Chapter 3

The Role of 401(k) Accumulations in Providing Future Retirement Income

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At year-end 2004, in aggregate, some 43 million 401(k) plan participants held more than $2 trillion in 401(k) plan assets.[1] Nevertheless, today's retirees do not tell us about the future status of workers having had 401(k) plans available over a full career. This is because the 401(k) plan is just now turning twenty-five years old, which means that even the oldest current participants could have only saved in a 401(k) plan for at most, a little over half of their careers. Thus, the EBRI/ICI 401(k) Accumulation Projection Model[2] was developed to project the proportion of an individual's preretirement income that *might* be replaced by 401(k) plan accumulations at retirement after a full career with availability of 401(k) plans under many scenarios.

The question of retirement income adequacy involves examining the potentially several sources of income in retirement: (*a*) Social Security benefits, (*b*) income from defined benefit (DB) and/or defined contribution (DC) retirement plans and individual retirement accounts (IRAs), (*c*) income from other individual savings (possibly including housing equity), and (*d*) income from continued employment.[3] The model in this chapter only focuses on the income stream future retirees are projected to receive from 401(k) accumulations, which are the sum of 401(k) balances at all employers and rollover IRA assets, in the first year of retirement.

Growth of 401(k) Plans

The past quarter century has witnessed a shift in the US pension landscape. About twenty-five years ago, 401(k) plans had only just come into existence, DB plans held the bulk of the pension asset base, with over $444 billion, while DC plans, which were usually supplemental, held $185 billion.[4] Today, by contrast, DC plans control $2.7 trillion in assets, and DB plan assets total $1.8 trillion.[5] Significantly, IRAs are also very substantial, amounting to $3.5 trillion;[6] these benefited not only from contributions and investment returns over time but also from rollover assets from employer-sponsored plans.[7]

This dramatic change in the pension landscape has shifted some responsibility for retirement security from plan sponsors to individual participants. Further, while 401(k) plans have great potential, individual workers must now take the important steps of participating when offered a plan, preserving assets while working and on job change, and spending down assets responsibly in retirement. As a result, it is natural to reflect on where participation in 401(k) plans might be leading future retirees. This chapter weaves together two recent trends in pension research[8] to examine whether 401(k) plans will be able to provide retirees with substantial retirement income under a range of scenarios. In addition, following Holden and VanDerhei (2002), the chapter assesses the role that plan design plays in shaping the different outcomes. We begin by briefly describing the EBRI/ICI 401(k) Accumulation Projection Model and then present baseline results reflecting continuous employment, continuous coverage by 401(k) plans, and historical market returns (based on the performance of US financial markets from 1926 through 2001). Next we modify the model to explore the impact of catch-up contributions, contributing to IRAs if a worker is not offered a 401(k) plan, and changing the retirement age.

Methodology

The key elements of the EBRI/ICI 401(k) Accumulation Projection Model are sketched in Figure 3-1.[9] The starting point for the model is to collect data on 401(k) plan participants' account balances at their current employers, asset allocations, loan balances, and annual incomes (at year-end 2000) using the EBRI/ICI database.[10] The model then projects participants' plan activity over the remainder of their careers, which varies as a function of personal characteristics and typical behaviors observed among millions of 401(k) participants at different ages, tenures, and income levels (based on our analysis of the EBRI/ICI database). For example, asset allocations are adjusted as participants age, because in the cross-sectional data we see that older participants tend to hold lower percentages of their account balances in equities compared with younger ones. However, individuals' risk profiles vary. Thus, those with more of their accounts in equities at year-end 2000 relative to others in their age group are assumed to continue to hold higher equity allocations over their careers, albeit with some rebalancing away from equities as they age. Further, the group of 401(k) participants also engages in behaviors typical at job change. If a job change is predicted to occur, the model determines whether the individual leaves his balance in his employer's plan, cashes it out, or rolls it over into an IRA. If a rollover IRA is created, then typical IRA behaviors are modeled including asset allocation decisions and IRA withdrawal activity.

