



Mortality and Longevity



Aging and Retirement

# Fully Funded Pensions for Centenarians





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# Fully Funded Pensions for Centenarians

## Executive Summary

At retirement, workers want to have enough income to support themselves throughout their retirement years. In that regard, financial planners often suggest that retiring workers should aim to replace 70 to 80% of their annual preretirement earnings. Social Security benefits typically replace around 35% of the typical worker's preretirement earnings. That leaves another 35 to 45% of preretirement earnings that needs to be financed through pensions and other savings, but most retirees have little in the way of other savings. Accordingly, this Paper focuses quite simply on how pensions alone could and should be designed to replace, say, 40% of the typical worker's preretirement earnings throughout their retirement years. In particular, this Paper is concerned with how to fully fund private pensions for centenarians (i.e., retirees who live to be 100 or more).

After some introductory remarks, Section II provides an overview of Social Security, pensions, annuities, and other lifetime income mechanisms, and Section III focuses on funding issues for Social Security and pensions. Section IV then explains pension benefit accrual and pension funding. First, Section IVA develops a model traditional defined benefit plan that would provide a typical retiree with a pension that would replace 40% of her preretirement earnings, and Section IVA also shows how to fully fund that model plan. Second, Section IVB then develops a model defined contribution plan that would replace 40% of a typical retiree's preretirement earnings and shows how to fully fund that model plan. Section V then brings some real world considerations into the analysis, and Section VI discusses some options for reform. In particular, Section VI considers various options for redesigning—and fully funding—real-world defined contribution and defined benefit plans. Finally, Section VII offers some concluding remarks.

## Section I: Introduction

At retirement, workers want to have enough income to support themselves throughout their retirement years. In that regard, financial planners often suggest that retiring workers should aim to replace 70 to 80% of their annual preretirement earnings.<sup>1</sup> Social Security benefits typically replace around 35% of the typical worker’s preretirement earnings.<sup>2</sup> That leaves another 35 to 45% of preretirement earnings that needs to be financed through pensions and other savings. Other than home equity, most retirees have little in the way of other savings,<sup>3</sup> and most retirees are reluctant to sell (or reverse mortgage) their homes to come up with extra retirement income—until they have to.<sup>4</sup> Accordingly, this Paper focuses quite simply on how pensions alone could and should be designed to replace, say, 40% of the typical worker’s preretirement earnings throughout their retirement years.<sup>5</sup> In particular, this Paper is concerned with how to fully fund private pensions for centenarians (i.e., retirees who live to be 100 or more).

Pension plans generally fall into two broad categories based on the nature of the benefits provided: defined benefit plans and defined contribution plans. In a defined benefit plan, an employer promises workers a specific benefit at retirement.<sup>6</sup> The default benefit for defined benefit plans is a retirement income stream in the form of an annuity for life (e.g., a monthly pension).<sup>7</sup> For example, many traditional defined benefit plans provided workers with an annual retirement benefit (B) equal to 2% times years of service (yos) times final average pay (fap) ( $B = 2\% \times \text{yos} \times \text{fap}$ ).<sup>8</sup>

To be sure, such generous traditional pension plans are less common today.<sup>9</sup> Among other things, increased longevity has made such traditional pensions more expensive. These days, a 65-year-old man can expect to live, on

<sup>1</sup> See, e.g., Robert C. Lawton, *This Is How Much Money You Need To Retire* (Aug. 26, 2018), <https://www.forbes.com/sites/robertlawton/2018/08/26/this-is-how-much-money-you-need-to-retire/#7299d62947cf> (cross-referencing a number of retirement savings targets); and see *infra* Section IIIA..

<sup>2</sup> National Academy of Social Insurance, *Social Security Benefits, Finances, and Policy Options: A Primer* 6 (Aug. 2019), [https://www.nasi.org/sites/default/files/research/2019\\_Social\\_Security\\_Primer.pdf](https://www.nasi.org/sites/default/files/research/2019_Social_Security_Primer.pdf) (showing that the current Social Security system replaces 40% of the preretirement earnings of a worker with “medium” earnings). See also Michael Clingman, Kyle Burkhalter & Chris Chaplain, *Replacement Rates for Hypothetical Retired Workers* (Social Security Administration, Office of the Chief Actuary, Actuarial Note No. 2019.9, Apr. 2019), <https://www.ssa.gov/oact/NOTES/ran9/an2019-9.pdf> (showing how replacement rates vary with preretirement earnings); Congressional Budget Office, *CBO’s 2019 Long-Term Projections for Social Security: Additional Information* tbl.B-8 (Sept. 12, 2019), <https://www.cbo.gov/system/files/2019-09/55590-CBO-longterm-projections-social-security.xlsx> (showing how replacement rates vary with preretirement earnings); Peter Brady, Kimberly Burnham & Sarah Holden, *The Success of the U.S. Retirement System* 17–20 (Investment Company Institute, 2012), available at <https://www.ici.org/research/retirement/retirement> (showing how replacement rates vary with preretirement earnings).

<sup>3</sup> See, e.g., Joint Committee on Taxation, *Background Data Relating to Retirement Income* 15–16 (JCX-4-19, Feb. 4, 2019), [https://www.jct.gov/publications.html?func=download&id=5160&chk=5160&no\\_html=1](https://www.jct.gov/publications.html?func=download&id=5160&chk=5160&no_html=1) (showing how few elderly Americans have interest or dividend income); U.S. Government Accountability Office, *The Nation’s Retirement System: A Comprehensive Re-evaluation Is Needed to Better Promote Future Retirement Security* 22 fig.2-1 (GAO-18-111SP, Oct. 2017), <https://www.gao.gov/assets/690/687797.pdf> (showing that only 9% of the income of the elderly in 2015 came from home equity and non-retirement savings and investments).

<sup>4</sup> See, e.g., Karan Kaul & Laurie Goodman, *Seniors’ Access to Home Equity Identifying Existing Mechanisms and Impediments to Broader Adoption* (Urban Institute, Housing Finance Policy Center, Research Report, Feb. 2017), [https://www.urban.org/sites/default/files/publication/88556/seniors\\_access\\_to\\_home\\_equity.pdf](https://www.urban.org/sites/default/files/publication/88556/seniors_access_to_home_equity.pdf).

<sup>5</sup> The term “pensions” is used here in its broadest sense to encompass both traditional monthly pensions and also newer types of pension plans such as 401(k) plans and even individual retirement accounts (IRAs). See, e.g., 26 United States Code (U.S.C.) §§ 401(k), 219, respectively (a/k/a, the Internal Revenue Code, hereinafter I.R.C.). While this Paper has selected a 40% target replacement rate for pensions, the methodology used here means that proportionally larger or smaller replacement rates would result from larger or smaller pension contributions.

<sup>6</sup> See, e.g., Staff of the Joint Committee on Taxation, *Present Law and Background Relating to Challenges in the Retirement System* 9–10 (JCX-20-19, May 10, 2019), [https://www.jct.gov/publications.html?func=download&id=5186&chk=5186&no\\_html=1](https://www.jct.gov/publications.html?func=download&id=5186&chk=5186&no_html=1).

<sup>7</sup> In the United States, defined benefit plans are generally designed to provide annuities, i.e., “definitely determinable benefits . . . over a period of years, usually for life after retirement.” 26 Code of Federal Regulations (C.F.R.) § 1.401-1(b)(1).

<sup>8</sup> For example, 2% is a common annual benefit accrual rate in many traditional State and local pension plans. See, e.g., U.S. Department of Labor, Bureau of Labor Statistics, *National Compensation Survey: Retirement Plan Provisions in State and Local Government in the United States, 2016* tbl.12 (Bulletin No. 2786, Apr. 2017), <https://www.bls.gov/ncs/ebs/detailedprovisions/2016/ownership/govt/ebbl0060.pdf>; Natalie Kramer & Jesus Ranon-Hernandez, State and local government workers preparing for retirement: Do you understand your plan formula?, 7(6) BEYOND THE NUMBERS (U.S. Department of Labor, Bureau of Labor Statistics, May 2018), <https://www.bls.gov/opub/btn/volume-7/state-and-local-government-workers-preparing-for-retirement.htm>.

<sup>9</sup> See, e.g., Staff of the Joint Committee on Taxation, *Present Law And Background Relating to Tax-Favored Retirement Saving And Certain Related Legislative Proposals* 56, 57 fig.2 (JCX-3-16, Jan. 26, 2016), [https://www.jct.gov/publications.html?func=download&id=4865&chk=4865&no\\_html=1](https://www.jct.gov/publications.html?func=download&id=4865&chk=4865&no_html=1).



average, until age 84, and a 65-year-old woman can expect to live, on average until age 86.5.<sup>10</sup> The joint life expectancy of a 65-year-old couple is even more remarkable. For example, there is a 50% chance that at least one 65-year-old spouse in a nonsmoking heterosexual couple in average health will live 27 years to age 92, a 25% chance that at least one will live 31 years to age 96, and a 10% chance that at least one will live 35 years to age 100.<sup>11</sup> In short, many individuals and couples will need to plan for the possibility of retirements that can last for 30 years or more. Nevertheless, the traditional defined benefit plan approach is still a very useful way to think about providing workers with adequate incomes throughout their retirement years. Accordingly, this Paper initially develops a simplified model defined benefit plan. More specifically, this Paper’s model defined benefit plan would provide retired workers with a pension benefit equal to 1% times years of service times final pay (fp).<sup>12</sup> Under that plan, a typical worker with 40 years of service—say from age 25 through age 64—would end up with a pension starting at age 65 equal to 40% of her preretirement earnings. For example, if a worker has final pay of \$100,000, she would be entitled to a pension of \$40,000 a year for life ( $\$40,000 = 1\% \times 40 \text{ yrs} \times \$100,000 \text{ fp}$ ).

Alternatively, in a typical defined contribution plan, the employer simply withholds a specified percentage of the worker’s compensation, which it contributes to an individual investment account for that worker.<sup>13</sup> For example, contributions might be set at 5% of annual compensation. Under such a plan, a worker who earned \$50,000 in a given year would have \$2,500 contributed to an individual investment account for her ( $\$2,500 = 5\% \times \$50,000$ ). Her benefit at retirement would be based on all such contributions to her individual account plus investment earnings. Unlike defined benefit plans, defined contribution plans usually make distributions as lump sum or periodic distributions rather than as lifetime annuities.<sup>14</sup> Of course, a retiree can use the balance in her defined contribution plan to buy an annuity. For example, consider a worker who retires after 40 years of service with a final salary of \$100,000. To replace 40% of her preretirement earnings, by age 65 she would need to accumulate enough in her defined contribution plan to be able to buy an annuity that would pay her \$40,000 a year for life.

