effective match rate of 3 percent (0.50 x 6 percent) of salary. About one-quarter of participants were in plans offering an effective match rate of up to 2 percent of salary, and 41 percent of participants were offered an effective match rate of more than 2–3 percent of salary (chart 7). Furthermore, about 9 percent of participants were offered employer contributions of more than 5 percent of their salaries if they contributed at least at the match level.

A regression analysis of the influence of the match rate on participants' contribution rates found that

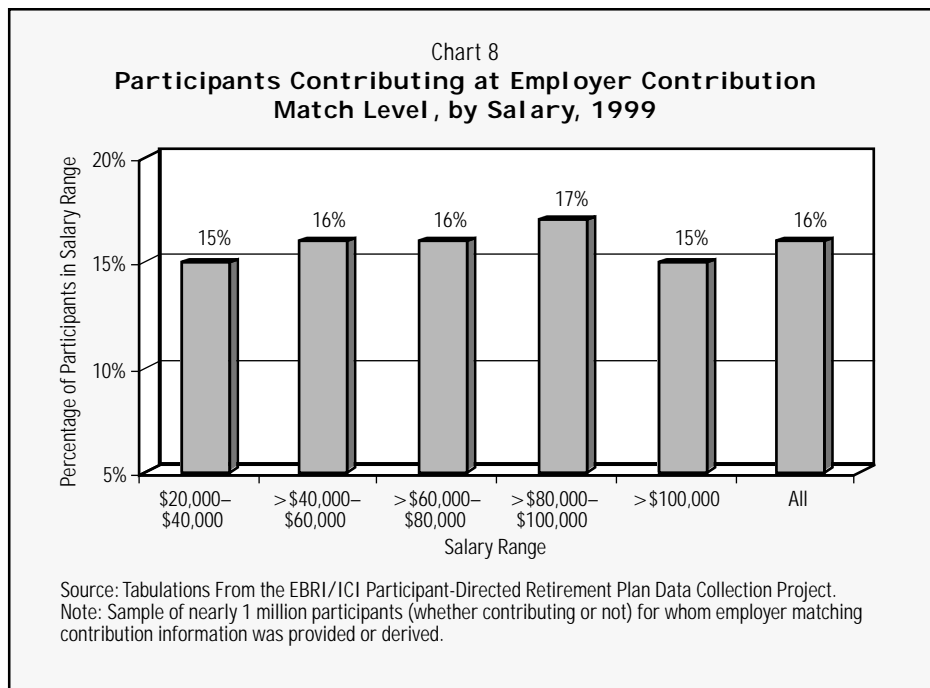
Chart 7  
**Distribution of Effective Match Rates<sup>a</sup> Among Plans Offering Matching Employer Contributions,<sup>b</sup> 1999**  
 (Percentage of Participants)



Source: Tabulations From the EBRI/ICI Participant-Directed Retirement Plan Data Collection Project.

<sup>a</sup>The effective match rate is the match level multiplied by the match rate.

<sup>b</sup>Sample of nearly 1 million participants for whom employer matching contribution information was provided or derived.



participant before-tax contribution rates fell minimally as the employer match rate rose.<sup>58, 59</sup> However, the regression analysis found that as the match level chosen by the employer rose, participant contribution rates rose.<sup>60</sup>

Previous research on a few large 401(k) plans found that participants tended to cluster at match levels.<sup>61</sup> In the EBRI/ICI database sample of nearly 1 million participants, there was some evidence of clustering at the match level. Indeed, 16 percent of all participants<sup>62</sup> contributed at the match level offered in their plans (chart 8). Remarkably, there was only slight variation in meeting match levels across salary. For example, 15 percent of participants earning between \$20,000–\$40,000 a year contributed at the plan match level, and 17 percent of participants earning between \$80,000–\$100,000 a year contributed at the plan match level.

## Appendix

### The EBRI/ICI Participant-Directed Retirement

#### Plan Data Collection Project

Plan administrators that are either EBRI or ICI members provided records on participants in 401(k) plans administered by these organizations in 1996, 1997, 1998, and 1999.<sup>63</sup> These administrators included mutual fund

companies, insurance companies, and consulting firms. Records were encrypted to conceal the identity of employers and employees, but were coded so that both could be tracked over multiple years. Complete employee and employer contribution and salary information was available for a sample of 1.7 million participants from the 1999 EBRI/ICI database.

