

Issue

BRIEF

What Does Consistent Participation in 401(k) Plans Generate? Changes in 401(k) Plan Account Balances, 2010–2016

By Jack VanDerhei, EBRI; Sarah Holden, ICI; Luis Alonso, EBRI; and Steven Bass, ICI

AT A GLANCE

This paper provides an annual update of a longitudinal analysis of 401(k) plan participants drawn from the EBRI/ICI 401(k) database — the largest participant-level database of its kind, with 27.1 million 401(k) participants at year-end 2016.

Because the annual cross sections cover participants with a wide range of participation experience in 401(k) plans, meaningful analysis of the potential for 401(k) participants to accumulate retirement assets must examine the 401(k) plan accounts of participants who maintained accounts over all of the years being studied (consistent participants). For example, because of changing samples of providers, plans, and participants, changes in account balances for the entire database are not a reliable measure of how individual participants have fared. A consistent sample is necessary to accurately gauge changes such as growth in account balances experienced by individual 401(k) plan participants over time.

A few key insights emerge from looking at the 6.1 million consistent participants in the EBRI/ICI 401(k) database over the six-year period from year-end 2010 to year-end 2016.

- The average 401(k) plan account balance for consistent participants rose each year from 2010 through year-end 2016. Overall, the average account balance increased at a compound annual average growth rate of 14.2 percent from 2010 to 2016, to \$167,330 at year-end 2016.
- The median 401(k) plan account balance for consistent participants increased at a compound annual average growth rate of 18.3 percent over the period, to \$82,338 at year-end 2016.
- The growth in account balances for consistent participants greatly exceeded the growth rate for all participants in the EBRI/ICI 401(k) database.

Analysis of a consistent group of 401(k) participants highlights the impact of ongoing participation in 401(k) plans. At year-end 2016, the average account balance among consistent participants was more than double the average account balance among all participants in the EBRI/ICI 401(k) database. The consistent group's median balance was nearly five times the median balance across all participants at year-end 2016.

Younger 401(k) participants or those with smaller year-end 2010 balances experienced higher percent growth in account balances compared with older participants or those with larger year-end 2010 balances. Three primary factors affect account balances: contributions, investment returns, and withdrawal and loan activity. The percent change in average 401(k) plan account balance of participants in their twenties was heavily influenced by the relative size of their contributions to their account balances and increased at a compound average growth rate of 43.5 percent per year between year-end 2010 and year-end 2016.

401(k) participants tend to concentrate their accounts in equity securities. The asset allocation of the 6.1 million 401(k) plan participants in the consistent group was broadly similar to the asset allocation of the 27.1 million participants in the entire year-end 2016 EBRI/ICI 401(k) database. On average at year-end 2016, about two-thirds of 401(k) participants' assets were invested in equities—through equity funds, the equity portion of target-date funds, the equity portion of non-target-date balanced funds, or company stock. Younger 401(k) participants tended to have higher concentrations in equities than older 401(k) participants.

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Since 1996, the Employee Benefit Research Institute (EBRI) and the Investment Company Institute (ICI) have worked together on collecting and analyzing annual data on millions of 401(k) plan participants' accounts. This report reflects the year-end 2016 update of these data and EBRI's and ICI's ongoing research into 401(k) plan participants' activity.

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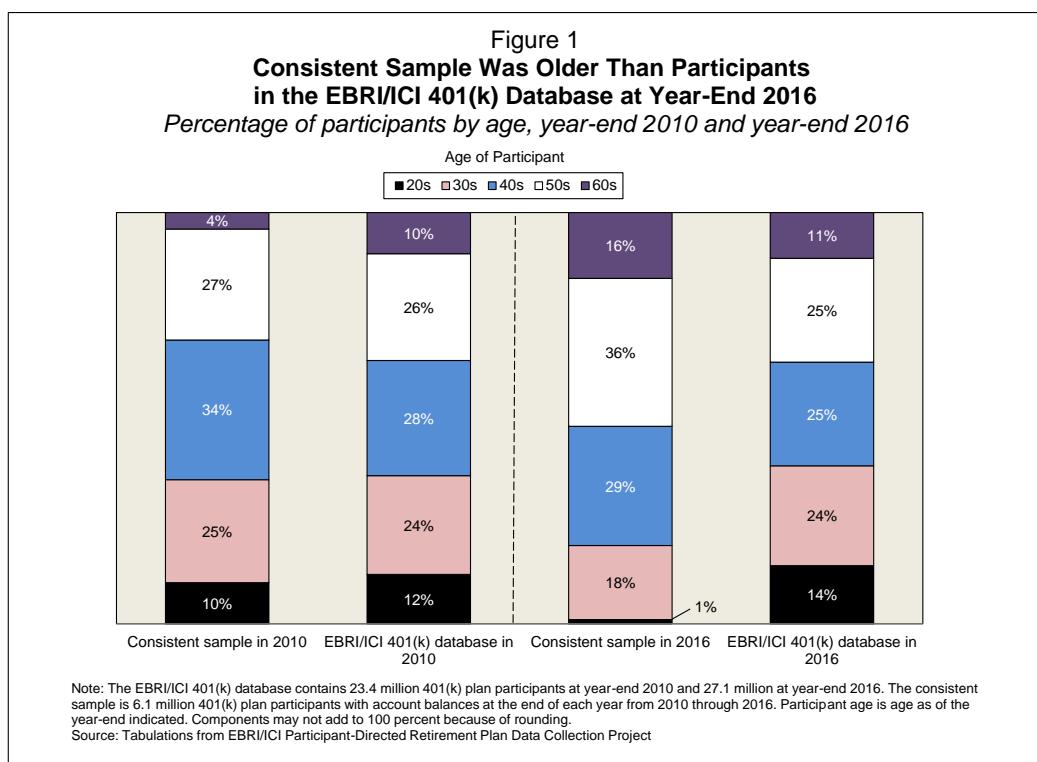
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What Does Consistent Participation in 401(k) Plans Generate? Changes in 401(k) Plan Account Balances, 2010–2016

By Jack VanDerhei, EBRI; Sarah Holden, ICI; Luis Alonso, EBRI; and Steven Bass, ICI

Introduction

The EBRI/ICI 401(k) database, which is constructed from the administrative records of 401(k) plans, represents a large cross section, or snapshot, of 401(k) plans at the end of each year.¹ It is a cross section of the entire population of 401(k) plan participants, and it represents a wide range of participants—including those who are young and individuals who are new to their jobs, as well as older participants and those who have been with their current employers for many years. For example, at year-end 2016, 14 percent of 401(k) participants in the EBRI/ICI 401(k) database were in their twenties, while 11 percent were in their sixties (Figure 1); 22 percent of participants had two or fewer years of tenure at their current jobs, while 5 percent had more than 30 years of tenure (Figure 2). Participants in the consistent sample are both older and longer tenured than participants in the overall database at year-end 2016.



Although annual updates of the EBRI/ICI 401(k) database provide valuable perspectives of 401(k) plan account balances, asset allocation, and loan activity across wide cross sections of participants, cross-sectional analyses are not well suited to examining the impact of participation in 401(k) plans over time. Cross sections change in composition from year to year because the selection of data providers and sample of plans using a given provider vary, and because 401(k) participants join or leave plans.² In addition, the analysis covers account balances held in 401(k) plans at participants' current employers. Retirement savings held in plans at previous employers or rolled over into individual retirement accounts (IRAs) are not included in the analysis.³ To explore the full impact of ongoing participation in 401(k) plans, and to understand how 401(k) plan participants have fared over an extended period, it is important to analyze a consistent group of participants (a longitudinal sample) who have been part of the database for an extended period—in this case, 2010 through 2016.