In short, both defined benefit plans and defined contribution plans could be designed to replace 40% of a worker’s preretirement earnings. In the real world, however, relatively few retirees will actually collect pension benefits that equal or exceed 40% of their preretirement earnings. At the outset, many workers are not even covered by pension plans of any kind. For example, in March of 2019, just 71% of private-sector workers had access to an employer-sponsored pension plan, and just 56% participated.<sup>15</sup> However, even if a worker is covered by a pension of some kind, that worker may not end up with pension income that will replace 40% of her preretirement earnings: many pension plans are just not funded that well.

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<sup>10</sup> Social Security Administration, *Retirement & Survivors Benefits Planner/Life Expectancy Calculator*, <https://www.ssa.gov/planners/lifeexpectancy.html> (last visited February 3, 2020). See also Board of Trustees of the Federal Old-Age and Survivors Insurance and Federal Disability Insurance Trust Funds, *The 2019 Annual Report of the Board of Trustees of the Federal Old-Age and Survivors Insurance and Federal Disability Insurance Trust Funds* 94 tbl.IV.A4 (2019), <https://www.ssa.gov/OACT/TR/2019/tr2019.pdf> (hereinafter *2019 Social Security Trustees Report*) (showing period life expectancies for men and women at birth and at age 65 from 1940 through 2095).

<sup>11</sup> Calculations are from the Society of Actuaries, *Actuaries Longevity Illustrator* (2020), <http://www.longevityillustrator.org/> (last visited Feb. 6, 2020) (The author filled out the form as follows: Person 1 [Name: Man; Date of Birth: 12/17/1954; Age for Illustration to Start: 65; Gender: Male; Do you smoke?: No; General Health: Average]; Person 2 [Name: Woman; Date of Birth: 12/79/1954; Gender: Female; Do you smoke?: No; General Health: Average]; click on View Results).

<sup>12</sup> As more fully explained in Section IVA1 below, final pay is a simpler variable to model than final average pay.

<sup>13</sup> See, e.g., Staff of the Joint Committee on Taxation, *Present Law and Background Relating to Challenges in the Retirement System*, *supra* note 6, at 9.

<sup>14</sup> See, e.g., Willis Towers Watson, *International Pension Plan Survey: Report 2016*, at 14 (2016), available at <https://www.willistowerswatson.com/en/insights/2016/02/international-pension-plan-survey-report-2016> (indicating that lump sums distributions are “by far the most prevalent” form of distribution for defined contribution plans).

<sup>15</sup> U.S. Department of Labor, Bureau of Labor Statistics, *National Compensation Survey: Employee Benefits in the United States—March 2019* tbl.2 (Bulletin No. 2791, Sept. 2019), <https://www.bls.gov/ncs/ebs/benefits/2019/employee-benefits-in-the-united-states-march-2019.pdf>.

For workers with defined contribution plans, the problem is often that contribution levels are just set too low. For example, if only 3% a year is contributed to a worker’s defined contribution plan, that worker is very unlikely to accumulate enough money to buy a lifetime annuity that would replace 40% of her preretirement earnings.<sup>16</sup>

For workers with defined benefit plans, the problem is more often that employer contributions are simply inadequate to fund benefits that will replace 40% of preretirement earnings.<sup>17</sup> As more fully explained in Section III C2, many public- and private-sector defined benefit plans are underfunded.

All in all, providing adequate pensions is largely a problem of inadequate funding. Defined benefit plans or defined contribution plans could provide meaningful lifetime incomes for retirees, but contributions must be made at a high enough level to achieve that result. The purpose of this Paper is to show how to provide workers with fully funded pensions that will replace 40% of their preretirement earnings.

At the outset, Section II provides an overview of Social Security, pensions, annuities, and other lifetime income mechanisms, and Section III focuses on funding issues for Social Security and pensions. Section IV then explains pension benefit accrual and pension funding. First, Section IVA develops a model traditional defined benefit plan that would provide a typical retiree with a pension that would replace 40% of her preretirement earnings, and Section IVA also shows how to fully fund that model plan. Second, Section IVB then develops a model defined contribution plan that would replace 40% of a typical retiree’s preretirement earnings and shows how to fully fund that model plan. Section V then brings some real-world considerations into the analysis, and Section VI discusses some options for reform. In particular, Section VI considers various options for redesigning—and fully funding—real-world defined contribution and defined benefit plans. Finally, Section VII offers some concluding remarks.

## Section II: An Overview of Social Security, Pensions, and Other Lifetime Income Mechanisms

Retirees can generally count on Social Security benefits to cover at least a portion of their retirement income needs. In addition, retirees use pensions, annuities, and a variety of other mechanisms to generate income in their retirement years. These are discussed in turn.

### A. SOCIAL SECURITY

#### 1. An Overview Of The Social Security System

Social Security provides monthly cash benefits to retirees and their families.<sup>18</sup> A worker builds Social Security protection by working in employment that is covered by Social Security and paying the applicable payroll taxes. At retirement, disability, or death, monthly benefits are paid to insured workers and to their eligible dependents and survivors. While *full retirement age* was once age 65, it is currently age 66, and it is gradually increasing to age 67 for workers born after 1959 (who reach age 67 in or after 2027).<sup>19</sup> In January of 2019, Social Security paid retirement

<sup>16</sup> The size of a worker’s pension will also depend on how many years she works, on how many of those years she has coverage and participates in a pension, on how early or late she retires, and on many other factors.

<sup>17</sup> Also, employees that change jobs during their careers will accrue less benefits than those who stay with a single employer. Moreover, if employees change jobs too quickly, they may not even vest in the benefits that they accrue. See *infra* Section VC.

<sup>18</sup> See, e.g., HOUSE WAYS AND MEANS COMMITTEE, GREEN BOOK: BACKGROUND MATERIAL AND DATA ON PROGRAMS WITHIN THE JURISDICTION OF THE COMMITTEE ON WAYS AND MEANS Chapter 1: Social Security (2018), <https://greenbook-waysandmeans.house.gov/2018-green-book> (last visited Feb. 3, 2020).

<sup>19</sup> Social Security Administration, *Retirement Planner: Full Retirement Age*, <http://www.socialsecurity.gov/retire2/retirechart.htm> (last visited Feb. 3, 2020).

benefits to almost 43.9 million retired workers, and the average monthly benefit paid to a retired worker was \$1,417.03.<sup>20</sup>

Social Security retirement benefits are financed primarily through payroll taxes imposed on individuals working in employment or self-employment that is covered by the Social Security system.<sup>21</sup> Workers over the age of 62 generally are entitled to Social Security retirement benefits if they have worked in covered employment for at least 10 years.<sup>22</sup> Benefits are based on a measure of the worker's earnings history in covered employment.<sup>23</sup> The benefit formula is highly progressive,<sup>24</sup> and, as a result, Social Security benefits tend to favor workers with low lifetime earnings relative to workers with higher lifetime earnings.<sup>25</sup> These redistributive Social Security retirement benefits play an important role in reducing poverty among the elderly.<sup>26</sup>

Benefits may be increased or decreased for several reasons. Most importantly, benefits are indexed each year for inflation as measured by the consumer price index.<sup>27</sup> Also, the retirement earnings test can reduce the monthly benefits of individuals who have not yet reached full retirement age but who continue to work after starting to draw Social Security retirement benefits.<sup>28</sup>

In addition, workers who retire before their full retirement age have their benefits actuarially reduced.<sup>29</sup> On the other hand, benefits payable to workers who choose to retire after their full retirement age are actuarially increased (but only up to age 70).<sup>30</sup> In effect, beneficiaries can buy additional annuity protection by delaying retirement.<sup>31</sup> For example, consider various workers who retired in January 2020 with maximum taxable earnings since age 22. A

<sup>20</sup> Social Security Administration, *Monthly Statistical Snapshot, January 2019* 2 tbl.2 (Feb. 2019), [https://www.ssa.gov/policy/docs/quickfacts/stat\\_snapshot/2019-01.pdf](https://www.ssa.gov/policy/docs/quickfacts/stat_snapshot/2019-01.pdf).

<sup>21</sup> For 2020, employees and employers each pay a Social Security payroll tax of 6.2% on up to \$137,700 of wages, for a combined Old-Age and Survivors and Disability Insurance (OASDI) rate of 12.4%. Social Security Administration, *2020 Social Security Changes*, <https://www.ssa.gov/news/press/factsheets/colafacts2020.pdf> (last visited Feb. 3, 2020). Self-employed workers pay an equivalent OASDI tax of 12.4% on up to \$137,700 of net earnings. Id.

<sup>22</sup> 42 U.S.C. §§ 402(a), 414(a)(2).

<sup>23</sup> Social Security Administration, *Social Security Benefit Amounts*, <http://www.ssa.gov/oact/cola/Benefits.html> (last visited Feb. 3, 2020).

<sup>24</sup> Benefits for retired workers are based on a measure of the worker's earnings history in covered employment known as the *average indexed monthly earnings* (AIME). Id. The starting point for determining the worker's AIME is to determine how much the worker earned each year through age 60. Once those *benefit computation years* and *covered earnings* for those years have been identified, the worker's earnings are indexed for wage inflation, using the year the worker turns 60 to index the earnings of prior years. The highest 35 years of earnings are then selected, and the other years are dropped out. The AIME is then computed as the average earnings for the remaining 35 years (420 months).

The AIME is then linked by a progressive formula to the monthly retirement benefit payable to the worker at full retirement age, a benefit known as the *primary insurance amount* (PIA). For a worker turning 62 in 2020, the PIA equals 90% of the first \$960 of the worker's AIME, plus 32% of the AIME over \$960 and through \$5,785 (if any), plus 15% of the AIME over \$5,785 (if any). Id.; Social Security Administration, *Primary Insurance Amount*, <http://www.ssa.gov/oact/cola/piaformula.html> (last visited Feb. 3, 2020).

<sup>25</sup> See, e.g., Michael Clingman, Kyle Burkhalter & Chris Chaplain, *Money's Worth Ratios Under the OASDI Program for Hypothetical Workers* (Social Security Administration, Office of the Chief Actuary, Actuarial Note No. 2018.7, Jan. 2019), <https://www.ssa.gov/oact/NOTES/ran7/an2018-7.pdf> (showing money's worth ratios for various hypothetical workers).