For this contribution activity analysis, the following data were determined for each participant: date of birth, which determined an age and age cohort; participant date of hire, which assigned a job tenure and tenure range; salary, which determined a salary range; dollar amount of employee contribution; and dollar amount of employer contribution for the individual participant. Using contribution and salary information, each participant was identified as at the IRC §402(g) limit or not and at the IRC §415(c) limit or not. Information on before- and after-tax participant contributions was available for about three-quarters of the participants. Table 6 presents contribution activity and participant characteristic variables for the “typical” 401(k) plan participant.<sup>64</sup>

Several descriptive plan variables also were used in the analysis. All participants were identified by whether or not their plan offered a loan provision.<sup>65</sup> Furthermore, all participants were also identified by whether or not their plan offered an employer contribution of any kind.<sup>66</sup>

Additional detail for plan sponsor contribution limits (for about 0.9 million participants) and matching formulas (for nearly 1 million participants) was reported

Table 6  
401(k) Participant Contribution Data, 1999

Item	Median <sup>a</sup>	Mean <sup>a</sup>
Participant Contribution Variables		
Before-Tax Participant Contribution as a Percentage of Salary (the <i>Before-Tax Contribution Rate</i> ).	6.0%	6.8%
After-Tax Participant Contribution as a Percentage of Salary (the <i>After-Tax Contribution Rate</i> ).	3.6	4.0
Total Participant Contribution as a Percentage of Salary (the <i>Total Participant Contribution Rate</i> ).	6.0	6.9
Sum of Employer and Participant Contribution as a Percentage of Salary (the <i>Total Contribution Rate</i> ).	9.0	9.7
Personal Participant Characteristic Variables		
Annual Participant Salary	\$32,730	\$44,187
Participant Age (Years)	41	41
Participant Tenure (Years)	5	8
Plan Characteristics Offered to Participant Variables		
Employer Contribution to Participant's Account as a Percentage of Participant's Salary.	2.8%	3.3%
Employer Match Rate—the Percentage of Each Dollar Contributed by the Employee That the Employer Will Match (Cents on the Dollar).	\$0.50	\$0.51
Employer Match Level—the Percentage of Salary Up to Which the Employer Will Provide A Matching Contribution.	6.0%	4.2%
Employer Effective Match Rate—the Employer Match Level Multiplied by the Employer Match Rate (Percentage of Participant's Salary).	3.0	2.4
Maximum Contribution Allowed by the Employer as a Percentage of Participant's Salary.	16.0	17.0

Source: Tabulations From the EBRI/ICI Participant-Directed Retirement Plan Data Collection Project.

<sup>a</sup>Medians and means calculated among those participants with positive values of the variable in question. Means are not dollar-weighted.

or derived. Participants were then identified as in a plan with a formal specified limit on before-tax contribution rates or in a plan with no plan sponsor limit.<sup>67</sup> In plans with employer contributions and for which no match formula information was provided, an algorithm was developed, which examined employer and employee contributions for all participants in any given plan, to derive the match formula for the plan.<sup>68</sup> Two types of match variables were created for each plan: (1) the *match rate*—the percentage of each dollar contributed by the employee that is contributed by the employer, and (2) the *match level*—the percentage of salary contributed by the employee up to which the employer applies the match rate. An *effective match rate* was derived by multiplying the match rate by the match level. Table 6 presents the median and average (mean) values of these plan variables.

In order to ensure typical results that accurately represent 401(k) participant contribution activity, several regression models were tested using several groupings of participants. The four participant sample groups predominantly used were: (1) all participants in the sample whether contributing or not; (2) participants making before-tax contributions; (3) all non-highly compensated employees, whether contributing or not; and (4) non-highly compensated employees making before-tax contributions.<sup>69</sup> For additional detail on the regression analyses, see Holden and VanDerhei (forthcoming).

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## Endnotes

<sup>1</sup> In this analysis, participants are individuals who were currently employed and who had 401(k) account balances—whether or not they made a contribution in 1999. See the Appendix for a detailed description of the data.

<sup>2</sup> EBRI is a nonprofit, nonpartisan, public policy research organization that does not lobby or take positions on legislative proposals.

<sup>3</sup> ICI is the national association of the American investment company industry. Its membership includes 8,638 open-end investment companies ("mutual funds"), 498 closed-end investment companies, and seven sponsors of unit investment trusts. Its mutual fund members manage assets of approximately \$7 trillion, accounting for approximately 95 percent of total industry assets, and represent more than 88 million individual shareholders.