[“401\(k\) Plan Asset Allocation, Account Balances, and Loan Activity in 2016”](#) reported year-end 2016 account balance, asset allocation, and loan activity results for the EBRI/ICI 401(k) database, which consists of a large cross section of 27.1 million 401(k) plan participants. This paper presents a longitudinal analysis—the analysis of 401(k) participants who maintained accounts each year from 2010 through 2016—that was not included in the previous report. The longitudinal analysis tracks the account balances of 6.1 million 401(k) plan participants who had accounts in the year-end 2010 EBRI/ICI 401(k) database and each subsequent year through year-end 2016 (a six-year period).

Sample of Consistent 401(k) Participants, 2010–2016

More than one-quarter, or 6.1 million, of the 401(k) participants with accounts at the end of 2010 in the EBRI/ICI 401(k) database are in the consistent sample.⁴ These consistent participants had accounts at the end of each year from 2010 through 2016; they make up a longitudinal sample, which removes the effect of participants and plans entering and leaving the database. Initially, this group was demographically similar to the entire EBRI/ICI 401(k) database at year-end 2010. However, by year-end 2016, these participants had grown older, accrued longer job tenures, and accumulated larger account balances compared with participants in the year-end 2016 cross section.

Age and Tenure of Consistent 401(k) Participants

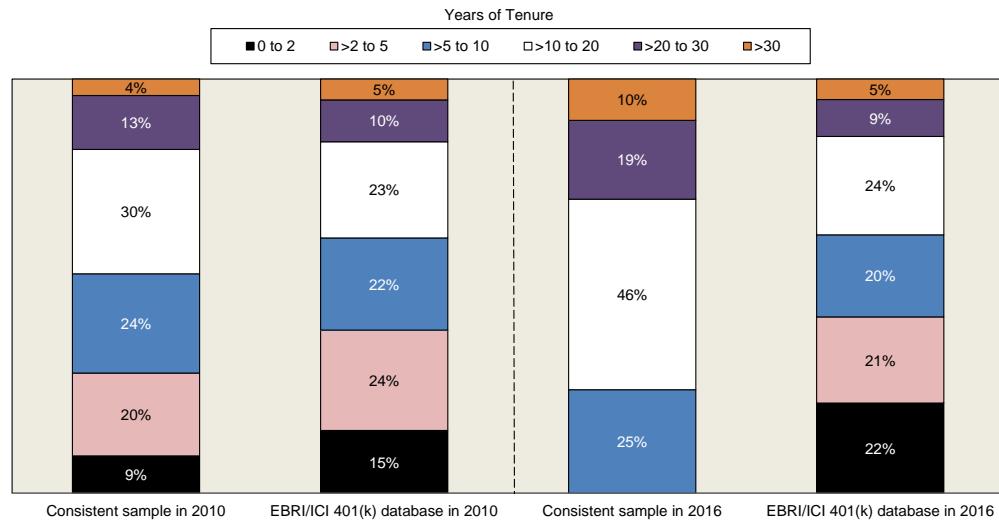
At year-end 2010, the consistent group was similar in age to the participants in the entire EBRI/ICI database. For example, 35 percent of the participants in the consistent sample were in their twenties or thirties in 2010, similar to 36 percent of the 23.4 million participants in the entire database (Figure 1).⁵ Thirty-four percent of the participants in the consistent sample were in their forties in 2010, while 28 percent of participants in the entire database were in their forties. Thirty-one percent of the participants in the consistent sample were in their fifties or sixties, compared with 36 percent of participants in the EBRI/ICI database overall.

The tenure composition of the consistent sample also was roughly similar to the tenure composition of 401(k) participants in the year-end 2010 EBRI/ICI 401(k) database.⁶ For example, 29 percent of the consistent sample had five or fewer years of tenure in 2010, compared with 39 percent of participants in the entire EBRI/ICI 401(k) database (Figure 2). Seventeen percent of the consistent sample had more than 20 years of tenure in 2010, as did 15 percent of the participants in the entire EBRI/ICI 401(k) database.

As expected, the consistent participants who were followed over the six-year period tended to have longer tenures by year-end 2016, compared with the broader base of 401(k) participants in the EBRI/ICI 401(k) database. Participants in the consistent sample, by definition, had at least six years of tenure in 2016 (the length of time for the longitudinal analysis), with none having five or fewer years of tenure, 25 percent having more than five to 10 years, 46 percent having more than 10 to 20 years, and 29 percent having more than 20 years (Figure 2). In contrast, in the entire EBRI/ICI 401(k) database in 2016, 43 percent of participants had five or fewer years of tenure, 20 percent had more than five to 10 years, 24 percent had more than 10 to 20 years, and 14 percent had more than 20 years.

By year-end 2016, the consistent sample of 401(k) participants also was older, on average, compared with the 27.1 million participants in the entire EBRI/ICI 401(k) database. For example, only 1 percent of the participants in the consistent group were in their twenties and 18 percent were in their thirties at year-end 2016 (Figure 1). In the entire EBRI/ICI 401(k) database at year-end 2016, 14 percent of participants were in their twenties and 24 percent were in their thirties. Thirty-six percent of the participants in the consistent sample were in their fifties and 16 percent were in their sixties, compared with 25 percent and 11 percent, respectively, in the entire database at year-end 2016.

Figure 2
Consistent Sample Had Longer Tenure Than Participants
in the EBRI/ICI 401(k) Database at Year-End 2016
Percentage of participants by years of tenure, year-end 2010 and year-end 2016



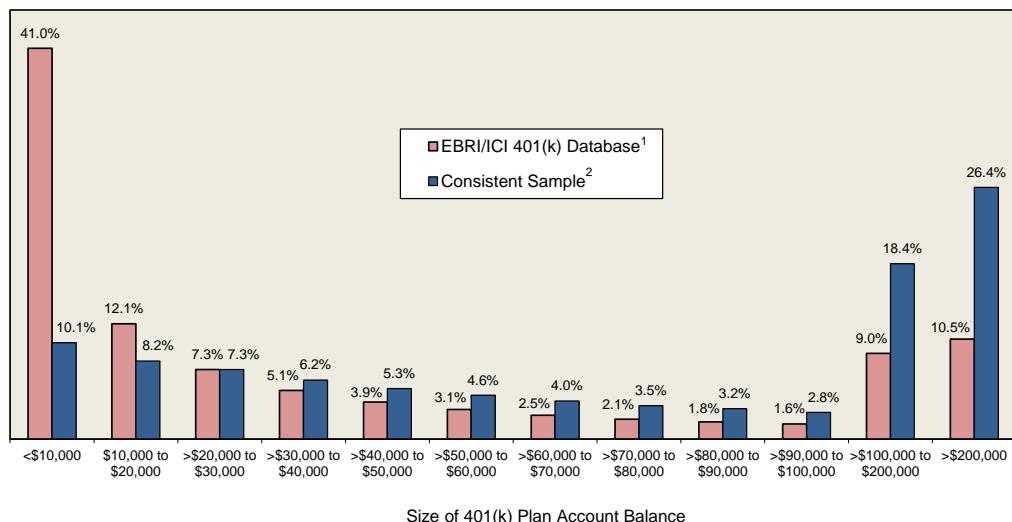
Note: The EBRI/ICI 401(k) database contains 23.4 million 401(k) plan participants at year-end 2010 and 27.1 million at year-end 2016. The consistent sample is 6.1 million 401(k) plan participants with account balances at the end of each year from 2010 through 2016. Participant tenure is tenure as of the year-end indicated. Components may not add to 100 percent because of rounding.