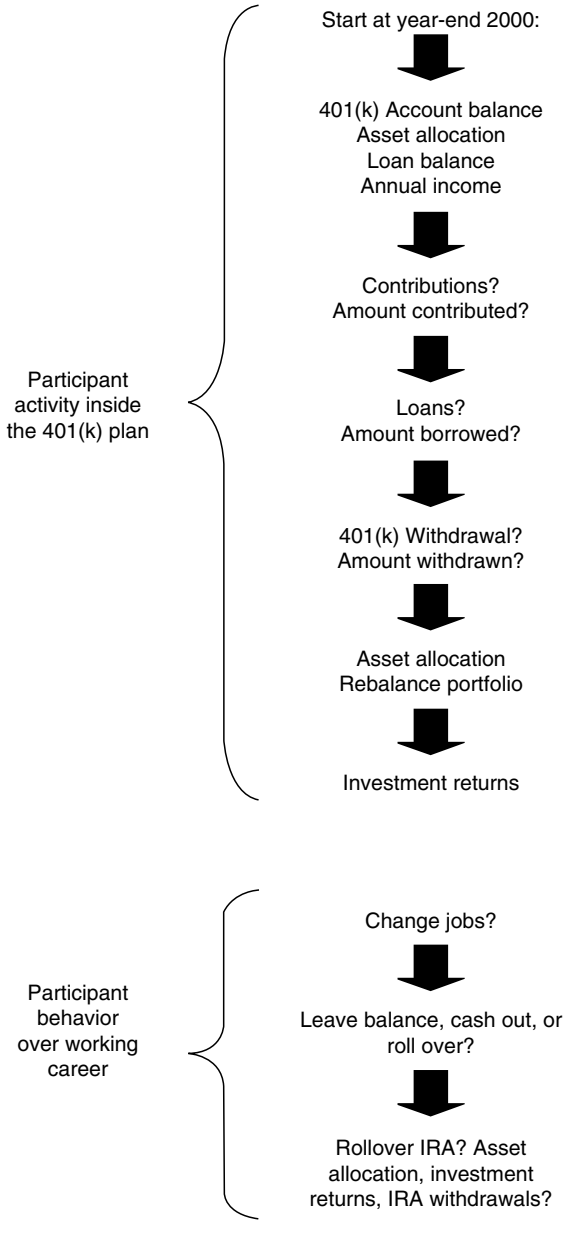

Figure 3-1. Diagram of basic elements of the EBRI/ICI 401(k) Accumulation Projection Model.
Source: EBRI/ICI 401(k) Accumulation Projection Model (see Holden and VanDerhei 2002).

To evaluate a full career with exposure to 401(k) plans, we first present results for participants born 1965–74 (age 26–35 in 2000); they will turn age 65 between 2030 and 2039. The 401(k) accumulation value at the end of each individual's career represents the sum of all 401(k) balances at all employers as well as IRA balances resulting from the 401(k) experience. We also convert the accumulations into an income stream—an annuity or set of installment payments—using current life expectancies at the retirement age indicated (in most cases, age 65) and projected discount rates. Finally, replacement rates are calculated to compare benefit payments in the first year of retirement to each worker's projected final five-year average preretirement income.[11]

Baseline Results

In the model's baseline run we move participants through a career with continuous employment, continuous 401(k) plan coverage, and financial market returns as characterized by the experience in US financial markets from 1926 through 2001.[12,13] In this case, 401(k) accumulations are projected to replace a significant fraction of projected preretirement income. For example, Figure 3-2 shows that the median retiree in the lowest income quartile attaining age 65 between 2030 and 2039 (based on projected final five-year average preretirement salary) will have a 401(k) payout