<sup>4</sup> Papers summarizing the 401(k) plan asset allocation, account balances, and loan activities of participants at year-end 1996, 1997, 1998, and 1999 have been published as previous issues of EBRI Issue Briefs and ICI Perspective, available through EBRI's Web site at [www.ebri.org](http://www.ebri.org) and ICI's Web site at [www.ici.org/economy/perspective.html](http://www.ici.org/economy/perspective.html)

<sup>5</sup> The EBRI/ICI database covers only 401(k) participants and does not contain information on employees who do not participate in 401(k) plans. Thus, it is not possible to study why employees choose to participate. For research on the factors that influence an employee's decision to participate, see Joulfaian and Richardson (September 2001); Even and Macpherson (May 2001); Munnell, Sundén, and Taylor (December 2000); Madrian and Shea (May 2000); Clark, Goodfellow, Schieber, and Warwick (2000); Even and Macpherson (April 1999); Bassett, Fleming, and Rodrigues (June 1998); Clark and Scheiber (1998); Kusko, Poterba, and Wilcox (1998); Poterba, Venti, and Wise (November 1997); U.S. General Accounting Office (GAO) (October 1997); Bernheim and Garrett (July 1996); Bassett (August 1995); Papke (1995); Papke and Poterba (1995); and Andrews (1992).

<sup>6</sup> The notable exception is VanDerhei and Copeland (January 2001), which analyzed a sample of 163,346 participants drawn from the 1998 EBRI/ICI database to examine the effect of employer match formulas on a participant's decision to contribute an additional percentage point of salary.

<sup>7</sup> For example, U.S. GAO (October 1997) and Papke (1995) analyzed data compiled from the Internal Revenue Service (IRS)/Department of Labor (DOL)/Pension Benefit Guaranty Corporation (PBGC) Form 5500. The IRS/DOL/PBGC Form 5500 data also are tabulated by the DOL Pension and Welfare Benefits Administration and summarized in an annual report (for the most recent report, see U.S. DOL (Winter 2001)).

In addition, Levinson (Winter 2000) analyzed plan-level data from a 1998 survey of 1,292 employers; and Papke and Poterba (1995) analyzed plan-level survey data (for 1986 and 1990) from 43 plans.

<sup>8</sup> For example, see Madrian and Shea (May 2000); Kusko, Poterba, and Wilcox (1998); and Yakoboski and VanDerhei (June 1996).

<sup>9</sup> For example, see Fidelity Investments (2001), which tabulated information on defined contribution plans; Clark, Goodfellow, Schieber, and Warwick (2000), which analyzed 1995 participant-level data for 87 plans; Hewitt Associates (1999); and Clark and Schieber (1998), which analyzed 1994 participant-level data for 19 plans.

<sup>10</sup> For example, see U.S. GAO (September 2001); Munnell, Sundén, and Taylor (December 2000); Bassett, Fleming, and Rodrigues (June 1998); U.S. GAO (October 1997); Even and Macpherson (May 1997); Poterba, Venti, and Wise (November 1997); Ippolito (1997); Xiao (1997); Bernheim and Garrett (July 1996); Bassett (August 1995); and Andrews (1992). In addition, ICI (Spring 2000) included some results on contribution activity among 401(k) participant households surveyed.

<sup>11</sup> Joulfaian and Richardson (September 2001) used IRS Statistics of Income individual tax return information combined with contribution information from W-2 forms to tabulate average contribution and participation rates in individual retirement accounts (IRAs), defined contribution plans, and Simplified Employee Pension (SEP) and Keogh plans, for individuals and households in 1996.

<sup>12</sup> The IRC §402(g) limit in 1999 was \$10,000. In 2000 and 2001, the limit was \$10,500. The "Economic Growth and Tax Relief Reconciliation Act of 2001" (EGTRRA) raises the 402(g) limit to \$11,000 in 2002, \$12,000 in 2003, \$13,000 in 2004, \$14,000 in 2005, and \$15,000 in 2006. The limit will be indexed for inflation in \$500 increments after 2006. In addition, starting in 2002, participants who are age 50 or older will be allowed to make additional "catch-up" contributions.

Participants earning \$40,000 a year or less were excluded because another IRC limit prevented them from reaching the \$10,000 limit. See endnote 27.

<sup>13</sup> If the employer chooses to make a contribution, it may be a matching contribution that is contingent on the employee making a contribution, and/or a nonmatching contribution that is deposited into the participants' accounts regardless of whether they contribute.