Source: Tabulations from EBRI/ICI Participant-Directed Retirement Plan Data Collection Project

Consistent Participants Have Accumulated Sizable 401(k) Plan Account Balances

Trends in the consistent group's account balances highlight the accumulation effect of ongoing 401(k) participation. At year-end 2016, 26.4 percent of the consistent group had more than \$200,000 in their 401(k) plan accounts at their current employers, while another 18.4 percent had between \$100,000 and \$200,000 (Figure 3). In contrast, in the broader EBRI/ICI 401(k) database, 10.5 percent had accounts with more than \$200,000, and 9.0 percent had between \$100,000 and \$200,000.

Figure 3
Distribution of 401(k) Plan Account Balances by Size of Account Balance
Percentage of participants with account balances in specified ranges, year-end 2016



¹The year-end 2016 EBRI/ICI 401(k) database represents 27.1 million 401(k) plan participants.

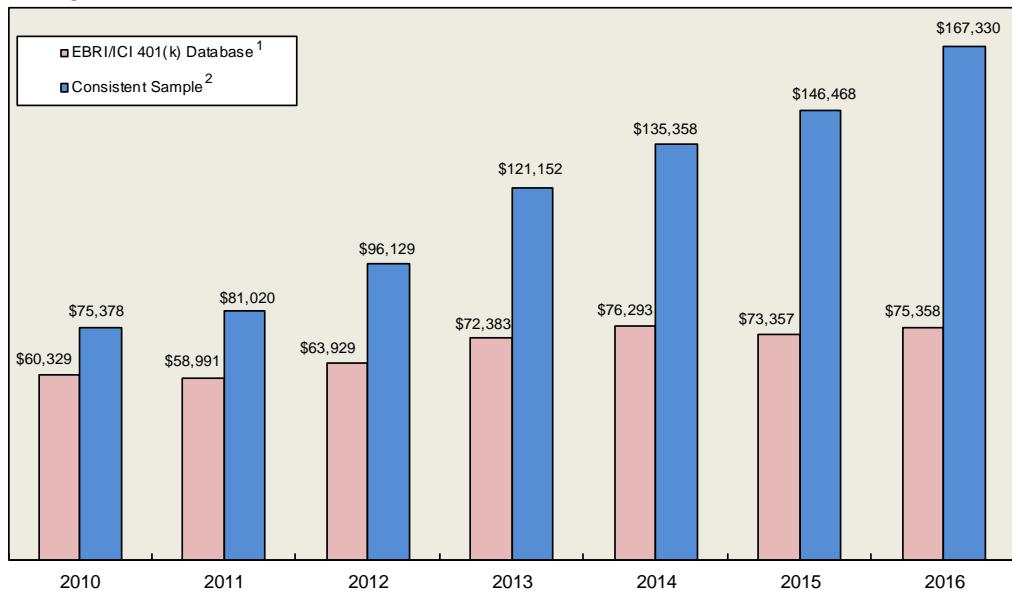
²The consistent sample is 6.1 million 401(k) plan participants with account balances at the end of each year from 2010 through 2016.

Note: Account balances are participant account balances held in 401(k) plans at the participants' current employers and are net of plan loans. Retirement savings held in plans at previous employers or rolled over into IRAs are not included.

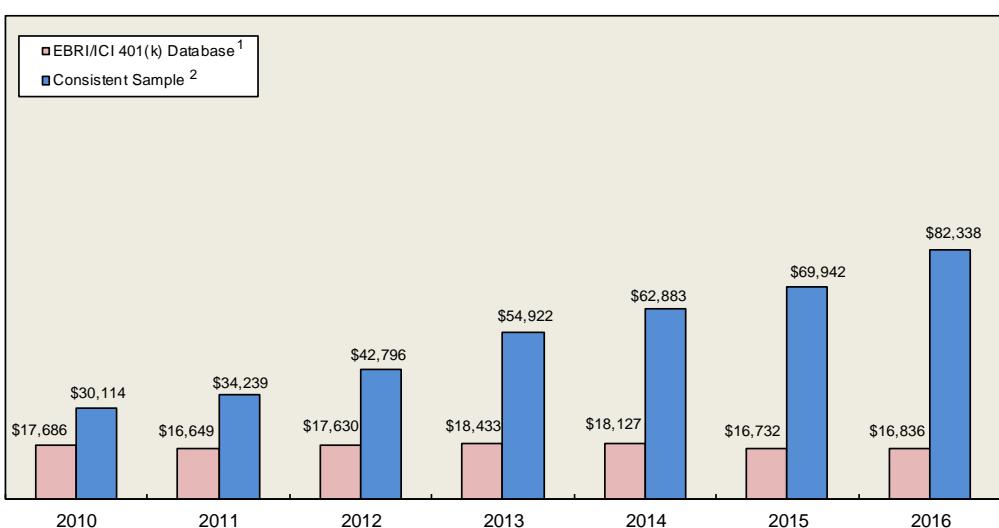
Source: Tabulations from EBRI/ICI Participant-Directed Retirement Plan Data Collection Project

Figure 4
Consistent 401(k) Participants
Accumulate Significant Account Balances

Average



Median



¹The number of 401(k) plan participants varies from year to year in the EBRI/ICI 401(k) database. The year-end 2016 EBRI/ICI 401(k) database represents 27.1 million 401(k) plan participants.

²The consistent sample is 6.1 million 401(k) plan participants with account balances at the end of each year from 2010 through 2016.

Note: Account balances are participant account balances held in 401(k) plans at the participants' current employers and are net of plan loans.

Retirement savings held in plans at previous employers or rolled over into IRAs are not included.

Source: Tabulations from EBRI/ICI Participant-Directed Retirement Plan Data Collection Project

Reflecting their higher average age and tenure, the consistent group also had average and median account balances that were much higher than the average and median account balances of the broader EBRI/ICI 401(k) database (Figure 4). At year-end 2016, the average 401(k) plan account balance of the consistent group was \$167,330, more than double the average account balance of \$75,358 among participants in the entire EBRI/ICI 401(k) database.⁷ The median 401(k) plan account balance among the consistent participants was \$82,338 at year-end 2016, almost five times the median account balance of \$16,836 for participants in the entire EBRI/ICI 401(k) database.

401(k) plan account balances tended to increase with both age and tenure among the consistent group of participants, as they do in the cross-sectional EBRI/ICI 401(k) database. Younger participants or those with shorter job tenures at their current employers tended to have smaller account balances, while those who were older or had longer job tenures tended to have higher account balances.⁸ For example, within the consistent group, among 401(k) participants with

more than 10 to 20 years of tenure at year-end 2016, older participants tended to have higher balances than younger participants: Those in their thirties with more than 10 to 20 years of tenure had an average account balance of \$91,639, compared with an average of \$146,815 for participants in their sixties with more than 10 to 20 years of tenure (Figure 5). Among consistent participants in their sixties at year-end 2016, those with more than five to 10 years of tenure had a lower average 401(k) plan balance (\$101,027) than those with more than 30 years of tenure (\$338,735).

Changes in Consistent 401(k) Participants' Account Balances

In any given year, the change in a participant's account balance is a combination of three factors:

- New contributions by the participant (+), the employer (+), or both;
- Total investment return on account balances (\pm), which depends on the performance of financial markets and on the allocation of assets in an individual's account; and
- Withdrawals (-), borrowing (-), and loan repayments (+).