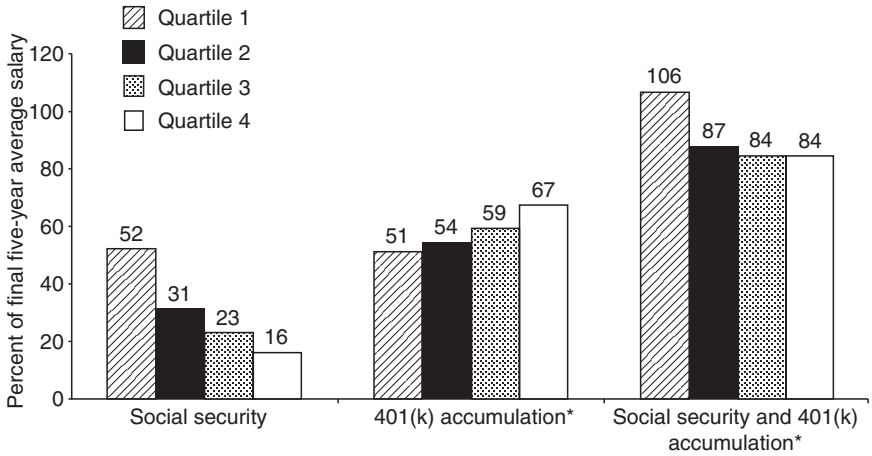

Figure 3-2. Median replacement rates for participants turning 65 between 2030 and 2039, by income quartile at age 65.
*The 401(k) accumulation includes 401(k) balances at employer(s) and rollover IRA balances.
Source: EBRI/ICI 401(k) Accumulation Projection Model.

in the first year of retirement that replaces about half of preretirement earnings. The median retiree in the highest income quartile at age 65 is projected to replace about two-thirds of projected preretirement income using 401(k) accumulations.[14]

For comparison, the median individual in the lowest income quartile would anticipate projected social security benefits worth 52 percent of projected preretirement income at age 65, if the current benefit structure were maintained.[15] Social security replacement rates decline with income, by design, so the median highest income quartile worker would have social security replace only 16 percent of projected preretirement income (if the current benefit structure is maintained). As mentioned earlier, 401(k) accumulation replacement rates tend to rise with income.

Alternative Simulations

The Economic Growth and Tax Relief Reconciliation Act of 2001 (EGTRRA) increased contribution limits and also permitted catch-up contributions by individuals age 50 or older. Specifically, workers age 50 or older who were already at the tax-deferred contribution limit were now allowed to make additional catch-up contributions. The first simulation examines the impact of this increased saving opportunity, in addition to having already included the legislated limit increases. We also evaluate scenarios where workers contribute to IRAs as they would have to their 401(k) plans during times when they do not find 401(k) coverage, following suggestions in the literature (Ippolito 1997; Pence 2002) that 401(k) plan participants may differ from other workers in that they are 'savers'.[16] An additional projection simulation combines the IRA contribution scenario and catch-up contributions in both IRAs and 401(k) plans. Finally, we allow some flexibility in selecting a retirement date, by exploring the impact of retiring at 60, versus postponing retirement until age 67 or 70.

Impact of the Catch-Up Provisions. In part because life-cycle analysis has suggested that older individuals are able to save more,[17] EGTRRA created catch-up contributions for individuals age 50 or older to allow them additional contributions if they had already reached the tax-deferred participant contribution limit.[18] The model assumes that any individual age 50 or older who would have contributed at the limit in the simulation in any given year (after 2001), will also make a catch-up contribution of the entire amount allowed, as seen in Figure 3-3.[19]

Holden et al. (2005) find that households taking advantage of IRA catch-up contributions, did so to the limit.[20] Thus, we assumed that 401(k) plan participants making catch-up contributions contribute the entire amount allowed;[21] we do not account for participants constrained from reaching the 402(g) limit by either plan design or nondiscrimination testing and

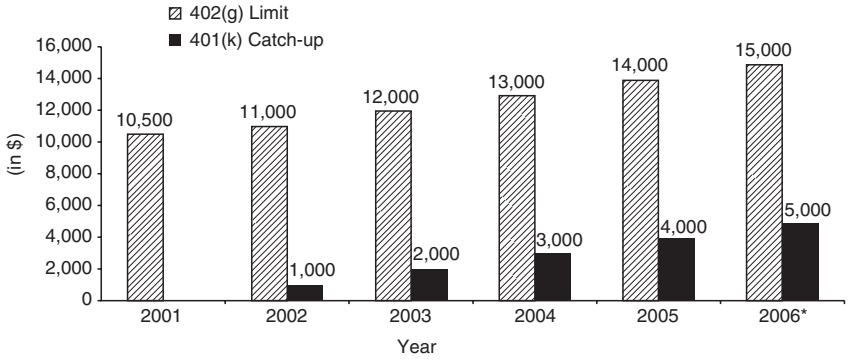

Figure 3-3. Internal Revenue Code deferred contribution limits in 401(k) plans, 2001–2006.
*After 2006, these limits are indexed for inflation in $500 increments.
Source: Authors' Summary of US Internal Revenue Code.

thus do not recognize them as eligible to make catch-up contributions.[22] In reality, such individuals would be eligible for catch-up.