<sup>14</sup> For research examining possible plan sponsor motivations for employer contribution activities, see Ippolito (1997), which argued that employers offer matching contributions to attract and retain workers who are "savers" because savers tend to be more productive; and Even and Macpherson (April 1999), which summarized Ippolito's hypothesis, and an alternative view that suggested that employers offer matching contributions to help meet nondiscrimination testing requirements.

<sup>15</sup> The Profit Sharing/401(k) Council of America (PSCA) (2000) reported that 70 percent of all plans in their survey allowed participants to contribute on a before-tax basis only; about 2 percent of plans allowed participants to contribute on an after-tax basis only; and 17 percent of plans allowed both before- and after-tax contributions. Eleven percent of plans in the PSCA survey had no participant contributions. In addition, U.S. DOL (September

1999) reported that, in 1997, 98 percent of full-time employees of medium and large private establishments (with savings and thrift plans) were allowed to contribute on a before-tax basis, and 54 percent were allowed to contribute only on a before-tax basis. U.S. DOL (April 1999) found that, in 1996, 88 percent of full-time employees of small private establishments (with savings and thrift plans) were allowed to contribute on a before-tax basis, and 41 percent were allowed to contribute only on a before-tax basis.

<sup>16</sup> By design, the IRC limits, in 1999, prohibited highly compensated employees from contributing (on a before-tax basis) more than 12.5 percent of salary (\$10,000/\$80,000).

<sup>17</sup> The clustering of participants in the more than 5 percent–6 percent of salary range occurred because 49 percent of participants were in plans offering employer matching contributions on up to 6 percent of salary (table 5).

<sup>18</sup> The clustering of participants in the more than 8 percent–9 percent of salary range occurred because 27 percent of participants were in plans offering employer contributions of 50 cents on the dollar on up to 6 percent of salary (table 5).

<sup>19</sup> IRC rules are discussed in this Issue Brief in the context of analyzing participant contribution activity in 1999. EBRI and ICI do not provide legal, investment, or employee benefit plan design advice or advice concerning compliance with federal regulations, and this Issue Brief should not be used for such purposes.

<sup>20</sup> In 2000 and 2001, the limit on employee elective deferrals (before-tax contributions) was \$10,500. EGTRRA raised the limit further (see endnote 12).

<sup>21</sup> Technically, 415(c) limits total "additions" for a given participant's account (the sum of employer contributions, employee contributions, and any forfeitures allocated to the employee's account) for any given year. In 2000, the 415(c) limit was the same as in 1999. In 2001, 415(c) limited additions to the lesser of \$35,000 or 25 percent of salary. EGTRRA raised the dollar amount in 415(c) to \$40,000 and the percentage to 100 percent; both new limits are effective Jan. 1, 2002. The dollar amount is then indexed for inflation in \$1,000 increments on an annual basis.

<sup>22</sup> Given the IRC limits on before-tax contributions and typical plan designs, it was difficult for participants to reach this limit. Indeed, only about 1 percent of all participants (regardless of income grouping) hit the 415(c) limit.

<sup>23</sup> Under IRC §414(q), an individual in 1999 who, for the preceding year had compensation in excess of \$80,000, was considered a "highly compensated employee." This limit is indexed for inflation in \$5,000 increments; thus, in 2000 and 2001, participants earning in excess of \$85,000 in salary were counted as highly compensated employees.

At the employer's discretion, employees that are in the top-paid group of employees for the preceding year may also be considered highly compensated employees. An employee is in the top-paid group of employees for any year if such employee is in the group consisting of the top 20 percent of the employees when ranked on the basis of compensation paid during such year. In addition, any individual employee with 5 percent ownership in the firm is also counted as a highly compensated employee.

<sup>24</sup> IRC §401(a)(17) defines the annual compensation limit (to be included in nondiscrimination tests) to be \$160,000 in 1999. In 2000 and 2001, the 401(a)(17) annual compensation limit was set at \$170,000. EGTRRA increased the limit to \$200,000 in 2002 and then indexed it for inflation in \$5,000 increments. This limit is important in the calculation of nondiscrimination tests because it has an impact on the contribution rate of highly compensated employees by influencing how much of their salaries may be



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counted in the test (everything else equal, the more that can be counted, the lower their aggregate contribution rate will be).

<sup>25</sup> PSCA (2000) reported that 11.5 percent of plans had excess contributions that were returned to participants after the plan year ended; 1.5 percent of plans deposited excess contributions into a non-qualified account; and 12.3 percent of plans limited contributions of highly paid participants within the plan year once the maximum allowed by the test was reached.