The change in any individual participant's 401(k) plan account balance is influenced by the magnitudes of these three factors relative to the starting account balance. For example, a contribution of a given dollar amount produces a larger growth rate when added to a smaller account than it would if added to a larger one. On the other hand, investment returns of a given percentage produce larger dollar increases (or decreases) when compounded on a larger asset base. In other words, growth rates are a function of the relative size of the dollar adjustment to the size of the individual account.

Altogether, from year-end 2010 through year-end 2016, the average 401(k) plan account balance among the group of consistent participants more than doubled (increasing by 122 percent), rising from \$75,378 at year-end 2010 to \$167,330 at year-end 2016 (Figures 4, 5, and 6). This translates into a compound annual average growth rate of 14.2 percent over the six-year period. The median account balance among this consistent group also grew, more than doubling from \$30,114 in 2010 to \$82,338 in 2016 (a compound annual average growth rate of 18.3 percent) (Figure 4).

Among the consistent group, individual 401(k) participants experienced a wide range of outcomes, often influenced by the relationship among the three factors mentioned above: contributions, investment returns, and withdrawal or loan activity. Participants who were younger or had fewer years of tenure experienced the largest percent increases in average account balance between year-end 2010 and year-end 2016. For example, the average account balance of 401(k) participants in their twenties rose 774.3 percent (a 43.5 percent compound annual average growth rate) between the end of 2010 and the end of 2016 (Figures 5 and 6). Because younger participants' account balances tended to be smaller (Figure 5), their contributions produced significant percent growth in their account balances. In contrast, the average account balance of older participants, or those with longer tenures—both of which tended to have larger balances at the beginning of the study period than younger workers or those with shorter tenures—showed more modest percent growth in account size (Figure 6). For example, the average account balance of 401(k) participants in their sixties increased 74.8 percent (a 9.8 percent compound annual average growth rate) between year-end 2010 and year-end 2016. Investment returns, rather than annual contributions,⁹ generally account for most of the change in accounts with larger balances.

Investment returns, which vary with 401(k) plan account asset allocation, also influence the changes in participants' accounts. Although asset allocation varied with age, and many participants held a range of investments, stock market performance tended to have an impact on these balances because, in large part, 401(k) plan participants' balances tended to be weighted toward equities. Altogether, at year-end 2016, whether looking at the consistent group or the entire EBRI/ICI 401(k) database, equities—equity funds, the equity portion of target-date funds, the equity portion of non-target-date balanced funds,¹⁰ and company stock—represented about two-thirds of 401(k) plan participants' assets (Figure 7, lower panel).¹¹ The asset allocation of participants in the consistent sample varied with participant age, a pattern that also is observed in the cross-sectional EBRI/ICI 401(k) database. Younger participants generally tended to

favor equity funds and target-date funds, while older participants were more likely to invest in fixed-income securities such as bond funds, money funds, or guaranteed investment contracts (GICs) and other stable-value funds.

Finally, loan or withdrawal activities can have an impact on 401(k) plan account balances. Although in general, very few active 401(k) plan participants take withdrawals,¹² participants in their sixties tend to have a higher propensity to make withdrawals as they approach retirement.¹³

Figure 5
**401(k) Plan Account Balances Among Consistent
 401(k) Participants From 2010 Through 2016**
*Average 401(k) plan balance for consistent 401(k)
 participants by age and tenure, year-end 2010–2016*

Age Group	Tenure (years)	2010	2011	2012	2013	2014	2015	2016
20s	All	\$3,998	\$6,939	\$11,106	\$17,100	\$22,100	\$27,428	\$34,956
	>5 to 10	3,470	6,423	10,864	17,098	22,407	28,091	36,469
30s	All	21,804	26,142	34,542	47,246	56,315	63,645	77,927
	>5 to 10	13,347	18,103	26,155	37,803	47,255	54,938	69,375
	>10 to 20	30,177	34,424	43,666	58,163	67,847	76,064	91,639
40s	All	57,117	62,435	76,586	99,766	113,641	124,067	146,624
	>5 to 10	25,000	31,121	42,512	58,867	71,943	81,230	100,618
	>10 to 20	60,455	65,952	80,927	105,317	120,221	132,196	157,012
	>20 to 30	92,809	97,965	115,383	147,693	163,891	178,109	205,256
50s	All	99,388	105,825	124,671	156,930	174,898	189,835	217,447
	>5 to 10	32,825	39,346	51,791	69,763	83,722	93,694	113,586
	>10 to 20	71,984	78,384	95,031	121,729	138,907	153,390	179,386
	>20 to 30	137,177	143,882	167,322	209,014	230,658	251,072	286,513
	>30	182,144	189,795	215,274	265,679	288,570	310,607	347,197
60s	All	117,139	123,643	141,077	169,449	182,920	191,745	204,783
	>5 to 10	35,577	42,171	53,960	69,749	81,262	88,243	101,027
	>10 to 20	70,416	76,837	91,008	112,322	124,909	133,671	146,815
	>20 to 30	136,035	142,549	162,359	194,238	210,180	221,028	235,339
	>30	219,431	226,771	250,751	295,547	311,277	323,909	338,735
All	All	75,378	81,020	96,129	121,152	135,358	146,468	167,330

Note: The consistent sample is 6.1 million 401(k) plan participants with account balances at the end of each year from 2010 through 2016. Age and tenure groups are based on participant age and tenure at year-end 2016. The all category includes participants with missing tenure information. Account balances are participant account balances held in 401(k) plans at the participants' current employers and are net of plan loans. Retirement savings held in plans at previous employers or rolled over into IRAs are not included.

Source: Tabulations from EBRI/ICI Participant-Directed Retirement Plan Data Collection Project

Figure 6
**Changes in 401(k) Plan Account Balances Among
 Consistent 401(k) Participants From 2010 Through 2016**

*Percent change in average 401(k) plan account balance among
 consistent 401(k) participants by age and tenure, 2010–2016*

Age Group	Tenure (years)	2010–2011	2011–2012	2012–2013	2013–2014	2014–2015	2015–2016	2010–2016	Compound annual average growth rate, 2010–2016
20s	All	73.6%	60.1%	54.0%	29.2%	24.1%	27.4%	774.3%	43.5%
	>5 to 10	85.1%	69.1%	57.4%	31.1%	25.4%	29.8%	951.0%	48.0%
30s	All	19.9%	32.1%	36.8%	19.2%	13.0%	22.4%	257.4%	23.6%
	>5 to 10	35.6%	44.5%	44.5%	25.0%	16.3%	26.3%	419.8%	31.6%
	>10 to 20	14.1%	26.8%	33.2%	16.6%	12.1%	20.5%	203.7%	20.3%
40s	All	9.3%	22.7%	30.3%	13.9%	9.2%	18.2%	156.7%	17.0%
	>5 to 10	24.5%	36.6%	38.5%	22.2%	12.9%	23.9%	302.5%	26.1%
	>10 to 20	9.1%	22.7%	30.1%	14.2%	10.0%	18.8%	159.7%	17.2%
	>20 to 30	5.6%	17.8%	28.0%	11.0%	8.7%	15.2%	121.2%	14.1%
50s	All	6.5%	17.8%	25.9%	11.4%	8.5%	14.5%	118.8%	13.9%
	>5 to 10	19.9%	31.6%	34.7%	20.0%	11.9%	21.2%	246.0%	23.0%
	>10 to 20	8.9%	21.2%	28.1%	14.1%	10.4%	16.9%	149.2%	16.4%
	>20 to 30	4.9%	16.3%	24.9%	10.4%	8.9%	14.1%	108.9%	13.1%
	>30	4.2%	13.4%	23.4%	8.6%	7.6%	11.8%	90.6%	11.4%
60s	All	5.6%	14.1%	20.1%	7.9%	4.8%	6.8%	74.8%	9.8%
	>5 to 10	18.5%	28.0%	29.3%	16.5%	8.6%	14.5%	184.0%	19.0%
	>10 to 20	9.1%	18.4%	23.4%	11.2%	7.0%	9.8%	108.5%	13.0%
	>20 to 30	4.8%	13.9%	19.6%	8.2%	5.2%	6.5%	73.0%	9.6%
	>30	3.3%	10.6%	17.9%	5.3%	4.1%	4.6%	54.4%	7.5%
All	All	7.5%	18.6%	26.0%	11.7%	8.2%	14.2%	122.0%	14.2%