As one would expect, because highly compensated employees are more likely to be at contribution limits, higher replacement rates are primarily observed among the fourth income quartile when catch-up contributions are modeled. As shown in Table 3-1, this boosts the projected replacement rate of the median individual in the fourth income quartile by 3.1 percentage points. The impact on the median individual in the other income quartiles is indistinguishable from zero.[23]

Impact of Saving in IRAs When 401(k) Plan Not Available. The baseline case assumes that workers always have a 401(k) plan, but replacement rates fall significantly if this assumption is relaxed. For example, as seen in Figure 3-4, the baseline replacement rate from 401(k) accumulations for the median lowest income quartile worker is about 51 percent of projected preretirement income, which falls to 25 percent if 401(k) coverage is not continuous and no other plan is allowed to take its place. Table 3-1 shows that the reduction in replacement rates rises with income, reaching 37 percentage points among the highest income quartile.

Next we examine the impact of modeling saving through IRAs, if employees find that their employers do not offer a 401(k) plan. Because workers are assumed to use the IRA only when a 401(k) plan is unavailable, the model uses the 401(k) contribution decision variables to determine whether a contribution will be made to an IRA when the individual does not have access to a 401(k) plan. We assume that each individual tries to contribute to the IRA what would have been contributed to the 401(k) plan by the employee and

TABLE 3-1 Change in Median Replacement Rates from 401(k) Accumulations*

	Income Quartile			
	1	*2*	*3*	*4*
Assuming always have contributions to 401(k) plan account	9.1	8.9	6.5	4.6
Assuming all 50+'s contributing at the 402(g) limit take advantage of catch-up	(***)	(***)	(***)	3.1
Assuming loans are never taken from 401(k) plan account	0.4	0.3	0.4	0.3
Assuming preretirement withdrawals are never taken from 401(k) plan account	6.7	6.0	6.0	3.8
Assuming do not always have 401(k) plan coverage	−25.7	−29.1	−32.6	−37.1
Assuming contribute to IRAs when don't have 401(k) coverage	−0.1	−3.7	−11.9	−23.6
Assuming catch-up in IRA and 401(k) plans	−0.1	−2.6	−10.3	−21.5
Assuming never cash out balance at job change	13.3	9.1	6.8	4.7
Assuming preretirement withdrawals are never taken from IRA balances	11.1	12.8	14.8	18.4
Memo: Median replacement rates for typical 401(k) participant**	50.7	54.0	59.5	67.2

Source: Authors' computations using the EBRI/ICI 401(k) Accumulation Projection Model.

Notes: Relative to baseline model assumptions for participants reaching age 65 between 2030 and 2039, by income quartile at age 65 (percentage points)

* Change in median replacement rate for 401(k) accumulations relative to final five-year average salary. This is the first-order difference and does not take into account changes in participant behavior that might occur as result of changing the activity in question.

** The ratio of the income generated in the first year of retirement from 401(k) accumulations to final five-year average salary (in percent) for the baseline model.

(***) Indistinguishable from zero.

employer combined, taking into account the lower IRA contribution limits, which are shown in Figure 3-5. Thus, individuals will be constrained to contribute the minimum of what would have been contributed in a given year in a 401(k) and what they are allowed to contribute to an IRA.

Interestingly, contributing to an IRA if an employer plan is not available almost moves workers in the lowest income quartile back to baseline results. This is because the 401(k) plan contribution amounts among lower income quartiles are closer to the IRA limits, and thus these individuals are better able to replicate their 401(k) contribution activity in an IRA, as seen in Figure 3-4. For those in the higher income quartiles, lower