<sup>26</sup> See, e.g., Kathleen Romig, *Social Security Lifts More Americans Above Poverty Than Any Other Program* (Center on Budget and Policy Priorities, updated July 19, 2019), <https://www.cbpp.org/research/social-security/social-security-lifts-more-americans-above-poverty-than-any-other-program>; Bruce D. Meyer & Derek Wu, *The Poverty Reduction of Social Security and Means-Tested Transfers* (National Bureau of Economic Research, Working Paper 24567, May 2018), <https://www.nber.org/papers/w24567.pdf>; Liana Fox, *The Supplemental Poverty Measure: 2017* 10 fig.8 (U.S. Bureau of the Census, Report No. P60-265 (Sept. 2018), <https://www.census.gov/content/dam/Census/library/publications/2018/demo/p60-265.pdf>; National Academy of Social Insurance, *The Role of Benefits in Income and Poverty*, <https://www.nasi.org/learn/socialsecurity/benefits-role> (last visited Nov. 3, 2020).

<sup>27</sup> See, e.g., Social Security Administration, *2019 Social Security Changes*, *supra* note 21.

<sup>28</sup> 42 U.S.C. § 403(f).

<sup>29</sup> 42 U.S.C. § 402(q).

<sup>30</sup> 42 U.S.C. § 402(w).

<sup>31</sup> See, e.g., Melissa A. Z. Knoll & Anya Olsen, *Incentivizing Delayed Claiming of Social Security Retirement Benefits Before Reaching the Full Retirement Age*, 74(4) SOCIAL SECURITY BULLETIN 21 (2014), <https://www.ssa.gov/policy/docs/ssb/v74n4/v74n4p21.pdf>; Kenn Beam Tacchino, David A. Littell & Bruce D. Schobel, *A Decision Framework for Optimizing the Social Security Claiming Age*, 28(2) BENEFITS QUARTERLY 40 (Second Quarter 2012), <https://www.iscebs.org/Documents/PDF/bqpublic/bq212f.pdf>.



worker retiring at age 62 then would get a starting benefit of \$2,265 per month, while a worker retiring at 65 then would get \$2,857 per month, and a worker retiring at age 70 then would get \$3,790 per month.<sup>32</sup>

In addition to Social Security benefits, a means-tested Supplemental Security Income (SSI) program provides monthly cash benefits to certain low-income elderly, disabled, or blind Americans.<sup>33</sup> In 2020, the maximum federal benefit for a single individual is \$783 per month, and the maximum for a couple is \$1,175 per month.<sup>34</sup> In January of 2019, almost 2.3 million elderly Americans received SSI benefits from the federal government, and the average monthly benefit was \$458.54.<sup>35</sup>

## 2. The Adequacy Of Social Security Benefits

Social Security is the most common source of income for households aged 65 or older. For example, in 2015, 84% of households aged 65 or older received Social Security benefits.<sup>36</sup> Moreover, Social Security provided more than half of total income for 50% of aged beneficiary couples that year and 71% of total income for aged single beneficiaries.<sup>37</sup> In 2014, only 43.8% of households received retirement benefits from sources other than Social Security, and only 61.8% received income from other assets.<sup>38</sup>

All in all, Social Security provided 33% of the personal income of households aged 65 or older in 2015.<sup>39</sup> Earnings accounted for another 34% of their income, pensions 20%, and asset income 9%.<sup>40</sup> Of course, as people age, earnings decline, and their inflation-adjusted Social Security benefits become an even larger portion of their incomes.<sup>41</sup> Still, as currently structured, Social Security alone cannot ensure that Americans will have adequate incomes throughout their retirement years.

## B. PENSION PLANS AND INDIVIDUAL RETIREMENT ACCOUNTS

### 1. Pensions

The United States has a voluntary private pension system, and employers can decide whether and how to provide pension benefits for their employees.<sup>42</sup> However, when employers do provide pensions, those pensions are typically subject to regulation under the Employee Retirement Income Security Act of 1974 (ERISA).<sup>43</sup> ERISA protects the pension benefits of most private-sector workers through sweeping participation, coverage, vesting, benefit accrual,

<sup>32</sup> Social Security Administration, *Workers with Maximum-Taxable Earnings*, <http://www.ssa.gov/oact/COLA/examplemax.html> (last visited Feb. 3, 2020).

<sup>33</sup> See, e.g., HOUSE WAYS AND MEANS COMMITTEE, GREEN BOOK: BACKGROUND MATERIAL AND DATA ON PROGRAMS WITHIN THE JURISDICTION OF THE COMMITTEE ON WAYS AND MEANS, *supra* note 18, at Chapter 3: Supplemental Security Income.

<sup>34</sup> Social Security Administration, *SSI Federal Payment Amounts for 2020*, <http://www.ssa.gov/oact/cola/SSI.html> (last visited Feb. 3, 2020).

<sup>35</sup> Social Security Administration, *Monthly Statistical Snapshot, January 2019*, *supra* note 20, at 3 tbl.3.

<sup>36</sup> Social Security Administration, *Fast Facts & Figures About Social Security, 2017* 6 (Sept. 2017), [https://www.ssa.gov/policy/docs/chartbooks/fast\\_facts/2017/fast\\_facts17.pdf](https://www.ssa.gov/policy/docs/chartbooks/fast_facts/2017/fast_facts17.pdf). See also SOCIAL SECURITY ADMINISTRATION, POPULATION 55 AND OLDER, 2014 (Social Security Administration Publication No. 13-11871, Apr. 2016), [https://www.ssa.gov/policy/docs/statcomps/income\\_pop55/2014/incpop14.pdf](https://www.ssa.gov/policy/docs/statcomps/income_pop55/2014/incpop14.pdf); U.S. Department of Health & Human Services, *2017 Profile of Older Americans* 1, 10 (Apr. 2018), <https://www.acl.gov/sites/default/files/Aging%20and%20Disability%20in%20America/2017OlderAmericansProfile.pdf>.

<sup>37</sup> Social Security Administration, *Fast Facts & Figures About Social Security, 2017*, *supra* note 36, at 8.

<sup>38</sup> Social Security Administration, *Income of the Aged Chartbook, 2014* 8 (Apr. 2016), [https://www.ssa.gov/policy/docs/chartbooks/income\\_aged/2014/iac14.pdf](https://www.ssa.gov/policy/docs/chartbooks/income_aged/2014/iac14.pdf). See also Joint Committee on Taxation, *Background Data Relating to Retirement Income*, *supra* note 3, at 2–4 (showing income sources of the elderly).

<sup>39</sup> Social Security Administration, *Fast Facts & Figures About Social Security, 2017*, *supra* note 36, at 7.

<sup>40</sup> *Id.*

<sup>41</sup> See, e.g., Jonathan Barry Forman, *Supporting the Oldest Old: The Role of Social Insurance, Pensions, and Financial Products*, 21(2) ELDER LAW JOURNAL 375, 382–384 (2014), <http://publish.illinois.edu/elderlawjournal/files/2015/02/Forman.pdf> (another version is in the SOCIETY OF ACTUARIES, 2014 LIVING TO 100 MONOGRAPH, at <https://www.soa.org/globalassets/assets/files/resources/essays-monographs/2014-living-to-100/mono-li14-3b-forman.pdf>).

<sup>42</sup> See, e.g., Jonathan Barry Forman & George A. (Sandy) Mackenzie, *The Cost of “Choice” in a Voluntary Pension System*, 2013 NEW YORK UNIVERSITY REVIEW OF EMPLOYEE BENEFITS & EXECUTIVE COMPENSATION 6-1, 6-4–6-5.

<sup>43</sup> Public Law No. 93-406, 88 STATUTES AT LARGE 864. See generally Staff of the Joint Committee on Taxation, *Present Law And Background Relating To Tax-Favored Retirement Saving And Certain Related Legislative Proposals*, *supra* note 6.

funding, and reporting rules on plans.<sup>44</sup> ERISA also created the Pension Benefit Guaranty Corporation (PBGC) to administer a plan termination insurance program to insure the benefits of workers in private-sector single-employer and multiemployer pension plans.<sup>45</sup>

To encourage Americans to save for retirement in the voluntary pension system, the government relies on two major approaches.<sup>46</sup> First, most pension plans qualify for favorable tax treatment.<sup>47</sup> Basically, employer contributions to a pension are not taxable to the employee; the pension fund's earnings on those contributions are tax-exempt; and employees pay tax only when they receive distributions of their pension benefits.<sup>48</sup> Nevertheless, the employer is allowed a current deduction for its contributions (within limits).<sup>49</sup> Second, employers and workers are given great flexibility in designing their pension plans, in making contributions, and in making (or taking) distributions.<sup>50</sup>

### *Defined Benefit Plans*

In a defined benefit plan, an employer promises employees a specific benefit at retirement, and the default benefit takes the form of an annuity for life.<sup>51</sup> For married participants, defined benefit plans (and some defined contribution plans) are required to provide a Qualified Joint-and-Survivor Annuity (QJSA) as the normal benefit payment, unless the spouse consents to another form of distribution.<sup>52</sup>

### *Defined Contribution Plans*

Under a typical defined contribution plan, the employer simply withholds a specified percentage of the worker's compensation, which it contributes to an individual investment account for the worker.<sup>53</sup> Her benefit at retirement is based on all such contributions plus investment earnings.<sup>54</sup> Unlike defined benefit plans, defined contribution plans usually make distributions as lump sum or periodic distributions rather than as lifetime annuities.<sup>55</sup> Indeed, relatively few defined contribution plans even offer annuity options, and, in any event, relatively few participants elect those annuity options.<sup>56</sup>

Of particular importance, many defined contribution plans often include a feature that allows workers to choose between receiving cash currently or deferring taxation by placing the money in a retirement account according to Internal Revenue Code Section 401(k). Consequently, these plans are usually called 401(k) plans, and they are the most popular type of retirement plan in the United States.<sup>57</sup> The maximum annual amount of such elective deferrals that can be made by an individual in 2020 is \$19,500, although workers over the age of 50 can contribute another

<sup>44</sup> See, e.g., Forman & Mackenzie, *The Cost of "Choice" in a Voluntary Pension System*, *supra* note 42, at 6-16. A worker's retirement benefit is said to be vested when the worker has a nonforfeitable right to receive that benefit.