<sup>26</sup> Although there have been recent modifications (e.g., prior-year testing and safe harbor approaches) that allow plan sponsors to reduce the uncertainty inherent in this annual testing procedure, many sponsors place limits on the amounts that highly compensated employees may contribute to a plan in an attempt to improve their chances of compliance without the need for year-end modifications to contributions. For a listing of the alternative approaches to maximize the likelihood of compliance, see Allen, Melone, Rosenbloom, and VanDerhei (1997), pp. 191–192.

PSCA (2000) reported that 7.7 percent of plans indicated that the before-tax contributions of highly paid participants were limited by plan design. In addition, larger plans were more likely to have limits on the before-tax contributions of highly paid participants than smaller plans.

In addition, employee after-tax and employer matching contributions are subject to a similar nondiscrimination test (the Actual Contribution Percentage [ACP] test).

<sup>27</sup> This is because \$10,000 represented more than 25 percent of the participant's salary, and therefore, the participant would have reached the 415(c) limit first.

<sup>28</sup> Six percent of participants made no contributions and the remainder made contributions of less than \$10,000.

<sup>29</sup> Plan-imposed limits were reported or derived for a sample of 0.9 million participants (see the Appendix for details).

<sup>30</sup> Because so many factors simultaneously influence whether a given participant is at the limit or not, regression analysis was used to identify the effects of each individual factor, while simultaneously taking each factor into account. Each participant was identified as at the limit or not (with a yes/no variable). A probit regression model was used to estimate the impact of plan and participant characteristics on the likelihood of a participant being at the 402(g) limit. The probit regression model included variables for participant age, salary, and tenure, as well as plan variables (i.e., loan provision (yes/no), and employer contribution (yes/no)). More details of the regression analyses are presented in Holden and VanDerhei (forthcoming).

<sup>31</sup> A \$10,000 contribution for an individual earning \$60,000 a year is a 16.7 percent contribution rate. For an individual earning \$70,000 a year, it is a 14.3 percent contribution rate.

<sup>32</sup> Because the 402(g) limit is a dollar-amount limit, by design, the percentage of salary contributed at the 402(g) limit falls as salary rises (\$10,000 is a 20 percent contribution rate for a participant with a \$50,000 salary, a 10 percent contribution rate for a participant with a \$100,000 salary).

<sup>33</sup> Ordinary Least Squares (OLS) regression analysis was used to estimate the effects of personal characteristics on the percentage of salary a participant contributed on a before-tax basis to the 401(k) plan. The regression models included participant age, salary, and tenure as well as variables reflecting plan characteristics (i.e., loan provision (yes/no), and employer contribution (yes/no) variables). Several combinations of variables were tested to ensure that the results presented were typical and accurately characterize 401(k)

participant contribution activity. Several samples of participants were tested for the same reason. More details of the regression analyses are presented in Holden and VanDerhei (forthcoming).

<sup>34</sup> Gender information was not available for a sufficiently large and representative sample of participants. However, other research has found mixed results for the influence of gender on participant contribution rates. For example, VanDerhei and Copeland (January 2001) and Even and Macpherson (May 1997) found (in the latter case, in some, but not all, of their regression models) that being female had a positive effect on the participant's contribution rate, while Clark, Goodfellow, Schieber, and Warwick (2000) found that being female had a negative effect in their OLS regression analysis. In addition, Ippolito (1997) and U.S. GAO (October 1997) found that contribution rates were about the same between men and women (the variable was not statistically significant).

Other research has studied the effect of the participant's level of education on contribution rates. For example, Ippolito (1997), Even and Macpherson (May 1997) and Bassett (August 1995) found that contribution rates rose with participant education levels. On the other hand, Munnell, Sundén, and Taylor (December 2000) found that education level was insignificant when a variable representing the participant's planning horizon was included (people with short planning horizons contributed less). And Bernheim and Garrett (July 1996) found that a participant's education level was not significant when a variable indicating whether an employer provides educational materials was considered (participant contribution rates were higher in plans with more detailed educational materials).

<sup>35</sup> Clark, Goodfellow, Schieber, and Warwick (2000); Clark and Schieber (1998); Even and Macpherson (May 1997); and Andrews (1992) also found that percentage of salary contributed rose with age.

<sup>36</sup> These estimates are based on regression of participants making before-tax contributions to the 401(k) plan. The regression model included age, tenure, salary, plan loan provision (yes/no), and employer contribution (yes/no) variables to examine their effects on participant before-tax contribution rates. The stylized estimates presented assumed that the participants were offered a loan provision and provided an employer contribution.