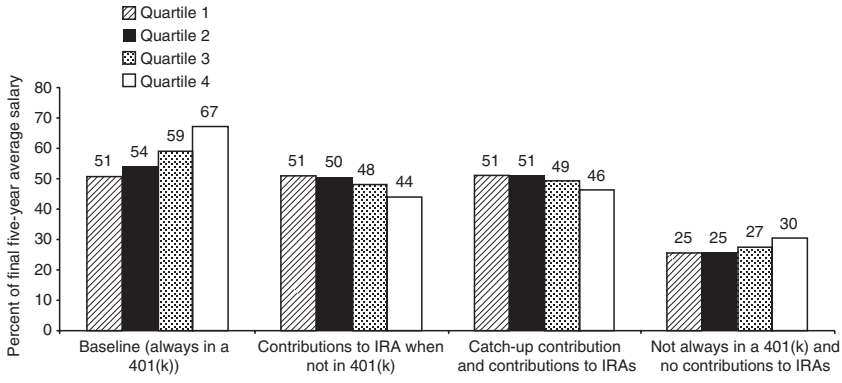

Figure 3-4. Median replacement rates from 401(k) accumulations* for participants turning 65 between 2030 and 2039, by income quartile at age 65.
*The 401(k) accumulation includes 401(k) balances at employer(s) and rollover IRA balances
Source: EBRI/ICI 401(k) Accumulation Projection Model.

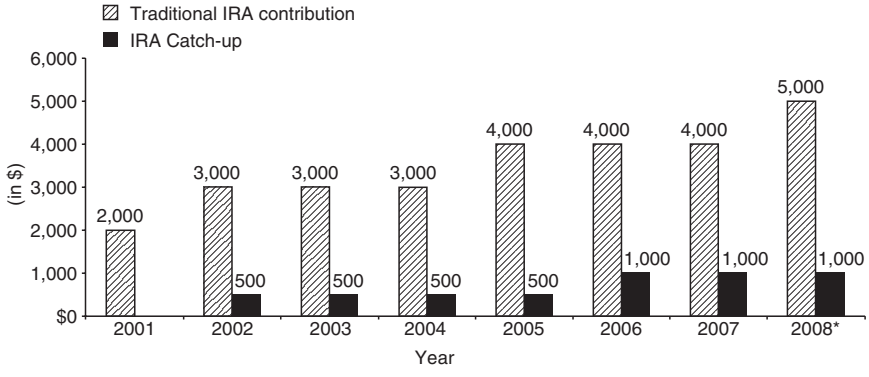

Figure 3-5. Internal Revenue Code traditional IRA contribution limits, 2001–2008.
* After 2008, traditional IRA contributions are indexed for inflation in $500 increments. IRA catch-up contributions are not indexed for inflation.
Source: Authors' Summary of US Internal Revenue Code.

IRA limits prevent them from replicating their 401(k) contributions; for example, the median replacement rate for the highest earning group improves by about 14 percentage points, to 44 percent of preretirement income, but it does not attain the baseline result. Allowing catch-up contributions in addition to the availability of IRAs moves the projected replacement rate among higher income participants up a bit.

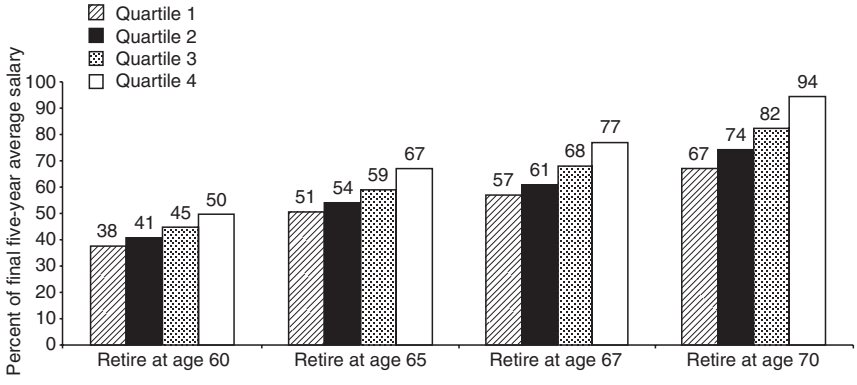

Figure 3-6. Median replacement rates from 401(k) accumulations* for participants born between 1965 and 1974 at the retirement age indicated, by income quartile at retirement age indicated.
*The 401(k) accumulation includes 401(k) balances at employer(s) and rollover IRA balances.
Source: EBRI/ICI 401(k) Accumulation Projection Model.

Impact of Changing Retirement Date. Participants in 401(k) plans have flexibility in selecting a retirement age;[24] furthermore, when employer contributions are provided, working longer is often a financially attractive proposition. Accordingly, we vary the retirement age from the baseline model, which assumes retirement occurs for everyone at age 65. By varying retirement across ages 60, 67, and 70, we find that the compounding of investment returns at the end of an individual's career produces important differences in replacement rates.