<sup>45</sup> ERISA §§ 4001 et seq., 29 U.S.C. §§ 1301 et seq. A multiemployer plan is a defined benefit pension plan created through agreements between employers and a union. See, e.g., Staff of the Joint Committee on Taxation, *Present Law and Background Relating To Multiemployer Defined Benefit Plans* 53-56 (JCX-30-18, Apr. 17, 2018), <https://www.jct.gov/publications.html?func=startdown&id=5089>.

<sup>46</sup> Forman & Mackenzie, *The Cost of "Choice" in a Voluntary Pension System*, *supra* note 42, at 6-17.

<sup>47</sup> *Id.*

<sup>48</sup> I.R.C. §§ 72, 402, 501(a).

<sup>49</sup> I.R.C. § 404.

<sup>50</sup> Forman & Mackenzie, *The Cost of "Choice" in a Voluntary Pension System*, *supra* note 42, at 6-18.

<sup>51</sup> See *supra* notes 6-8 and accompanying text.

<sup>52</sup> I.R.C. § 401(a)(11); ERISA § 205, 29 U.S.C. § 1055. A QJSA is an immediate annuity for the life of the pension plan participant and a survivor annuity for the life of the participant's spouse. I.R.C. § 417(b); ERISA § 205(d)(1), 29 U.S.C. § 1055(d)(1).

<sup>53</sup> See *supra* notes 13-14 and accompanying text.

<sup>54</sup> Defined contribution plans are also known as *individual account plans* because each worker has her own individual account, as opposed to defined benefit plans, where the plan's assets are pooled for the benefit of all of the employees. ERISA § 3(34), 29 U.S.C. § 1002(34).

<sup>55</sup> See, e.g., Willis Towers Watson, *International Pension Plan Survey: Report 2016*, *supra* note 14, at 14.

<sup>56</sup> In 2017, for example, just 12% of private industry workers in savings and thrift plans had annuities available to them. U.S. Department of Labor, Bureau of Labor Statistics, *National Compensation Survey: Retirement Plan Provisions in Private Industry in the United States* tbl.20 (Bulletin 2788, May 2018), <https://www.bls.gov/ncs/ebs/detailedprovisions/2017/ownership/private/health-retirement-private-benefits-2017.pdf>.

<sup>57</sup> See, e.g., U.S. Department of Labor, Bureau of Labor Statistics, *BLS examines popular 401(k) retirement plans*, 2(6) PROGRAM PERSPECTIVES 1 (Nov. 2010), [http://www.bls.gov/opub/perspectives/program\\_perspectives\\_vol2\\_issue6.pdf](http://www.bls.gov/opub/perspectives/program_perspectives_vol2_issue6.pdf).

\$6,500 (for a total of up to \$26,000).<sup>58</sup> Section 401(k) plans may be designed so that the employee automatically makes elective deferrals at a specified rate unless the employee elects otherwise (i.e., opts out).<sup>59</sup>

## 2. Individual Retirement Accounts

Favorable tax rules are also available for individual retirement accounts (IRAs).<sup>60</sup> In 2020, individuals without pension plans can contribute and deduct up to \$6,000 to an IRA, although individuals over age 50 can contribute and deduct another \$1,000 (for a total of up to \$7,000); and spouses can contribute and deduct similar amounts.<sup>61</sup> Like private pensions, IRA earnings are tax-exempt, and distributions are taxable.<sup>62</sup>

## 3. Pension Coverage And Participation

Pension coverage and participation rates are low. For example, in March of 2019, 71% of private-sector workers had access to ERISA retirement plans, and 56% of them participated.<sup>63</sup> The probability of pension coverage is greater for older workers, for whites, for highly educated workers, for full-time workers, for higher-income workers, and for workers at larger firms.<sup>64</sup> Participation in IRAs is even lower than participation in pensions. For example, while 36% of U.S. households had an IRA in mid-2019, only around 12% of households made contributions to their IRAs (in 2018).<sup>65</sup>

All in all, low participation rates in pension plans, in general, and low contributions rates to 401(k) plans, in particular, have led many analysts to wonder whether current and future generations of retirees will have adequate retirement incomes.<sup>66</sup> In that regard, just 52.1% of families had any retirement accounts in 2016, and of those families who did have accounts then, the median value was just \$60,000.<sup>67</sup> That year, just 49.8% of families age 65–74 had retirement accounts, and the median value of those accounts was \$126,000.<sup>68</sup> Also, just 5.0% of elderly individuals in the lowest income quintile in 2018 had pension or IRA income that year, compared to 62.4% of individuals in the highest income quintile.<sup>69</sup>

<sup>58</sup> I.R.C. § 402(g); Internal Revenue Service, *401(k) contribution limit increases to \$19,500 for 2020; catch-up limit rises to \$6,500* (IR-2019-179, Nov. 6, 2019), <https://www.irs.gov/newsroom/401k-contribution-limit-increases-to-19500-for-2020-catch-up-limit-rises-to-6500>.

There is also a limit on the total annual contributions and additions that can go into a defined contribution plan participant's individual account (e.g., \$57,000 in 2020). I.R.C. §§ 401(a)(17), 415; Notice 2019-59, 2019-47 Internal Revenue Bulletin (I.R.B.) 1091.

<sup>59</sup> See, e.g., Staff of the Joint Committee on Taxation, *Present Law And Background Relating to Challenges in the Retirement System*, *supra* note 6, at 25–26.

<sup>60</sup> I.R.C. § 219; Staff of the Joint Committee on Taxation, *Present Law And Background Relating to Challenges in the Retirement System*, *supra* note 6, at 37–40.

<sup>61</sup> Internal Revenue Service, *401(k) contribution limit increases to \$19,500 for 2020; catch-up limit rises to \$6,500*, *supra* note 58.

<sup>62</sup> I.R.C. § 408. Also, since 1998, individuals have been permitted to set up Roth IRAs. I.R.C. § 408A. Unlike regular IRAs, contributions to Roth IRAs are not deductible. Instead, withdrawals are tax-free. Staff of the Joint Committee on Taxation, *Present Law And Background Relating to Challenges in the Retirement System*, *supra* note 6, at 39–40.

<sup>63</sup> U.S. Department of Labor, Bureau of Labor Statistics, *National Compensation Survey: Employee Benefits in the United States—March 2019*, *supra* note 15, at tbl.2.

<sup>64</sup> See, e.g., Craig Copeland, *Employment-Based Retirement Plan Participation: Geographic Differences and Trends, 2013* 10 fig.2 (Employee Benefit Research Institute, Issue Brief No. 405, Oct. 2014), available at <https://www.ebri.org/content/employment-based-retirement-plan-participation-geographic-differences-and-trends-2013-5451>.

<sup>65</sup> Sarah Holden & Daniel Schrass, *The Role of IRAs in U.S. Households' Saving for Retirement, 2019*, 25(10) ICI RESEARCH PERSPECTIVE 1–2, 6 fig.3, 18 (Investment Company Institute, Dec. 2019), available at <https://www.ici.org/research/perspective>.

<sup>66</sup> See, e.g., U.S. Government Accountability Office, *Retirement Security: Low Defined Contribution Savings May Pose Challenges* 6 (GAO-16-408, 2016), <http://www.gao.gov/assets/680/676942.pdf> (finding that around 60% of all households had no defined contribution plan savings at all).

<sup>67</sup> Federal Reserve Board, *Survey of Consumer Finances 2016 Chartbook* 435–436 (Oct. 16, 2017), <https://www.federalreserve.gov/econres/files/BulletinCharts.pdf>.

<sup>68</sup> *Id.* at 441–442. Also, 59.3% of families age 55–64 had retirement accounts, and the median value of those accounts was \$120,000; and 40.8% of families age 75 and older had retirement accounts, and the median value of those accounts was \$120,000. *Id.* See also U.S. Government Accountability Office, *Retirement Security: Most Households Approaching Retirement Have Low Savings* 8, 10 (GAO-15-419, May 2015), <https://www.gao.gov/assets/680/670153.pdf> (29% of households age 55 and above had no retirement savings at all in 2013 and no defined benefit plan).

<sup>69</sup> Joint Committee on Taxation, *Background Data Relating to Retirement Income* *supra* note 3, at 2–3.

### C. ANNUITIES AND OTHER SOURCES OF LIFETIME INCOME

In addition to Social Security, pensions, and IRAs, individuals can also save money outside of the retirement system. In 2020, investment income is generally subject to federal income tax rates of up to 37%,<sup>70</sup> but capital gains and dividends are generally taxed at a preferential tax rate of 0, 15, or 20%, depending on the income tax rate that would be assessed on the same amount of ordinary income.<sup>71</sup> There are also various tax advantages associated with investments in homes,<sup>72</sup> State and local bonds,<sup>73</sup> annuities,<sup>74</sup> and life insurance.<sup>75</sup>

In particular, annuities are another common way to provide lifetime income. For example, in December of 2019, for \$100,000, a 65-year-old man could have purchased an immediate fixed (lifetime) annuity that paid around \$6,000 a year.<sup>76</sup> Because women tend to live longer than men, for \$100,000, a 65-year-old woman could have purchased an immediate, level-payment (lifetime) annuity then that paid around \$5,736 a year.<sup>77</sup>

Inflation-adjusted annuities offer an even better way to hedge against living too long. With inflation-adjusted annuities, annual payments would start out almost 40% lower than level-payment fixed annuities but over a long life would eventually end up higher. For example, if the hypothetical 65-year-old man in the last paragraph instead chose a lifetime annuity with a 3% annual escalator, the initial annual payment would be just \$4,272, but, eventually, the annual payments would exceed the \$6,000 per year under the level-payment fixed (lifetime) annuity.<sup>78</sup>

Alternatively, retirees can protect against longevity risk by purchasing deferred income annuities (a/k/a longevity insurance).<sup>79</sup> The typical approach is to buy a deferred income annuity at age 65 that starts making annual payments only if the annuitant lives past age 80 or 85. For example, in December of 2019 for \$100,000, a 65-year-old man could have purchased a deferred income annuity that would pay around \$18,793 a year when (and if) he turns 80.<sup>80</sup> Pertinent here, however, people rarely choose to buy annuities voluntarily.<sup>81</sup>

<sup>70</sup> I.R.C. § 1; Revenue Procedure 2019-44, 2019-47 I.R.B. 1093.