Note: The consistent sample is 6.1 million 401(k) plan participants with account balances at the end of each year from 2010 through 2016. Age and tenure groups are based on participant age and tenure at year-end 2016. The all category includes participants with missing tenure information. Account balances are participant account balances held in 401(k) plans at the participants' current employers and are net of plan loans. Retirement savings held in plans at previous employers or rolled over into IRAs are not included.

Source: Tabulations from EBRI/ICI Participant-Directed Retirement Plan Data Collection Project

Figure 7
Average Asset Allocation of 401(k) Plan Accounts by Participant Age
Percentage of account balances, year-end 2010 and year-end 2016

Age Group	Year-End 2010									
	Balanced funds									
	Equity Funds	Target-date Funds ^{1,2}	Non-target-date Balanced Funds	Bond Funds	Money Funds	GICs ^{2,3} and other stable-value funds	Company Stock ²	Other	Unknown	Memo: Equities ⁴
20s	25.1%	41.2%	8.2%	8.2%	1.8%	3.5%	9.2%	1.0%	1.9%	75.8%
30s	42.6%	22.8%	6.7%	8.2%	2.7%	4.1%	9.1%	1.9%	1.8%	75.7%
40s	49.7%	14.0%	5.6%	9.0%	3.0%	4.7%	9.6%	2.7%	1.6%	73.6%
50s	45.6%	11.6%	5.8%	10.3%	3.7%	7.7%	10.6%	3.2%	1.5%	66.4%
60s	39.4%	12.2%	6.0%	12.5%	5.4%	10.9%	8.9%	3.4%	1.3%	57.1%
All Consistent Sample ⁵	44.5%	12.9%	5.8%	10.6%	4.1%	7.8%	9.8%	3.1%	1.5%	65.7%
2010 EBRI/ICI 401(k) Database ⁶	42.0%	11.1%	7.1%	11.6%	4.4%	10.3%	8.0%	2.9%	2.6%	62.0%
Year-End 2016										
Age Group	Balanced funds									
	Equity funds	Target-date funds ^{1,2}	Non-target-date balanced funds	Bond funds	Money funds	GICs ^{2,3} and other stable-value funds	Company stock ²	Other	Unknown	Memo: equities ⁴
	31.8%	43.6%	6.0%	4.7%	0.9%	1.7%	6.4%	4.1%	0.8%	80.9%
20s	31.8%	43.6%	6.0%	4.7%	0.9%	1.7%	6.4%	4.1%	0.8%	80.9%
30s	45.5%	28.0%	4.3%	5.8%	1.6%	2.6%	6.6%	4.8%	0.8%	79.4%
40s	51.4%	18.4%	4.6%	6.8%	2.1%	3.6%	7.1%	5.1%	0.9%	75.8%
50s	46.8%	15.8%	5.3%	8.6%	2.8%	6.5%	7.6%	5.8%	0.9%	66.8%
60s	40.1%	16.1%	5.6%	10.8%	3.6%	10.1%	6.5%	6.1%	1.0%	57.2%
All Consistent Sample ⁵	46.3%	17.5%	5.1%	8.4%	2.7%	6.3%	7.1%	5.6%	0.9%	68.0%
2016 EBRI/ICI 401(k) Database ⁷	43.5%	21.3%	6.1%	8.2%	3.1%	5.8%	5.9%	5.1%	0.9%	67.4%

¹A target-date fund typically rebalances its portfolio to become less focused on growth and more focused on income as it approaches and passes the target date of the fund, which is usually included in the fund's name.

²Not all participants are offered this investment option.

³GICs are guaranteed investment contracts.

⁴Equities include equity funds, company stock, the equity portion of target-date funds, and the equity portion of non-target-date balanced funds.

⁵Asset allocation by age group is among the consistent sample of 6.1 million 401(k) plan participants with account balances at the end of each year from 2010 through 2016.

⁶The year-end 2010 EBRI/ICI 401(k) database represents 23.4 million 401(k) plan participants.

⁷The year-end 2016 EBRI/ICI 401(k) database represents 27.1 million 401(k) plan participants.

Note: Funds include mutual funds, bank collective trusts, life insurance separate accounts, and any pooled investment product primarily invested in the security indicated. Age group is based on the participant's age at year-end 2016. Row percentages may not add to 100 percent because of rounding. Percentages are dollar-weighted averages.

Source: Tabulations from EBRI/ICI Participant-Directed Retirement Plan Data Collection Project

Background Factors Influencing 401(k) Plan Assets

Aggregate data on 401(k) plans provide insight into the possible influence of each of the factors that cause changes in account balances: contributions, investment returns, and withdrawal or loan activity. Since year-end 2010, contributions to 401(k) plans have averaged \$327 billion a year, and benefits paid (including rollovers) have averaged \$322 billion (Figure 8). Investment returns—interest, dividends, and realized and unrealized asset appreciation/depreciation—vary significantly from year to year. For example, on net they had nearly no impact on assets in 2011 and 2015, but provided a significant boost as the stock market rose sharply from 2012 through 2014.

Contributions—which positively affect 401(k) plan account balances—include both employer and employee contributions, and most 401(k) participants are in plans where the employer contributes. In 2015, nearly 9 in 10 participants were in 401(k) plans where the employer made contributions (Figure 9). Although this figure fell slightly in the wake of the financial market crisis, reaching a low of 85 percent in 2010, it had generally rebounded by the end of the longitudinal study. Regarding individual participants' contribution activity, defined contribution (DC) plan participants tend to continue contributing in any given year to their plans.¹⁴

Between year-end 2010 and year-end 2016, the U.S. stock market generally rose (Figure 10), which tends to provide a boost to 401(k) plan accounts holding equities. On average, about two-thirds of the consistent sample of 401(k) participants' account balances were invested in equities (Figure 7). Subdued stock market performance in 2011 was followed by stronger growth in 2012 through 2014 (with particularly strong appreciation in 2013), but then followed by moderation in 2015 and resumed growth in 2016 (Figure 10). Though contributions and loan repayments also play a role in the growth of the average 401(k) plan account balances observed, the pattern of account balance growth rates from year to year also reflects the stock market performance.

Withdrawals and borrowing reduce 401(k) plan account balances in the EBRI/ICI 401(k) database, while loan repayment has a positive impact. Withdrawal activity among active DC plan participants is relatively rare. Typically, fewer than 5 percent of active DC plan participants take any withdrawal in a given year, with fewer than 2 percent taking hardship withdrawals.¹⁵ Data from the EBRI/ICI 401(k) database indicate that 19 percent of 401(k) plan participants in plans offering loans had loans outstanding at year-end 2016, with the youngest (8 percent of participants in their twenties) and oldest (14 percent of participants in their sixties) less likely to have loans outstanding than those in their thirties, forties, or fifties (Figure 11). In the database, a participant's account balance is reduced in the year that the loan is originated, but repayment of the loan in the ensuing years contributes to account growth.