For instance, Figure 3-6 shows that working two extra years from age 65 to age 67 increases the projected replacement rate in the first year of retirement of the lowest income quartile by about 6 percentage points, from 51 percent of preretirement income to 57 percent. The projected replacement rate of the highest income quartile rises by about 10 percentage points. Working until age 70 increases replacement rates even more dramatically. On the other hand, retiring five years earlier reduces projected replacement rates.

Conclusions

Current retirees' 401(k) accumulations are not representative of what a full career with exposure to 401(k) plans might generate for retirees. Thus, the EBRI/ICI 401(k) Accumulation Projection Model simulated several projected retirement scenarios for a group of 401(k) plan participants born between 1965 and 1974 after essentially a full career's exposure to 401(k) plans. The simulations suggest that catch-up contributions, which are

available to participants who are age 50 or older and already contributing at the limit, primarily help higher income participants increase their replacement rates, while use of IRAs during lapses in 401(k) coverage is more successful at making lower income participants whole. Postponing retirement tends to increase replacement rates.

Endnotes

1. At year-end 2004, IRAs held $3.5 trillion in assets, with some of those monies coming from employer-sponsored retirement plans including 401(k) plans (as rollovers). See Investment Company Institute (ICI 2005). Estimate of number of 401(k) plan participants from Cerulli Associates (2004).
2. The EBRI/ICI 401(k) Accumulation Projection Model was developed as part of an ongoing collaborative effort between the Employee Benefit Research Institute (EBRI) and the Investment Company Institute (ICI). In this ongoing research effort, known as the EBRI/ICI Participant-Directed Retirement Plan Data Collection Project, EBRI and ICI have gathered data from some of their members that serve as plan recordkeepers. The data include demographic information, annual contributions, participant account balances, asset allocations, and loan balances. The year-end 2003 EBRI/ICI database contained information on 15 million 401(k) plan participants, in 45,152 plans, holding $776 billion in assets (Holden and VanDerhei 2004).
3. Here we do not address the issue of retirement income adequacy. For a recent summary of changes in consumption and income in retirement, see Hurd and Rohwedder (2005). There is an extensive research literature that analyzes whether DC plans will be able to provide workers with significant retirement income. Many of these research papers find favorably for 401(k) plans in many instances. For example, Poterba (2004) finds that although retirement wealth in 401(k) accounts is reduced by the deferred tax liabilities, a 401(k) with an employer match consistently has a higher rate of return than any other type of account considered. Samwick and Skinner (2004) conclude that 401(k) plans are as good or better than DB plans in providing for retirement. Chernozhukov and Hansen (2004) find that 401(k) plan participation has a positive effect on wealth. Other research recognizes the potential of the DC plan structure, but points to human foibles and mistakes that prevent workers from reaching the most beneficial outcome. For example, Munnell and Sundén (2004) emphasize the practical changes in workers' participation, contribution, asset allocation, loan, and withdrawal decisions that must be made to ensure the potential of 401(k) plans is realized. While Hurst (2003) concludes that households who entered retirement with lower-than-predicted wealth generally engaged in near-sighted consumption during their working lives. Scholz et al. (2004) conclude that fewer than 20 percent of households have less retirement wealth accumulated than their optimal targets. Other related research includes: VanDerhei and Copeland (2004); Butrica and Uccello (2004); Engen et al. (1999, 2004*a*, 2004*b*); US Social Security Administrations Modeling Income in the Near Term (MINT) projections (Butrica et al. (2003/2004) and Toder et al. (2002)); Shackleton (2003); Fore (2003); Poterba et al. (2003); Poterba et al. (2001);

Scholz (2001); Uccello (2001); Steuerle et al. (2000); Montalto (2000); Moore and Mitchell (2000); Yuh et al. (1998); and Smith (1997).