<sup>37</sup> The relationship between age and participant contribution rates was not linear. A one-year increase in age produced a larger increase in the participant before-tax contribution rate at higher ages than at younger ages.

<sup>38</sup> An augmented version of the life-cycle theory predicts that the optimal savings pattern increases with age. For a summary discussion of life-cycle models, see Browning and Crossley (Summer 2001). For a more extensive discussion, see Engen, Gale, and Uccello (December 1999).

<sup>39</sup> Research by Munnell, Sundén, and Taylor (December 2000) supported this view. They found that a short planning horizon reduced a participant's contribution rate by almost 1 percentage point. However, their specification of factors affecting household contribution rates did not include age, which might be expected to influence a person's planning horizon.

<sup>40</sup> U.S. GAO (October 1997) and Even and Macpherson (May 1997) found a positive relationship between salary and contribution rates. Munnell, Sundén, and Taylor (December 2000) admittedly did not account for IRC limits or plan constraints and found a negative relationship between salary and participant contribution rates. Clark, Goodfellow, Schieber, and Warwick (2000) also found a negative relationship between salary and contribution rates. When highly compensated employees were included in the regression sample, a negative relationship between salary and participant contribution rates resulted here as well.

<sup>41</sup> These estimates are based on regression of participants earning \$80,000 or less per year and making before-tax contributions to the 401(k) plan. The regression model included age, tenure, salary, plan loan provision (yes/no), and employer contribution (yes/no) variables to examine their effects on participant before-tax contribution rates. The stylized estimates reported assumed that the participants were offered a loan provision and provided an employer contribution.

The relationship between salary and a participant's contribution rate was not linear. A \$1,000 increase in salary produced a larger increase in the participant before-tax contribution rate at higher salary levels than at lower salary levels.

<sup>42</sup> Even and Macpherson (May 1997) found similar results: Contribution rates increased with tenure up to about 17 years and then were pulled down by longer tenures. On the other hand, Clark, Goodfellow, Schieber, and Warwick (2000) found a negative correlation between contribution rates and all levels of tenure.

<sup>43</sup> These estimates are based on regression of participants making before-tax contributions to the 401(k) plan. The regression model included age, tenure, salary, plan loan provision (yes/no), and employer contribution (yes/no) variables to examine their effects on participant before-tax contribution rates. The stylized estimates reported assumed that the participants were offered a loan provision and provided an employer contribution.

<sup>44</sup> At this time, information was not available for the defined benefit plan coverage of participants in the EBRI/ICI database. However, other research has found mixed results for the effect of defined benefit plan coverage on participant contribution rates to their 401(k) plans.

For example, Clark, Goodfellow, Schieber, and Warwick (2000) found the projected value (replacement rate) of the defined benefit plan had a positive effect on the 401(k) contribution rate, which they noted was inconsistent with the target savings hypothesis (which would argue that participants wouldn't need to save as much on their own because the defined benefit plan would do some saving for them). They noted that the positive effect was consistent with the savings preference hypothesis put forth by Ippolito (1997), which argued that participants with a taste for savings would want both a defined benefit and defined contribution plan and would be attracted to employers offering both. In addition, U.S. GAO (October 1997) found that coverage by another pension had a positive effect on the household's contribution rate.

On the other hand, Even and Macpherson (May 1997) found that if the 401(k) plan was the "main" retirement plan that covered the participant, participant contribution rates were higher.

Two other studies found that other pension coverage was not a significant factor in participants' contribution activity. Clark and Schieber (1998) found that the defined benefit replacement rate had a small, but statistically insignificant, negative effect on participant contribution rates. And, Bassett (August 1995) found that the effect of having only a defined contribution plan was barely positive and statistically insignificant, and concluded that people whose defined contribution plans were supplemental saved as much in them as people whose defined contribution plan was their sole plan.

<sup>45</sup> Other employer actions also may influence participant contribution activity. For example, Clark and Schieber (1998) found that participants at firms that distributed specifically tailored information on the firm's 401(k) plan had higher contribution rates, and Bernheim and Garrett (July 1996) found that higher contributions prevailed among participants in plans where the employer provided financial educational information.