<sup>71</sup> I.R.C. § 1(h).

<sup>72</sup> For example, home mortgage interest is generally deductible, and gains from the sale of a personal residence are often excludable. I.R.C. §§ 163(a), 121, respectively.

<sup>73</sup> I.R.C. § 103 (interest exclusion).

<sup>74</sup> Under I.R.C. § 72, the individual can exclude a fraction of each annuity payment from income. That fraction (the *exclusion ratio*) is based on the amount of premiums or other after-tax contributions made by the individual. The exclusion ratio enables the individual to recover her own after-tax contributions tax free and to pay tax only on the remaining portion of benefits which represents income. The net effect is a deferral of taxation.

<sup>75</sup> I.R.C. § 101(a) (exclusion for insurance proceeds paid by reason of the death of the insured).

<sup>76</sup> *Immediate Annuities Update*, 35(1) ANNUITY SHOPPER BUYER'S GUIDE 17 tbl.5 (Jan. 2020), available at <https://www.immediateannuities.com/annuity-shopper/> (\$6,000 = \$500 × 12).

<sup>77</sup> *Id.* (\$5,736 = \$478 × 12). Unlike ERISA-covered pension plans, insurance companies can price the annuities that they offer to men and women differently. Jonathan Barry Forman, *Removing the Legal Impediments to Offering Lifetime Annuities in Pension Plans*, 23(1) CONNECTICUT INSURANCE LAW JOURNAL 31, 61 (Fall 2016).

<sup>78</sup> *Immediate Annuities Update*, *supra* note 76, at 17 tbl.5 (showing average monthly payments to 65-year-old men with a 3%-cost-of-living adjustment of \$356 per month in the first year of his retirement [\$4,272 in the first year = 12 × an average payment of \$356 per month]).

<sup>79</sup> See, e.g., Katherine G. Abraham & Benjamin H. Harris, *The Market for Longevity Annuities*, 3(4) JOURNAL OF RETIREMENT 12 (Spring 2016); Forman, *Removing the Legal Impediments to Offering Lifetime Annuities in Pension Plans*, *supra* note 77, at 62–64.

<sup>80</sup> Alternatively, he could have used that \$100,000 to buy a deferred income annuity that would pay him \$34,229 a year starting at age 85; *Immediate Annuities Update*, *supra* note 76, at 53 tbl.19.

<sup>81</sup> See, e.g., American Academy of Actuaries, *Risky Business: Living Longer Without Income for Life: Information for Current and Future Retirees* 1 (Oct. 2015), [http://actuary.org/files/Retiree\\_PreRetirees\\_IB\\_102215.pdf](http://actuary.org/files/Retiree_PreRetirees_IB_102215.pdf). The demand for annuities is significantly lower than expected, and this shortfall has come to be known as the *annuity puzzle*. See, e.g., Shlomo Benartzi, Alessandro Previtero & Richard H. Thaler, *Annuity Puzzles*, 25(4) JOURNAL OF ECONOMIC PERSPECTIVES 143, 154–157 (2011).

## Section III: Funding Issues for Social Security and Pensions

The goal of retirement policy is to ensure that workers will have adequate incomes throughout their retirement years. The first step is to determine a target level of retirement income. The second step is to design Social Security and pension systems that can produce that target level of retirement income, and the final step is to fund those systems. This Section starts this analysis by discussing retirement savings targets and then goes on to explain the funding problems of the current Social Security and pension systems.

### A. RETIREMENT SAVINGS TARGETS

The principal goal of pension policy is to ensure that workers have adequate incomes throughout their retirement years. Either implicitly or explicitly, most analysts adopt some kind of *target replacement rate*. For example, as this Paper does, a common approach is to suggest that pensions and Social Security together should replace 70 or 80% of preretirement earnings (i.e., a *replacement rate* of 70 or 80%).<sup>82</sup> The desired replacement rate is almost always assumed to be less than 100% because of the elimination of work-related expenses and because some preretirement earnings were devoted to saving for retirement.<sup>83</sup>

Once a retirement savings target is selected, some kind of accumulation strategy will be needed to reach that target. A common approach is to suggest that workers should save a fixed percent of salary each year for retirement—or a fixed dollar amount each year. For example, a worker might be advised to save 10% of her salary each year that she works.<sup>84</sup> Alternatively, she might be encouraged to save \$5,000 each year that she works.

### B. SOCIAL SECURITY IS FUNDED ON A PAY-AS-YOU-GO BASIS

The Social Security system is underfunded. The Social Security system operates largely on a pay-as-you-go basis (PAYG): Social Security benefits are primarily paid out of current-year Social Security payroll taxes, and the Social Security Trust Funds maintain only enough reserves to cover a few years of benefits. For example, in 2018, the Old-Age and Survivors Insurance Trust Fund received \$715.9 billion in payroll tax contributions, paid out \$844.9 billion in benefits, and had \$2.8 trillion on hand at the close of the year.<sup>85</sup> Similarly, in 2018, the Disability Insurance Trust Fund received \$169.2 billion in payroll tax contributions, paid out \$143.7 billion in benefits, and had \$97.1 billion on hand at the close of the year.<sup>86</sup> The combined trust fund reserves are expected to be depleted in 2035.<sup>87</sup>

All in all, as of January 1, 2019, the unfunded liability of the Social Security system over the agency's 75-year projection period was estimated to be \$13.9 trillion, which can also be expressed as 2.61% of taxable payroll or 0.9% of gross domestic product (GDP).<sup>88</sup> To wipe out that \$13.9 trillion shortfall, it would take: (1) an immediate and permanent payroll tax increase of 2.70 percentage points (to 15.10%); (2) an immediate and permanent 17% cut in

<sup>82</sup> U.S. Government Accountability Office, *The Nation's Retirement System: A Comprehensive Re-evaluation Is Needed to Better Promote Future Retirement Security*, *supra* note 3, at 6 (“retirees will need 70% or more of pre-retirement earnings to live comfortably”). The replacement rate (or replacement ratio) is the ratio of annual income in retirement to preretirement earnings. *See, e.g.*, Congressional Budget Office, *Measuring the Adequacy of Retirement Income: A Primer* 12 (Oct. 2017), <https://www.cbo.gov/system/files/115th-congress-2017-2018/reports/53191-retirementadequacy.pdf>; but see Bonnie-Jeanne MacDonald, Lars Osberg, & Kevin Moore. (2016). *How Accurately does 70% Final Earnings Replacement Measure Retirement Income (In)Adequacy? Introducing the Living Standards Replacement Rate (LSRR)*, 46(3) ASTIN BULLETIN 627 (2016) (arguing that 70% is too high).

<sup>83</sup> *See, e.g.*, Aon Consulting, *2008 Replacement Ratio Study* 24 (2008), <http://www.aon.com/about-aon/intellectual-capital/attachments/human-capital-consulting/RRStudy070308.pdf> (estimating that required replacement rate ranged from 77% for a person earning \$80,000 a year in 2008 to 94% for a person earning \$20,000 that year).

<sup>84</sup> *See, e.g.*, Fidelity, *4 rules of thumb for retirement savings* (Aug. 16, 2018), <https://www.fidelity.com/viewpoints/retirement/retirement-guidelines> (suggesting that workers save 15% of their salary every year).

<sup>85</sup> *2019 Social Security Trustees Report*, *supra* note 10, at 7 tbl.II.B1.

<sup>86</sup> *Id.*

<sup>87</sup> *Id.* at 3.

<sup>88</sup> *Id.* at 70–71, 200 tbl.VI.F1. Over the infinite horizon, the unfunded obligation is estimated to be \$34.3 trillion (4.1% of taxable payroll or 1.4% of GDP). *Id.* at 200 tbl.VI.F1.

benefits; or (3) some combination of these two approaches.<sup>89</sup> While some members of Congress have recently introduced bills to reduce or eliminate the long-term insolvency of the Social Security trust funds,<sup>90</sup> the prospects for enacting any significant legislation seem slim at this time.

### C. MANY PENSION PLANS ARE UNDERFUNDED

Generally speaking, a pension plan is said to be fully funded if the plan has sufficient assets to meet its emerging benefit obligations in a timely fashion, given reasonable assumptions about future contributions and investment income.<sup>91</sup> Measured against that standard, many public and private pension plans are underfunded. Moreover, even if a pension plan is technically fully funded, the plan may not be generous enough to replace 40% of each worker's preretirement earnings.

#### 1. Defined Contribution Plans (And IRAs)

The funding requirements for defined contribution plans are straightforward: the plan sponsor meets the ERISA requirements by contributing what it promised. For example, a plan sponsor that promises to contribute 3% of compensation will meet its funding obligation when it deposits 3% of compensation in its workers' individual accounts. That defined contribution plan is, technically speaking, "fully funded," but, in operation, such a low level of contributions is unlikely to result in cumulative retirement savings that would replace 40% of a worker's preretirement earnings.

In short, having a fully funded defined contribution plan is no guarantee that a retiree will actually have an adequate retirement income. After all, many workers do not participate in their employers' defined contribution plans,<sup>92</sup> and even among workers that do participate, contribution rates are often dismally low.<sup>93</sup> Moreover, workers often lose valuable accrued benefits when they change jobs before vesting.<sup>94</sup> In short, while defined contribution sponsors can meet their legal funding obligations by contributing what they say that they will, if contribution levels are too low, workers will not end up with adequately funded pensions when they retire.

#### 2. Defined Benefit Plans

Defined benefit pension plans make benefit promises that can extend many years into the future. Historically, some plans simply paid those liabilities on a pay-as-you-go basis. The triumph of ERISA was that it required private pension plans to prefund their pensions (i.e., to meet certain minimum funding standards).<sup>95</sup> Generally accepted accounting principles now also require private companies and government entities to report how well they are funding their pension obligations.<sup>96</sup> Nevertheless, many defined benefit plans are underfunded, and, in any event, relatively few

<sup>89</sup> Id. at 4–5.

<sup>90</sup> See, e.g., Social Security Administration, *Office of the Chief Actuary's Estimates of Proposals to Change Social Security*, <https://www.ssa.gov/oact/solvency/index.html> (last visited Feb. 3, 2020).

<sup>91</sup> See, e.g., Pensions and Employee Benefits Committee, *Defined Benefit Pension Plan Funding and the Role of Actuaries* 23 (International Actuarial Association, May 2018), [https://www.actuaries.org/IAA/Documents/Publications/Papers/PEBC\\_Pension\\_Funding\\_Monograph\\_May2018.pdf](https://www.actuaries.org/IAA/Documents/Publications/Papers/PEBC_Pension_Funding_Monograph_May2018.pdf).