Figure 8
401(k) Plan Contributions, Benefits Disbursed, Investment Returns, and Assets

Annual flows reported on Form 5500 and year-end assets, billions of dollars, 2000–2017

	Total Contributions ¹	Total Benefits Disbursed ²	Interest, Dividends, Gains, and Other Items ³	Assets at Year-End ⁴
2000	\$169	\$172	-\$79	1,738
2001	174	147	-119	1,701
2002	181	147	-203	1,565
2003	186	141	300	1,932
2004	204	166	204	2,193
2005	223	189	146	2,393
2006	251	228	303	2,773
2007	273	261	215	2,975
2008	285	233	-770	2,203
2009	256	206	431	2,718
2010	265	243	337	3,119
2011	283	250	-1	3,112
2012	303	282	357	3,495
2013	325	326	645	4,148
2014	349	366	278	4,406
2015	378	386	-1	4,377
2016	N/A	N/A	N/A	4,685
2017	N/A	N/A	N/A	5,275

¹Total contributions include both employer and employee contributions.

²Total benefits disbursed include both benefits paid directly from trust funds and premium payments made by plans to insurance carriers. Amounts exclude benefits paid directly by insurance carriers.

³This category includes interest, dividends, rent, net gains or losses on sale of assets, unrealized appreciation or depreciation of assets, and other income and expenses. The bulk of this category is net investment gains or losses.

⁴Estimates through 2015 are based on the Department of Labor Form 5500 Research File.

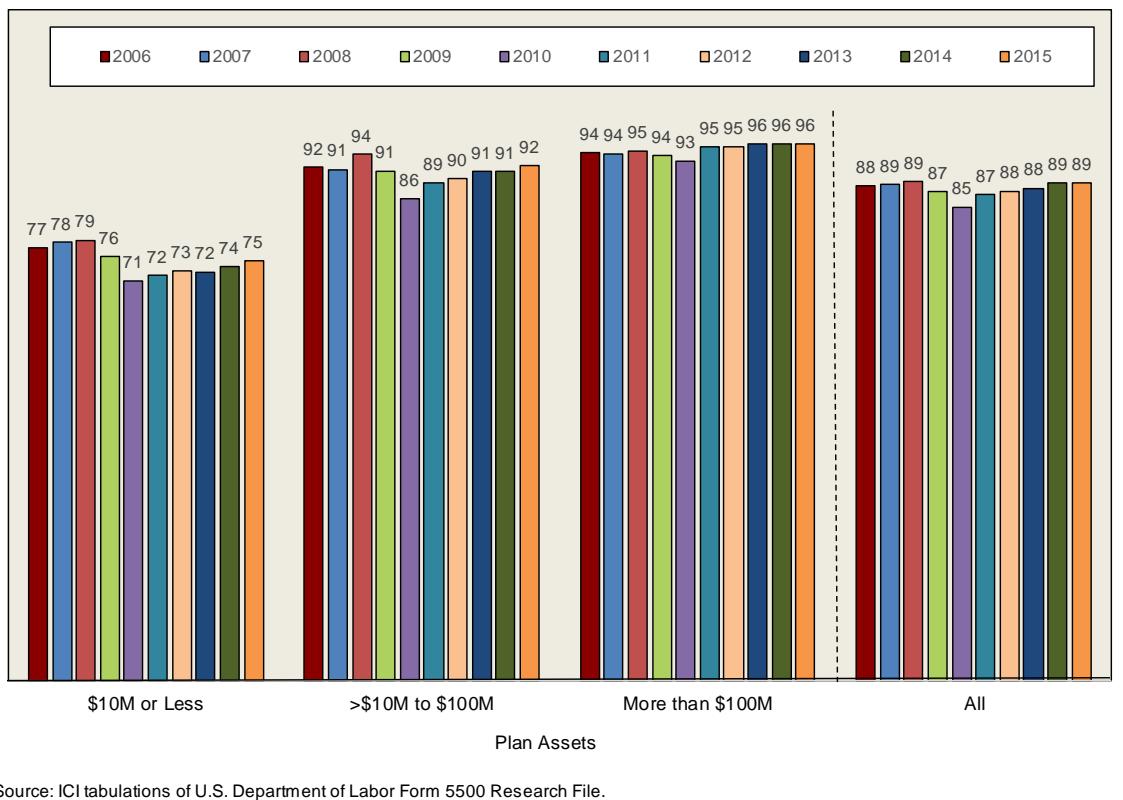
Note: Data exclude plans covering only one participant.

N/A = not available.

Sources: Investment Company Institute and Department of Labor

Figure 9
Most 401(k) Plan Participants Are in Plans With Employer Contributions

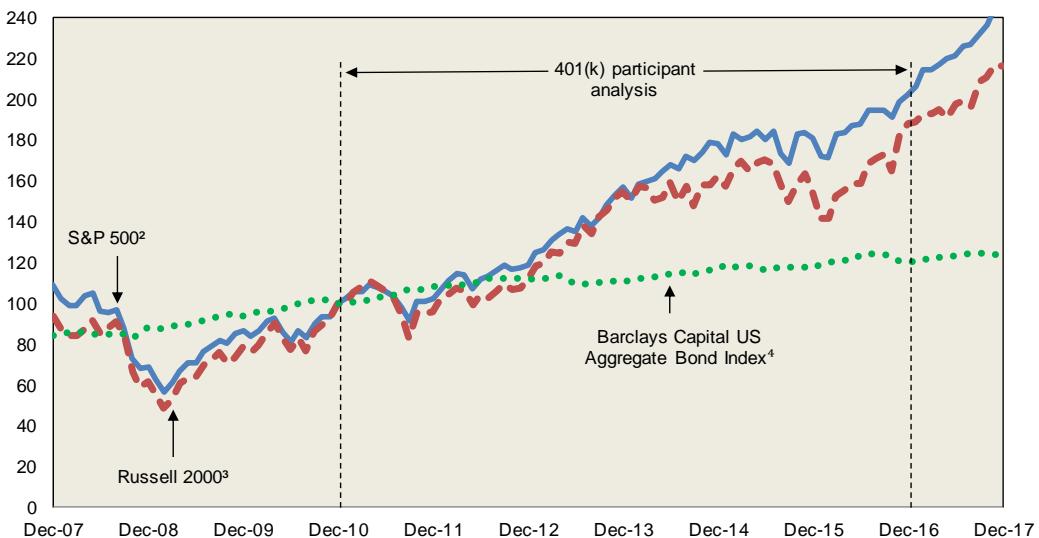
*Percentage of active 401(k) participants in plans with
employer contributions (by plan assets, plan year 2006–2015)*