In addition, using data from one large 401(k) plan, Madrian and Shea (May 2000) examined the effect of introducing automatic enrollment (where

new employees were automatically enrolled in the 401(k) plan and must have opted out if they did not want to participate) on participant contribution behavior. They found that new participants tended to stay with the default contribution rate of 3 percent of salary. Analysis of the effect of automatic enrollment default options was beyond the scope of this study. However, PSCA (2000) reported that only 4.2 percent of plans had automatic enrollment of participants. In addition, larger plans (with 5,000 or more participants) were more likely to have automatic enrollment than smaller plans.

<sup>46</sup> Results from the broader 1999 EBRI/ICI 401(k) database showed that 82 percent of participants were in plans offering loans. See Holden and VanDerhei (January/February 2001).

<sup>47</sup> This result is consistent with previous research using the Federal Reserve Board's Survey of Consumer Finances (SCF) data. For example, Munnell, Sundén, and Taylor (December 2000), using 1998 SCF data, found that participants in plans offering loans contributed 1 percentage point more of their salaries; and U.S. GAO (October 1997), using 1992 SCF data, found contribution rates of participants in plans with borrowing privileges were 3 percentage points higher than those of participants in plans without a loan provision.

<sup>48</sup> This estimate is based on regression of all participants, whether contributing or not. The regression model included age, tenure, salary, and employer contribution (yes/no) variables, in addition to the loan provision (yes/no) variable, to examine their effects on participant before-tax contribution rates.

<sup>49</sup> See Holden and VanDerhei (January/February 2001).

<sup>50</sup> These nonmatching employer contributions may be a fixed percentage of participants' salaries or a fixed dollar amount per employee. These contributions are called nonelective contributions (NECs) and, in certain circumstances, may be used to assist the plan sponsor in complying with ADP tests. See Chapter 11 of Allen, Melone, Rosenbloom, and VanDerhei (1997) for additional detail.

<sup>51</sup> Even and Macpherson (May 1997), using 1993 Current Population Survey (CPS) data, found that 81 percent of employees offered a 401(k) plan indicated their employers offered matching contributions.

<sup>52</sup> This estimate is based on regression of participants making participant before-tax contributions to the 401(k) plan. The regression model included age, tenure, salary, plan loan provision (yes/no), and employer contribution (yes/no) variables to examine their effects on participant before-tax contribution rates. The result held true when all participants, whether contributing or not, were included in the regression model.

<sup>53</sup> This suggests that 2.8 percentage points of the 2.6 percentage point difference in the average total contribution rates presented for participants in plans with and without employer contributions (in table 4) was explained by the employer contribution. The remaining difference resulted from varying age, salary, tenure, and loan provision status (among other things) of the participants in the two columns in table 4.

<sup>54</sup> This estimate is based on regression of participants with any contribution (before-tax, and/or after-tax, and/or employer) to the 401(k) plan. The regression model included age, tenure, salary, plan loan provision (yes/no), and employer contribution (yes/no) variables to examine their effects on the total contribution rates achieved by participants. A similar estimate was obtained when all participants, whether contributing or not, were included in the regression.

<sup>55</sup> For example, Even and Macpherson (May 2001), Even and Macpherson (April 1999), Bassett, Fleming, and Rodrigues (June 1998), and Andrews (1992) found that the presence of an employer match (or contribution) increased participation in the 401(k) plan.

<sup>56</sup> An algorithm comparing the employee contributions and the employer contributions for each participant in a given plan looking for a pattern established both the (initial) match rate as well as the maximum amount of compensation matched at that rate.

<sup>57</sup> U.S. DOL (September 1999) reported similar results. Their report found that 47 percent of all full-time employees of medium and large private firms were offered a 50 cents on the dollar match rate in 1997, 48 percent were offered matching employer contributions on up to 6 percent of salary contributed, and 25 percent were offered the combination of 50 cents on the dollar on contributions up to 6 percent of salary. U.S. DOL (April 1999) found that 36 percent of all full-time employees of small private firms were offered a 50 cents on the dollar match rate in 1996, 38 percent were offered matching employer contributions on up to 6 percent of salary contributed, and 19 percent were offered the combination of 50 cents on the dollar on contributions up to 6 percent of salary.

<sup>58</sup> This result is from a regression on a sample of all participants (whether contributing or not) for whom match rate and match level information was provided or derived. The regression model included age, tenure, salary, plan loan provision (yes/no), employer match rate, and employer match level variables to examine their effects on participant before-tax contribution rates.