<sup>92</sup> See *supra* note 15 and accompanying text.

<sup>93</sup> See, e.g., Barbara A. Butrica & Nadia S. Karamcheva, *Automatic enrollment, employer match rates, and employee compensation in 401(k) plans*, MONTHLY LABOR REVIEW (May 2015), <https://www.bls.gov/opub/mlr/2015/Paper/pdf/automatic-enrollment-employer-match-rates-and-employee-compensation-in-401k-plans.pdf>.

<sup>94</sup> See, e.g., U.S. Department of Labor, Bureau of Labor Statistics, *Employee Tenure in 2018* (News Release No. USDL-18-1500, Sept. 20, 2018), <https://www.bls.gov/news.release/pdf/tenure.pdf> (showing high levels of labor mobility: the median number of years that wage and salary workers had been with their current employer was just 4.2 years in January of 2018).

<sup>95</sup> See, e.g., the author's unattributed entry, *Employee Retirement Income Security Act*, ENCYCLOPEDIA OF AGING, <https://www.encyclopedia.com/social-sciences-and-law/economics-business-and-labor/businesses-and-occupations/employee-retirement-income-security-act> (last visited Aug. 30, 2018):

One of the seminal events leading up to the passage of ERISA was the December 1963 shutdown of the Studebaker automobile company in South Bend, Indiana. Studebaker had promised its employees generous retirement benefits, but it had never adequately funded its plan. Consequently, the Studebaker plan was able to pay full retirement benefits only to its 3,600 retirees and to those active workers who had reached the permitted retirement age of sixty, while the company's remaining 7,000 workers were left with little or nothing to show for their years of work.

<sup>96</sup> See, e.g., *infra* Section VA.



workers will actually earn a significant defined benefit plan pension. In that regard, for example, defined benefit plans often use backloaded benefit formulas and have long vesting periods that penalize workers who change jobs frequently.<sup>97</sup>

### **Private-sector Defined Benefit Plans**

All in all, the U.S. government estimated that private-sector defined benefit plans were underfunded by \$553.8 billion at the end of 2018, and those plans were just 84% funded then.<sup>98</sup>

### **Single-employer Plans**

Single-employer defined benefit plans are required to make annual contributions to their plans in accordance with certain minimum funding rules.<sup>99</sup> Nevertheless, the average funded ratio for the 100 largest corporate defined benefit plan sponsors in 2018 was just 87.1%.<sup>100</sup> In the event that an underfunded, single-employer defined benefit plan terminates (for example, because the employer goes out of business), the Pension Benefit Guaranty Corporation (PBGC) will pay annual pension benefits of up to \$69,750 for a 65-year-old participant in 2020.<sup>101</sup> The PBGC paid over \$6 billion in benefits to 932,000 retirees from failed single-employer pensions in fiscal year 2019.<sup>102</sup>

### **Multiemployer Plans**

Multiemployer defined benefit pension plans are even more underfunded than single-employer plans.<sup>103</sup> For example, in 2015, multiemployer plans were only about 46% funded and had a total underfunded liability of \$560.3 billion.<sup>104</sup> In fiscal year 2019, the PBGC paid \$160 million to provide benefits for 66,900 beneficiaries of around 89 insolvent multiemployer plans.<sup>105</sup>

### **Government Defined Benefit Plans**

Many governments have defined benefit pension plans for their employees. These plans are not covered by the ERISA funding rules; however,<sup>106</sup> and most are underfunded.<sup>107</sup> For example, the U.S. government's civilian employee pension plans were underfunded by \$968.1 billion in fiscal year 2018,<sup>108</sup> and its military pensions were underfunded by \$767.9 billion in fiscal year 2017.<sup>109</sup> Similarly, the U.S. government estimated that State and local

<sup>97</sup> See, e.g., Jonathan Barry Forman, *Pensions and retirement*, in LABOR AND EMPLOYMENT LAW AND ECONOMICS OF THE ENCYCLOPEDIA OF LAW AND ECONOMICS (2d ed.), Vol. 2, 539, 565–566 (Kenneth G. Dau-Schmidt, Seth D. Harris & Orly Lobel, eds., 2009).

<sup>98</sup> Board of Governors of the Federal Reserve System, *Financial Accounts of the United States: Flow of Funds, Balance Sheets, and Integrated Macroeconomic Accounts: Fourth Quarter 2018* 96 tbl.L.118.b (Mar. 7, 2019), <https://www.federalreserve.gov/releases/z1/20190307/z1.pdf>; and author's calculation (0.839156 = 1.0 - (\$553.8 billion claims of pension fund on sponsor / \$3,443.1 billion pension entitlements [liabilities]).

<sup>99</sup> I.R.C. §§ 412, 430; ERISA §§ 302, 303 29 U.S.C. § 1082, 1083.

<sup>100</sup> Milliman, *2019 Corporate Pension Funding Study* 1, 11 (White Paper, Apr. 2019), <http://assets.milliman.com/ektron/2019-corporate-pension-funding-study.pdf> (the 87.1% funded ratio is based on GAAP accounting information disclosed by the companies in their Form 10-K annual reports and does not represent the companies' compliance with ERISA funding standards).

<sup>101</sup> Pension Benefit Guaranty Corporation, *Maximum Monthly Guarantee Tables*, <https://www.pbgc.gov/wr/benefits/guaranteed-benefits/maximum-guarantee> (last visited Feb. 3, 2020) (\$69,750 = 12 × \$5,812.50 per month).

<sup>102</sup> Pension Benefit Guaranty Corporation, *Annual Report 2019 2* (2019), [https://www.pbgc.gov/sites/default/files/pbgc-fy-2019-annual-report.pdf?utm\\_medium=email&utm\\_source=govdelivery](https://www.pbgc.gov/sites/default/files/pbgc-fy-2019-annual-report.pdf?utm_medium=email&utm_source=govdelivery).

<sup>103</sup> See, e.g., Staff of the Joint Committee on Taxation, *Present Law and Background Relating To Multiemployer Defined Benefit Plans*, *supra* note 45, at 53–56; John J. Topoleski, *Data on Multiemployer Defined Benefit (DB) Pension Plans* 3 (Congressional Research Service, Report No. R45187, Aug. 10, 2018), available at <https://fas.org/spp/crs/misc/R45187.pdf>.

<sup>104</sup> Topoleski, *Data on Multiemployer Defined Benefit (DB) Pension Plans*, *supra* note 103, at 3; and author's calculation (0.4602 = \$477.7 billion in assets / \$1,038.0 billion owed participants). The PBGC's multiemployer insurance program had a net deficit of \$65,166 billion at the end of fiscal year 2019.

<sup>105</sup> Pension Benefit Guaranty Corporation, *Annual Report 2019*, *supra* note 102, at 3.

<sup>106</sup> ERISA § 4, 29 U.S.C. § 1003.

<sup>107</sup> See, e.g., Lisa Schilling, *U.S. Public Pension Contribution Analysis* (Society of Actuaries, Aging and Retirement, Feb. 2019),

<https://www.soa.org/Files/resources/research-report/2019/pension-plan-analysis.pdf> (finding that most of the plans studied received insufficient contributions to reduce their unfunded liabilities).

<sup>108</sup> United States Office of Personnel Management, *Civil Service Retirement and Disability Fund Annual Report: Fiscal Year Ended September 30, 2018* 26 tbl.1 (Feb. 2019), <https://www.opm.gov/about-us/budget-performance/other-reports/fy-2018-csrd-fund-annual-report.pdf>.

<sup>109</sup> U.S. Department of Defense, Office of the Actuary, *Valuation of the Military Retirement System as of September 30, 2017* 24 tbl.6A (revised Apr. 2019), <https://media.defense.gov/2019/Apr/26/2002122105/-1/-1/0/MRF%20VALRPT%202017%20APRIL%202019%20FINAL.PDF>. See also *Financial Accounts of*

government pension plans were underfunded by \$4.7 trillion at the end of 2018 and were just 45% funded then,<sup>110</sup> although other analysts estimate that the aggregate funding ratio for State and local government plans is around 72%.<sup>111</sup>

## Section IV: Pension Benefit Accrual and Pension Funding

This Section develops two simplified model pension plans that are designed to replace 40% of a worker's preretirement earnings: one defined benefit plan and one defined contribution plan. These two model pensions are similar to—but less complicated than real-world pension plans. Both model pensions rely on a variety of simplifying—but plausible—demographic and economic assumptions, and both model pensions focus on a single typical worker. Using this approach makes it easier to focus on full funding issues without immediately getting bogged down in the cluttering details of the real world.

### A. THE MODEL DEFINED BENEFIT PLAN

#### 1. The Design Of The Model Defined Benefit Plan

Under the model defined benefit plan, each worker will earn a pension benefit (B) equal to 1% times years of service (yos) times final pay (fp) ( $B = 1\% \times \text{yos} \times \text{fp}$ ). The model plan also assumes that the typical worker starts work at age 25, works from age 25 through age 64, and therefore earns a pension benefit equal to 1% of final pay in each of those 40 years. The model plan further assumes that the typical worker then retires at age 65 and goes on to collect a pension equal to 40% of her final pay from retirement at age 65 until her death. For example, if the hypothetical worker had final pay of \$100,000, she would be entitled to a pension, starting at age 65, of \$40,000 a year from age 65 until her death ( $\$40,000 B = 1\% \times 40 \text{ yos} \times \$100,000 \text{ fp}$ ).

#### *The Key Assumptions*

Table 1 summarizes the key assumptions for the model defined benefit plan, and some brief explanations follow.<sup>112</sup>

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*the United States: Flow of Funds, Balance Sheets, and Integrated Macroeconomic Accounts: Fourth Quarter 2018*, *supra* note 98, at 98 tbl.L.119.b (showing that, in the aggregate, federal pensions were underfunded by \$1,650.9 billion at the end of 2018).

<sup>110</sup> See, e.g., Board of Governors of the Federal Reserve System, *Financial Accounts of the United States: Flow of Funds, Balance Sheets, and Integrated Macroeconomic Accounts: Fourth Quarter 2018*, *supra* note 98, at 100 tbl.L.120.b; and author's calculation ( $0.452812 = 1.0 - [\$4.724.2 \text{ billion claims of pension fund on sponsor} / \$8,633.6 \text{ billion pension entitlements}]$ ).