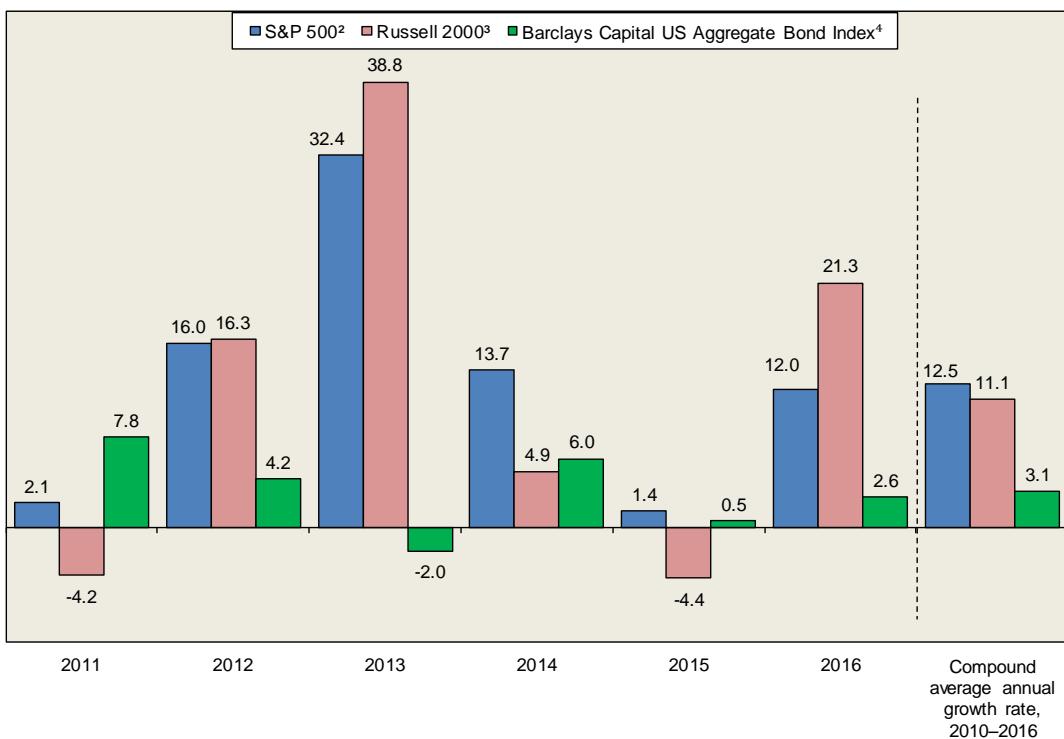
Source: ICI tabulations of U.S. Department of Labor Form 5500 Research File.

Figure 10
Domestic Stock and Bond Market Indexes

Month-end level,¹ December 2007 to December 2017



Annual percent change in total return index, 2011 to 2016



Sources: Bloomberg, Barclays Global Investments, Frank Russell Company, and Standard & Poor's

¹ All indexes are set to 100 in December 2006.

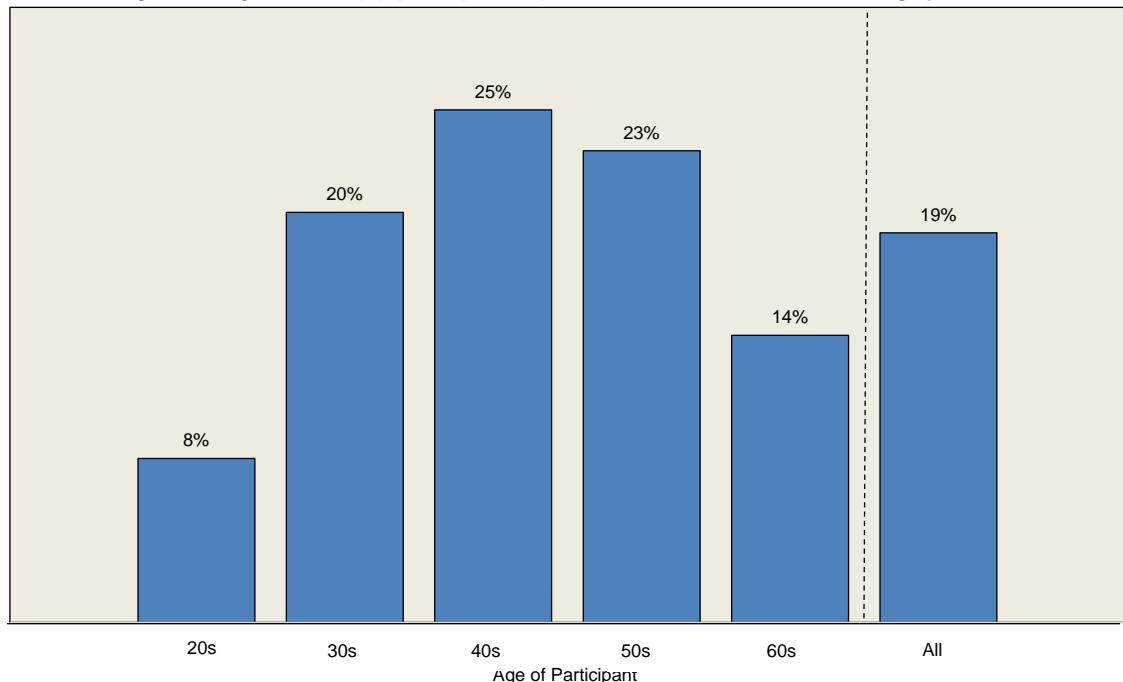
² The S&P 500 index measures the performance of 500 stocks chosen for market size, liquidity, and industry group representation.

³ The Russell 2000 index measures the performance of the 2,000 smallest US companies (based on total market capitalization) included in the Russell 3000 index (which tracks the 3,000 largest U.S. companies).

⁴ Formerly the Lehman Brothers US Aggregate Bond Index, the Barclays Capital US Aggregate Bond Index is composed of securities covering government and corporate bonds, mortgage-backed securities, and asset-backed securities (rebalanced monthly by market capitalization). The index's total return consists of price appreciation/depreciation plus income as a percentage of the original investment.

Figure 11
Less Than One-Fifth of Eligible 401(k) Plan Participants Have Loans Outstanding

Percentage of eligible 401(k) plan participants with loans outstanding, year-end 2016



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

Note: Eligible 401(k) plan participants are those in 401(k) plans that offer loans.

About the EBRI/ICI 401(k) Database

The EBRI/ICI Participant-Directed Retirement Plan Data Collection Project is the largest, most representative repository of information about individual 401(k) plan participant accounts. As of December 31, 2016, the EBRI/ICI 401(k) database included statistical information about 27.1 million 401(k) plan participants, in 110,794 employer-sponsored 401(k) plans, holding \$2.0 trillion in assets. The 2016 EBRI/ICI 401(k) database covers 49 percent of the universe of active 401(k) plan participants, 20 percent of plans, and 44 percent of 401(k) plan assets. The EBRI/ICI project is unique because of its inclusion of data provided by a wide variety of plan recordkeepers, permitting the analysis of the activity of participants in 401(k) plans of varying sizes—from very large corporations to small businesses—with a variety of investment options.

Sources and Types of Data

Several EBRI and ICI members provided records on active participants in 401(k) plans for which they kept records at year-end 2016.¹⁶ These plan recordkeepers include mutual fund companies, banks, insurance companies, and consulting firms. Although the EBRI/ICI 401(k) project has collected data from 1996 through 2016, the universe of data providers varies from year to year. In addition, the plans using a particular provider can change over time. Records were encrypted to conceal the identity of employers and employees, but were coded so that both could be tracked over multiple years.¹⁷ For each participant, data include date of birth, from which an age group is assigned; date of hire, from which a tenure range is assigned; outstanding loan balance; funds in the participant's investment portfolios; and asset values attributed to those funds. An account balance for each participant is the sum of the participant's assets in all funds.¹⁸ Plan balances are constructed as the sum of all participant balances in the plan.