<sup>59</sup> Other research results (using participant-level data) on the effect of the match rate on the participant's contribution rate have been mixed. For example, VanDerhei and Copeland (January 2001), using a variation of a sequential response regression model (in which the marginal incentive and opportunity cost of contributing at each sequential percentage of compensation was measured), found a positive effect for match rates. Clark and Schieber (1998) also found that higher match rates produced higher participant contribution rates. In addition, Even and Macpherson (May 1997) found (in the 1988 CPS sample) that the presence of a matching employer contribution increased participant contribution rates.

Clark, Goodfellow, Schieber, and Warwick (2000) found that participant contribution rates fell as the match rate rose, and Andrews (1992) found that the presence of an employer contribution reduced participant contribution rates. In other research, Munnell, Sundén, and Taylor (December 2000) found that offering a match (a yes/no variable) increased participant contribution rates, while increasing the match rate decreased participant contribution rates. However, both the yes/no variable and the continuous match rate variable were included in the same specification and the influence of the match level was not taken into account. Bassett (August 1995) concluded that the effect of the match rate on participant contribution rates was positive until the match rate exceeded 70 cents on the dollar.

Evidence (using participant-level data) on whether increasing the match rate increased participation or not is mixed. Clark, Goodfellow, Schieber, and Warwick (2000), and Clark and Schieber (1998) concluded that increasing the match rate increased participation. Bassett, Fleming, and Rodrigues (June 1998) concluded that increasing the match rate did not necessarily increase participation. Kusko, Poterba, and Wilcox (1998) tracked employees through match rate changes occurring over time in one 401(k) plan and found that only when the match rate was dramatically increased did non-contributors decide to start participating in the plan. Otherwise, they observed stability in participation status of participants tracked over time.

<sup>60</sup> VanDerhei and Copeland (January 2001) also found a positive effect of match level on participant contribution rates.

<sup>61</sup> For example, Madrian and Shea (May 2000) analyzed participants in one large 401(k) plan and found that prior to the introduction of automatic enrollment with a 3 percent of salary default contribution rate, more than one-third of participants clustered at the 6 percent match level. In addition, Kusko, Poterba, and Wilcox (1998) analyzed data for one 401(k) plan and found that 37 percent of employees contributed at the match level. Furthermore, Yakoboski and VanDerhei (June 1996) analyzed three large 401(k) plans and found that between one-fifth and one-third of participants contributed at the plan match level.

<sup>62</sup> Participants are individuals who were currently employed and holding 401(k) account balances—whether they contributed in 1999 or not.

<sup>63</sup> The universe of investment plan administrators varied from year to year, and thus, aggregate figures should not be used to estimate time trends.

<sup>64</sup> The median age of participants in the sample (41 years old) was similar to the median age among the 10.3 million participants in the entire 1999 EBRI/ICI database (42 years old). The median tenure of participants in the sample was five years on the job, compared with a median job tenure of seven years in the entire 1999 EBRI/ICI database. (See Holden and VanDerhei (January/February 2001).)

<sup>65</sup> Plan-specific information on loan provision was available for the majority of the plans in the sample. Some plans without this information were classified as having a loan provision if any participant in the plan had an outstanding loan balance. This may have understated the number of plans offering loans (or participants eligible for loans) because some plans may have offered, but had no participants take out, a plan loan. It is likely that this omission is small, as the U.S. GAO (October 1997) found that more than 95 percent of 401(k) plans that offered loans had a least one plan participant with an outstanding loan.

<sup>66</sup> If a single participant in a plan received an employer contribution, the plan was identified as offering an employer contribution and all participants in the plan were coded as having been offered an employer contribution.

<sup>67</sup> Formal plan limit information was provided for some participants and derived for others. When derived, if any participant in the plan in question contributed the 25 percent of salary permitted by IRC 415(c) in 1999, then the plan was assumed to have no plan sponsor limit. On the other hand, if no participant reached the IRC maximum, the plan was assumed to have a plan contribution limit, and the contribution rate of the participant with the highest contribution rate in the plan was assumed to be the maximum allowed by the plan. Although this method may have overstated the number of participants with formal plan contribution limits, this method did not identify participants limited in ad hoc ways.

Among plans with formal contribution limits, the most common maximum contribution rate applied by plan sponsors was 15 percent of salary. Thirty-five percent of participants were estimated to be in plans with this 15 percent limit. Seven percent of participants faced a plan contribution limit of 10 percent of salary or lower.

<sup>68</sup> This exercise produced the first tier of any given match formula, but may have missed second or multiple tiers in the matching calculation.

<sup>69</sup> In addition, regressions analyzing total contributions (not just participant before-tax contributions) were also run.

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