<sup>111</sup> See, e.g., Jean-Pierre Aubry, Caroline V. Crawford & Kevin Wandrei, *Stability in Overall Pension Plan Funding Masks a Growing Divide 1* (Boston College Center for Retirement Research, State and Local Pension Plans Issue in Brief No. 62, Oct. 2018), [http://crr.bc.edu/wp-content/uploads/2018/10/slp\\_62.pdf](http://crr.bc.edu/wp-content/uploads/2018/10/slp_62.pdf) (estimating that State and local government pension plans were 72% funded in fiscal year 2017).

<sup>112</sup> These plans were developed in connection with the author's larger project on fully funded pensions, and most of the detailed explanations of the plausible modeling choices and model assumptions are omitted here. See Jonathan Barry Forman, *Fully Funded Pensions*, 103(4) MARQUETTE LAW REVIEW 1205, 1242–1252 (Summer 2020), <https://scholarship.law.marquette.edu/cgi/viewcontent.cgi?article=5455&context=mulr>.

**Table 1. Key Assumptions for the Model Defined Benefit Plan**

<i>Variable</i>	<i>Model Assumption</i>
<i>Economic Assumptions</i>	
Interest (Discount) Rate	5.0%
Inflation Rate	2.5%
Salary Growth Rate	3.5%
<i>Worker Assumptions</i>	
Entry Age	25
Retirement Age	65
Career Length	40 years (i.e., 25–64)
Age at Death	85
Length of Retirement	20 years (i.e., 65–84)
Longevity at Entry Age	60 years (i.e., 25–85)
Final Salary	\$100,000
<i>Plan Design Assumptions</i>	
Benefit Based On	Final Pay
Annual Benefit Accrual Rate	1.0%
Vesting Period	Immediate
Benefit Form	Single-life Annuity
Annuity Factor	12

#### Economic Assumptions

The model defined benefit plan assumes that the annual interest rate is 5%. That means investments earn a 5% rate-of-return, and present values and liabilities are also discounted at a 5% rate. The model plan also assumes that the annual inflation rate is 2.5% and that each employee’s salary grows by 3.5% a year.

#### Worker Assumptions

The model defined benefit plan assumes that the hypothetical employee starts working for her employer at age 25 and stays with that employer until retiring at age 65. To be sure, relatively few employees actually work for 40 years before retiring, let alone for 40 years with the same employer.<sup>113</sup> In planning for adequate retirement incomes however, workers should want to earn some kind of pension coverage on almost every job they hold and certainly on almost every job they hold from age 25 until retirement. Making the assumption that the hypothetical employee works for a single employer throughout her career avoids the complexity of trying to consolidate pension benefits earned from multiple employers.

The model defined benefit plan also assumes that 65-year-old retirees have a 20-year life expectancy: on average, retirees will collect their pensions for 20 years, although, of course, some will certainly live to be centenarians. In that regard, for example, according to the National Center for Health Statistics, the life expectancy of a 65-year-old in 2016 was 19.4 years (18.0 years for men and 20.6 years for women).<sup>114</sup>

Implicitly, the model defined benefit plan also ignores the reality that some 25-year-olds will not, in fact, live to age 65. In that regard, for example, according to the Social Security Administration’s 2016 Period Life Table, of 100,000

<sup>113</sup> See, e.g., U.S. Department of Labor, Bureau of Labor Statistics, *Employee Tenure in 2018*, *supra* note 94 and accompanying text.

<sup>114</sup> U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES, CENTERS FOR DISEASE CONTROL AND PREVENTION, NATIONAL CENTER FOR HEALTH STATISTICS, HEALTH, UNITED STATES, 2017: WITH SPECIAL FEATURE ON MORTALITY tbl.15 (2018), <https://www.cdc.gov/nchs/data/hus/hus17.pdf> (on p. x, click on the link for “Table 15”). See also *infra* Table 5, where columns 6 and 7 show the Social Security Administration’s similar estimates of period life expectancy in 2016 for males and females of various ages.

male live births, approximately 98,055 can be expected to survive to age 25. Of those survivors, 79,893 (81.5%) can be expected to survive until age 65 ( $0.8147 = 79,893 / 98,055$ ).<sup>115</sup> Choosing to ignore employee deaths before retirement would not affect the benefit accrual of those workers who live to age 65 that is the focus of this Paper; however, it is certainly worth noting that those deaths of employees younger than 65 usually reduce a real-world defined benefit plan sponsor's aggregate funding obligation as the accrued benefits of those who die before age 65 are typically forfeited.<sup>116</sup>

The model defined benefit plan also assumes that the hypothetical worker has a final salary of \$100,000 a year at age 64. Given the assumed salary growth rate of 3.5%, that \$100,000 final salary leads to a plausible starting salary of around \$26,141.<sup>117</sup>

### Plan Design Assumptions

The model defined benefit plan uses *final pay* rather than final average pay. Admittedly, most traditional plans in the real world compute pension benefits by averaging salary over several final years, rather than basing the pension on the single final year, and the single-year approach for this model plan is the more expensive of the two possibilities; however, choosing final pay makes for less complicated discussions in this Paper.

The model defined benefit plan also assumes a 1% *annual benefit accrual rate*. Historically, many traditional defined benefit plans provided higher annual benefit accrual rates (e.g., 2% over a 30-year career),<sup>118</sup> and even today, 2% is a common annual benefit accrual rate in many State and local pension plans.<sup>119</sup> On the other hand, the annual benefit accrual rate for most federal employees covered by the Federal Employees Retirement System (FERS) is now just 1%, down from 2% for most workers hired under the predecessor Civil Service Retirement System.<sup>120</sup>

The model defined benefit plan also implicitly assumes that there is no vesting period. That is, a worker is eligible for a pension benefit, beginning at age 65, regardless of the number of years of her service.<sup>121</sup>

The model defined benefit plan also assumes that the pension benefit takes the form of a level-payment single-life annuity. As a result, the model plan avoids the complexities associated with joint-and-survivor annuities and cost-of-living adjustments (COLAs), although these variations are discussed in Section V below.

<sup>115</sup> Social Security Administration, *Actuarial Life Table*, <https://www.ssa.gov/oact/STATS/table4c6.html> (last visited Feb. 3, 2020) (select the period life table for 2016). The text says "can be expected to survive until age 65," but the 81.5% computation is no better than a rough estimate, as the period life table is more of a snapshot than a projection: it is just too soon to know how many 25 year-old males in 2016 will, in fact, live to age 65. Similarly, of 100,000 female live births, approximately 98,861 can be expected to survive to age 25. Of those survivors, 87,574 (88.6%) can be expected to survive until age 65 ( $0.8858 = 87,574 / 98,861$ ). *Id.*

<sup>116</sup> In short, assuming that all 25-year-old workers live to age 65 is heroic. The model plan also ignores terminations. In the real world, however, plan sponsors often count on getting actuarial gains when at least some of their workforce leave when they have less years of service and lower salaries than they would have had if they had stayed until age 65. All in all, as some workers die or leave before retirement, real-world employers can meet their defined benefit pension obligations with lower contributions.

<sup>117</sup>  $\$26,141.25 = \$100,000 / 1.035^{39}$ .

<sup>118</sup> See, e.g., Barbara A. Butrica, Howard M. Iams, Karen E. Smith & Eric J. Toder, *The Disappearing Defined Benefit Pension and Its Potential Impact on the Retirement Incomes of Baby Boomers*, 69(3) SOCIAL SECURITY BULLETIN 1 (2009), <https://www.ssa.gov/policy/docs/ssb/v69n3/ssb-v69n3.pdf>; Richard Works, *Trends in employer costs for defined benefit plans*, 5(2) PAY & BENEFITS (Feb. 19, 2016), <https://www.bls.gov/opub/btn/volume-5/trends-in-employer-costs-for-defined-benefit-plans.htm>.

<sup>119</sup> See *supra* note 8 and accompanying text.

<sup>120</sup> Katelin P. Isaacs, *Federal Employees' Retirement System: Summary of Recent Trends* (Congressional Research Service, CRS Report No. 92-972, Feb. 2, 2018), available at <https://fas.org/spp/crs/misc/98-972.pdf>; U.S. Office of Personnel Management, *FERS Information*, <https://www.opm.gov/retirement-services/fers-information/> (last visited Feb. 3, 2020) (& also click on the Computation link) (explaining that the Federal Employees Retirement System provides typical workers with a basic annuity of 1% of the employee's high-3 average salary for each year of service); U.S. Office of Personnel Management, *CSRS Information*, <https://www.opm.gov/retirement-services/csrs-information/> (last visited Feb. 3, 2020) (& click on the Computation link to see how benefit accrue over the course of a covered worker's career).

<sup>121</sup> In the real world, 5-year vesting periods are common, and employees who terminate before vesting only get their own contributions back (if any), so the model plan is more generous in that regard. I.R.C. § 411(a); ERISA § 203, 29 U.S.C. § 1053.

When the hypothetical worker retires, the actuarial liability for the defined benefit plan is the starting amount of the pension times an *annuity factor*.<sup>122</sup> For simplicity, the model defined benefit plan assumes an annuity factor at age 65 of 12.<sup>123</sup> For example, if a 65-year-old retiree with a final salary of \$100,000 wants to receive a life annuity of \$40,000 a year, then the plan will need to have saved \$480,000 for her ( $\$480,000 = 12 \times \$40,000$ ). Conversely, if the plan has saved \$480,000 for a 65-year-old retiree, then the plan will be able to buy her a life annuity that pays her \$40,000 a year ( $\$40,000 = \$480,000 / 10$ ).

## 2. Benefit Accrual In The Model Defined Benefit Plan

This Section shows how benefits will accrue under the model defined benefit plan for the hypothetical 25-year-old worker. At the outset, column 1 of Table 2 shows the worker's age ( $x$ )—from age 25 when she starts working to age 65 when she retires. Column 2 shows the hypothetical worker's salary ( $S_x$ )—starting at \$26,141 at age 25 and growing by 3.5% a year until it reaches \$100,000 at age 64. Column 3 shows the hypothetical worker's number of years of service completed by the end of each year ( $Y_x$ )—starting at 1 year of service by the end of the year that she starts working (age 25) and increasing to 40 years of service by the end of the year that she turns age 64.