Investment Options

In the EBRI/ICI 401(k) database, investment options are grouped into eight broad categories.¹⁹ Equity funds consist of pooled investments primarily invested in stocks, including equity mutual funds, bank collective trusts, life insurance separate accounts, and other pooled investments. Similarly, bond funds are any pooled account primarily invested in bonds. Balanced funds are pooled accounts invested in both stocks and bonds. They are classified into two subcategories: target-date funds and non-target-date balanced funds. A target-date fund typically rebalances its portfolio to become less focused on growth and more focused on income as it approaches and passes the target date of the fund, which is usually included in the fund's name. Non-target-date balanced funds include asset allocation or hybrid funds, in addition to lifestyle funds.²⁰ Company stock is equity in the 401(k) plan's sponsor (the employer). Money funds consist of those funds designed to maintain a stable share price. Stable-value products, such as GICs²¹ and other stable-value funds,²² are reported as one category. The *other* category is the residual for other investments, such as real estate funds. The final category, *unknown*, consists of funds that could not be identified.²³

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Endnotes

¹ For example, as of December 31, 2016, the EBRI/ICI 401(k) database included statistical information on 27.1 million 401(k) plan participants, in 110,794 employer-sponsored 401(k) plans, holding \$2.0 trillion in assets (see Holden et al. 2018). Using National Compensation Survey data and historical relationships and trends evident in the Form 5500 data, EBRI and ICI estimate the number of active 401(k) participants to be about 55 million and the number of 401(k) plans to be about 555,000 in 2016 (see note 2 in Holden et al. 2018; and US Department of Labor, Employee Benefits Security Administration 2018). At year-end 2016, 401(k) plan assets were \$4.7 trillion (see Figure 8 and Investment Company Institute 2018). The 2016 EBRI/ICI database covers 49 percent of the universe of 401(k) plan participants, 20 percent of plans, and 44 percent of 401(k) plan assets.

² Because of these changes in the cross sections, comparing average account balances across different year-end cross-sectional snapshots can lead to false conclusions. For example, newly formed plans would tend to pull down the average account balance but would tell us nothing about consistently participating workers. Similarly, the aggregate average account balance would tend to be pulled down if a large number of participants retire and roll over their account balances.

³ Account balances are net of unpaid loan balances.

⁴ The value of this percentage is lower than it would have been if it merely reflected employee turnover and retirement. For example, if 401(k) plan sponsors change their service providers, all participants in those plans would be excluded from the consistent sample.

⁵ For the report on the year-end 2010 EBRI/ICI 401(k) database, see Holden et al. 2011.

⁶ Tenure refers to years at the current employer and is generally derived from date of hire reported for the participant. Tenure will not reflect the years of participation in the 401(k) plan if the 401(k) plan was added by the employer at a later date or if there are restrictions on participating in the 401(k) plan immediately upon hire.

⁷ Although the average account balance for the entire database at year-end 2016 is slightly higher than the average account balance at year-end 2015, this is muted by participants and plans entering and leaving the database. Among the sample of participants who were present in the database in both 2015 and 2016, the average account balance increased by 18.4 percent between year-end 2015 and year-end 2016, from \$76,630 to \$90,713 (the average account balance for the 20.0 million 401(k) plan participants who had account balances at both year-end 2015 and year-end 2016). See Holden et al. 2018.

⁸ The cross-sectional EBRI/ICI 401(k) database also shows that younger participants and those with shorter tenures tend to have lower 401(k) balances than those who are older or have longer tenures. See Holden et al. 2018.

⁹ Although, contribution amounts and contribution rates tend to increase with age and earnings. See Figures A2 and A3 in Brady and Bass 2018 or data tables in Internal Revenue Service, Statistics of Income 2018.

¹⁰ At year-end 2016, 59 percent of non-target-date balanced fund assets were assumed to be invested in equities (see Investment Company Institute, Quarterly Supplementary Data). The allocation to equities in target-date funds varies with the funds' target dates. For target-date funds, investors were assumed to be in a fund whose target date was nearest to their 65th birthday. Allocation to equities in target-date funds is assumed to vary with investor age. The equity portion was estimated using the industry average equity percentage for the assigned target-date fund calculated using the Morningstar Lifecycle Allocation Indexes (see Morningstar 2015).

¹¹ For a description of the investment options, see page 17.

¹² See Holden and Schrass 2018.

¹³ For statistics indicating the higher propensity of withdrawals among participants in their sixties, see Holden and VanDerhei 2002. In addition, nonhardship withdrawals, which are generally limited to employees who are aged 59½ or older, constitute a majority of all withdrawals (see Utkus and Young 2018).

¹⁴ Data from the ICI Survey of Defined Contribution Plan Recordkeepers find that DC plan participants generally stayed the course through the financial crisis and ensuing years. During each year from 2010 through 2017, fewer than 3 percent of DC plan participants stopped contributing to their 401(k) plan accounts. Some of these participants may have stopped contributing because they reached the contribution limit. See Holden and Schrass 2018 for DC plan participants' annual

activities between 2008 and 2017. For an analysis of contribution activity during the bear market of 2000–2002 using the cross-sectional EBRI/ICI 401(k) databases, see Holden and VanDerhei 2004. The analysis finds that, overall, 401(k) participants' contribution rates were little changed in 2000, 2001, and 2002 when compared to 1999. On average, 401(k) participants' contribution behavior does not appear to have been materially affected by the bear market in equities from 2000 through 2002, whether measured in dollar amounts or percentage of salary they contributed.

¹⁵ See Holden and Schrass 2018.

¹⁶ For the complete update from the year-end 2016 EBRI/ICI 401(k) database, see Holden et al. 2018.

¹⁷ The EBRI/ICI 401(k) database environment is certified to be fully compliant with the ISO-27002 Information Security Audit standard. Moreover, EBRI has obtained a legal opinion that the methodology used meets the privacy standards of the Gramm-Leach-Bliley Act. At no time has any nonpublic personal information that is personally identifiable, such as a Social Security number, been transferred to or shared with EBRI.

¹⁸ Account balances are net of unpaid loan balances. Thus, unpaid loan balances are not included in any of the eight asset categories described.

¹⁹ This system of classification does not consider the number of distinct investment options presented to a given participant, but rather, the types of options presented. Preliminary research analyzing 1.4 million participants drawn from the 2000 EBRI/ICI 401(k) database suggests that the sheer number of investment options presented does not influence participants. On average, participants have 10.4 distinct options but, on average, choose only 2.5 (see Holden and VanDerhei 2001). In addition, the preliminary analysis found that 401(k) participants are not naive—that is, when given n options, they do not divide their assets among all n . Indeed, less than 1 percent of participants followed a $1/n$ asset allocation strategy. Plan Sponsor Council of America 2018 indicates that in 2016, the average number of investment fund options available for participant contributions was 20 among the 590 plans surveyed. Deloitte Consulting LLP 2017b reports that the average number of funds offered by the 160 401(k) and 403(b) plan sponsors surveyed was 19 in 2017. BrightScope and Investment Company Institute 2018 reports an average of 29 investment options in 2015, and an average of 22 investment options when a target-date fund suite is counted as a single investment option.

²⁰ Lifestyle funds maintain a predetermined risk level and generally use words such as "conservative," "moderate," or "aggressive" in their name to indicate the fund's risk level. Lifestyle funds generally are included in the non-target-date balanced fund category.

²¹ GICs are insurance company products that guarantee a specific rate of return on the invested capital over the life of the contract.

²² Other stable-value funds include synthetic GICs, which consist of a portfolio of fixed-income securities "wrapped" with a guarantee (typically by an insurance company or a bank) to provide benefit payments according to the plan at book value.

²³ Some recordkeepers supplying data were unable to provide complete asset allocation detail on certain pooled asset classes for one or more of their clients. The final EBRI/ICI 401(k) database includes only plans for which at least 90 percent of all plan assets could be identified.