4. See US Department of Labor, Employee Benefits Security Administration (2004).
5. See Board of Governors of the Federal Reserve System (2005).
6. See Investment Company Institute (2005).
7. For a history of IRAs, see Holden et al. (2005).
8. For a summary of recent retirement saving research, see Holden and VanDerhei (2004).
9. For a complete description of the model, see Holden and VanDerhei (2002 and Appendix).
10. See Holden and VanDerhei (2002 and Appendix) for references on the EBRI/ICI 401(k) Accumulation Projection Model.
11. The 401(k) distributions are not indexed to inflation over retirement, while social security payments are. In addition, if the individual elects a set of installment payments rather than an annuity, the amount that may be reasonably withdrawn each year after the first year may vary as future market fluctuations affect the account going forward.
12. In the projection model, the future equity returns are assumed to be similar to historical returns experienced by the S&P 500 between 1926 and 2001 (see 'large company stocks total returns' in Ibbotson 2002). Between 1926 and 2001, about two-thirds of the time, equity returns in any given year have fluctuated between −7 and 33 percent. The total return used for bonds, GICs, money market funds, and other investments in the projection was based on 'long-term government bonds total returns' from the beginning of 1926 to the end of 2001 (Ibbotson 2002). Historically, about two-thirds of the time, these returns in any given year have fluctuated between −1 and 14 percent.
13. Holden and VanDerhei (2002) also consider projections for many different investment return scenarios including: the worst 50-year return period for US equities (1929–1978); a bear market (three consecutive years of −9.3 percent annual returns on equities) at the beginning, middle, or end of individuals' careers; and a bull market (three consecutive years of +31.2 percent annual returns on equities) at the beginning, middle, or end of individuals' careers.
14. Among participants reaching age 65 between 2030 and 2039, the real (in 2000 dollars) cut-off points for the income quartiles are: first quartile—$36,700; second quartile—$56,400; and third quartile—$87,200. Thus, individuals in the highest income quartile at age 65 have a real income of $87,200 or more.
15. Technically, this is called the primary insurance amount (PIA). The PIA was calculated for the individual participant's earnings history and did not consider the possibility of a spousal benefit, which can be substantially larger than an individual's own benefit in some cases. The PIA calculated for each individual is the sum of three separate percentages of portions of their average indexed monthly earnings (AIME). The portions depend on the year in which the worker reaches retirement. For example, for 2005 the PIA was 90 percent of the first $627 of their AIME plus 32 percent of their AIME over $627 and through $3,779 plus 15 percent of their AIME over $3,779 (see the Social Security Administration's website for benefit formulas).

16. Pence (2002) finds that 401(k) plan participants have greater interest in saving compared with other workers, and Ippolito (1997) argues that firms that offer DC plans attract workers who are savers.
17. The life-cycle pattern of saving suggests that older individuals are able to save at higher rates because they no longer face the expenses of raising children or buying a home. 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 (2001). For a more detailed discussion, see Engen et al. (1999). In addition, Mitchell and Utkus (2004) discuss life-cycle savings and behavioral finance models in the context of retirement plan design considerations.
18. See Mitchell et al. (this volume) and Holden and VanDerhei (2001) for discussions of nondiscrimination and other contribution limits.
19. The model assumes that all 401(k) plans allow catch-up contributions. Profit Sharing/401(k) Council of America (PSCA 2004) reports that nearly all member plans allowed catch-up contributions in 2003. Utkus and Mottola (2005) report that 86 percent of 401(k) plans in Vanguard's recordkeeping system offered catch-up contributions in 2004.
20. On the other hand, Utkus and Mottola (2005) report an estimated average 401(k) catch-up contribution of $2,207 in 2004 (out of $3,000 possible), derived from total employee 401(k) contributions.
21. While assuming full catch-up contributions may overstate the impact, limiting the catch-up contributions to participants already contributing at the 402(g) limit reduces the modeled impact. This is because many 401(k) plan participants wanting to contribute at the 402(g) limit are prevented from doing so. For example, in 1999, only 11 percent of participants making contributions were at the 402(g) limit, but, among those not contributing at the limit, 52 percent could not have done so because of formal plan-imposed limits; see Holden and VanDerhei (2001).
22. PSCA (2004) reports that 8.6 percent of their member plans limit the contributions of highly compensated participants by plan design; 9.3 percent of plans limited contributions of highly compensated employees when contributions reached the maximum allowed by the nondiscrimination tests; and another 18.8 percent of plans returned excess contributions to participants after the plan year ended.
23. Utkus and Mottola (2005) also find that participants with higher income are more likely to take advantage of catch-up contributions, although they identify catch-up contribution activity across participants who are 50 or older in all income groups.
24. Munnell et al. (2003) and Friedberg and Webb (2003) explore how the shift in pension coverage toward DC plans may be a factor that affects the timing of retirement. Chan and Stevens (2003) examine the influence of financial factors on the timing of retirement.

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