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<sup>122</sup> The annuity factor is the expected present discounted value of the employee's pension, adjusted to an initial pension amount of \$1. Calculating the annuity factor is a standard exercise. See, e.g., Jonathan Barry Forman & Michael J. Sabin, *Tontine Pensions*, 163(3) UNIVERSITY OF PENNSYLVANIA LAW REVIEW 755, 791 n.140 (2015), [https://scholarship.law.upenn.edu/cgi/viewcontent.cgi?article=9471&context=penn\\_law\\_review](https://scholarship.law.upenn.edu/cgi/viewcontent.cgi?article=9471&context=penn_law_review).

<sup>123</sup> See, e.g., Internal Revenue Service, *Table S – Based on Life Table 2000CM*, [https://www.irs.gov/pub/irs-tege/sec\\_1\\_table\\_s\\_2009.xls](https://www.irs.gov/pub/irs-tege/sec_1_table_s_2009.xls) (last visited Feb. 6, 2020) (showing an annuity factor of 10.7925 for an individual age 65 and a 5.0% interest rate). See also Society of Actuaries, *Annuity Factor Calculator*, <https://afc.soa.org/#Calculator> (last visited Aug. 20, 2019) (For a 65-year-old male and a discount rate of 5% in 2020, the annuity factor for a single life annuity payable at the end of each month is calculated to be 12.1457 [12.8615 for a 65-year-old female]); Jack Vanderhei, *How Much Would It Take? Achieving Retirement Income Equivalency Between Final-Average-Pay Defined Benefit Plan Accruals and Automatic Enrollment 401(k) Plans in the Private Sector* 8 (Employee Benefit Research Institute, Issue Brief No. 473, Feb. 7, 2019), available at [https://www.ebri.org/content/how-much-would-it-take-achieving-retirement-income-equivalency-between-final-average-pay-defined-benefit-plan-accruals-and-automatic-enrollment-401\(k\)-plans-in-the-private-sector](https://www.ebri.org/content/how-much-would-it-take-achieving-retirement-income-equivalency-between-final-average-pay-defined-benefit-plan-accruals-and-automatic-enrollment-401(k)-plans-in-the-private-sector) (using annuity factors of 11.61 for 65-year-old men and 12.34 for 65-year-old women).

**Table 2. Benefit Accrual in the Model Defined Benefit Plan**

<i>Age (x)</i>	<i>Salary (S<sub>x</sub>)</i>	<i>Years of Service (Y<sub>x</sub>)</i>	<i>Benefit Factor (BF<sub>x</sub>)</i>	<i>Future Annual Pension at Age 65 (FP<sub>x</sub>)</i>	<i>Accrued Benefit (AB<sub>x</sub>)</i>	<i>Annual Benefit Accrual (B<sub>x</sub>)</i>	<i>Benefit Accrual as a Percentage of Current Salary (BP<sub>x</sub>)</i>
25	\$26,141	1	1%	\$0	\$0	\$457	1.75%
26	\$27,056	2	2%	\$261	\$468	\$536	1.98%
27	\$28,003	3	3%	\$541	\$1,017	\$625	2.23%
28	\$28,983	4	4%	\$840	\$1,658	\$726	2.51%
29	\$29,998	5	5%	\$1,159	\$2,402	\$840	2.80%
30	\$31,048	6	6%	\$1,500	\$3,263	\$968	3.12%
31	\$32,134	7	7%	\$1,863	\$4,255	\$1,112	3.46%
32	\$33,259	8	8%	\$2,249	\$5,395	\$1,274	3.83%
33	\$34,423	9	9%	\$2,661	\$6,701	\$1,456	4.23%
34	\$35,628	10	10%	\$3,098	\$8,192	\$1,659	4.66%
35	\$36,875	11	11%	\$3,563	\$9,892	\$1,887	5.12%
36	\$38,165	12	12%	\$4,056	\$11,825	\$2,141	5.61%
37	\$39,501	13	13%	\$4,580	\$14,019	\$2,426	6.14%
38	\$40,884	14	14%	\$5,135	\$16,505	\$2,744	6.71%
39	\$42,315	15	15%	\$5,724	\$19,317	\$3,099	7.32%
40	\$43,796	16	16%	\$6,347	\$22,492	\$3,494	7.98%
41	\$45,329	17	17%	\$7,007	\$26,073	\$3,936	8.68%
42	\$46,915	18	18%	\$7,706	\$30,106	\$4,427	9.44%
43	\$48,557	19	19%	\$8,445	\$34,642	\$4,974	10.24%
44	\$50,257	20	20%	\$9,226	\$39,739	\$5,582	11.11%
45	\$52,016	21	21%	\$10,051	\$45,459	\$6,259	12.03%
46	\$53,836	22	22%	\$10,923	\$51,873	\$7,011	13.02%
47	\$55,720	23	23%	\$11,844	\$59,057	\$7,847	14.08%
48	\$57,671	24	24%	\$12,816	\$67,097	\$8,774	15.21%
49	\$59,689	25	25%	\$13,841	\$76,088	\$9,804	16.43%
50	\$61,778	26	26%	\$14,922	\$86,134	\$10,946	17.72%
51	\$63,940	27	27%	\$16,062	\$97,351	\$12,213	19.10%
52	\$66,178	28	28%	\$17,264	\$109,865	\$13,617	20.58%
53	\$68,495	29	29%	\$18,530	\$123,818	\$15,172	22.15%
54	\$70,892	30	30%	\$19,863	\$139,365	\$16,895	23.83%
55	\$73,373	31	31%	\$21,268	\$156,677	\$18,803	25.63%
56	\$75,941	32	32%	\$22,746	\$175,945	\$20,915	27.54%
57	\$78,599	33	33%	\$24,301	\$197,376	\$23,251	29.58%
58	\$81,350	34	34%	\$25,938	\$221,201	\$25,836	31.76%
59	\$84,197	35	35%	\$27,659	\$247,675	\$28,694	34.08%
60	\$87,144	36	36%	\$29,469	\$277,077	\$31,853	36.55%
61	\$90,194	37	37%	\$31,372	\$309,717	\$35,345	39.19%
62	\$93,351	38	38%	\$33,372	\$345,935	\$39,202	41.99%
63	\$96,618	39	39%	\$35,473	\$386,105	\$43,463	44.98%
64	\$100,000	40	40%	\$37,681	\$430,642	\$48,169	48.17%
65				\$40,000	\$480,000		

Column 4 of Table 2 then shows the hypothetical worker's *benefit factor* (BF<sub>x</sub>) at the end of each year starting at 1% at the end of the year she starts working (age 25) and increasing to 40% by the end of the year in which she turns 64 (BF<sub>x</sub> = 1% annual benefit accrual rate × Y<sub>x</sub> years of service).



Column 5 of Table 2 then shows the amount of the *future annual pension* that the hypothetical worker has earned and will receive at age 65 ( $FP_x$ ). When she starts working at age 25, she has not yet earned any pension benefits, and thus her future annual pension is \$0 ( $FP_{25} = \$0$ ). After she completes a year of service during age 25, she becomes entitled to a pension benefit starting at age 65 of \$261 per year for life (starting at age 65), and thus, at the beginning of age 26, her future annual pension is \$261 ( $FP_{26} = \$261.41 = 1\% BF_{25} \times \$26,141 S_{25} = FP_x = BF_{x-1} \times S_{x-1}$ ).<sup>124</sup> Similarly, at the beginning of age 27, she will have earned a future pension of \$541 per year ( $FP_{27} = \$541.12 = 2\% BF_{26} \times \$27,056 S_{26}$ ), and so on until at age 65, she will have earned a pension of \$40,000 per year ( $FP_{65} = \$40,000 = 40\% BF_{64} \times \$100,000 S_{64}$ ).

Column 6 of Table 2 shows the present value of the hypothetical worker's *accrued benefit* as of the beginning of each year ( $AB_x$ ). The computation of the amounts in column 6 involves several steps. For example, column 5 shows that when the hypothetical worker turns 26, she has earned the right to a pension starting at age 65 of \$261 per year for life ( $FP_{26} = \$261$ ). Given the assumed annuity factor at age 65 is 12, the value of her right to receive that \$261-a-year pension then will be \$3,137 ( $\$3,137 = 12 \times \$261.41 FP_{26}$ ). Of course, this 26-year-old will have to wait 39 years to get that pension (at age 65). Given the assumed discount rate of 5%, column 6 shows that the value—when she turns 26—of the right to a pension worth \$3,137 at age 65 is \$468 ( $AB_{26} = \$468 = \$3,137 / 1.05^{39}$ ). All in all, column 6 of Table 2 shows how her accrued benefit will grow from \$0 when she starts working at age 25 ( $AB_{25} = 0$ ) to \$480,000 at age 65 when she retires ( $AB_{65} = \$480,000$ ).

Column 7 of Table 2 shows how and when the hypothetical worker earns that pension over the course of her career. More specifically, column 7 shows how much of her pension she earns each year that she works—i.e., her *annual benefit accrual* ( $B_x$ ). For example, by working through age 25, the hypothetical worker earned a future pension worth \$468 at the beginning of age 26 ( $AB_{26} = \$468$ , column 6 of Table 2). She really earned that future pension by working all through the prior year (age 25), and column 7 estimates the value of that annual benefit accrual as of the midpoint of that prior year. Given the 5% assumed discount rate, the value of that \$468 accrued benefit six months earlier would be \$457 ( $B_{25} = \$457 = \$468 AB_{26} / \sqrt{1.05}$ ).<sup>125</sup> Similarly, by working through age 26, her accrued benefit as of the beginning of age 27 was worth \$1,017 ( $AB_{27} = \$1,017$  column 6 of Table 2). That is an increase from age 26 to age 27 of \$549 ( $\$549 = \$1,017 AB_{27} - \$468 AB_{26}$ ), and the value of that \$549 six months earlier (i.e., at the midpoint of the prior year) is \$536 ( $B_{26} = \$536$ ).<sup>126</sup> All in all, column 7 of Table 2 shows that the hypothetical worker's annual benefit accrual ( $B_x$ ) will grow from \$457 at age 25 ( $B_{25} = \$457$ ) to \$48,169 at age 64 ( $B_{64} = \$48,169$ ).

In summary, Figure 1 shows how the hypothetical worker's annual salary ( $S_x$ ), annual benefit accrual ( $B_x$ ), and accrued benefit ( $AB_x$ ) will grow from age 25 until her retirement at age 65.

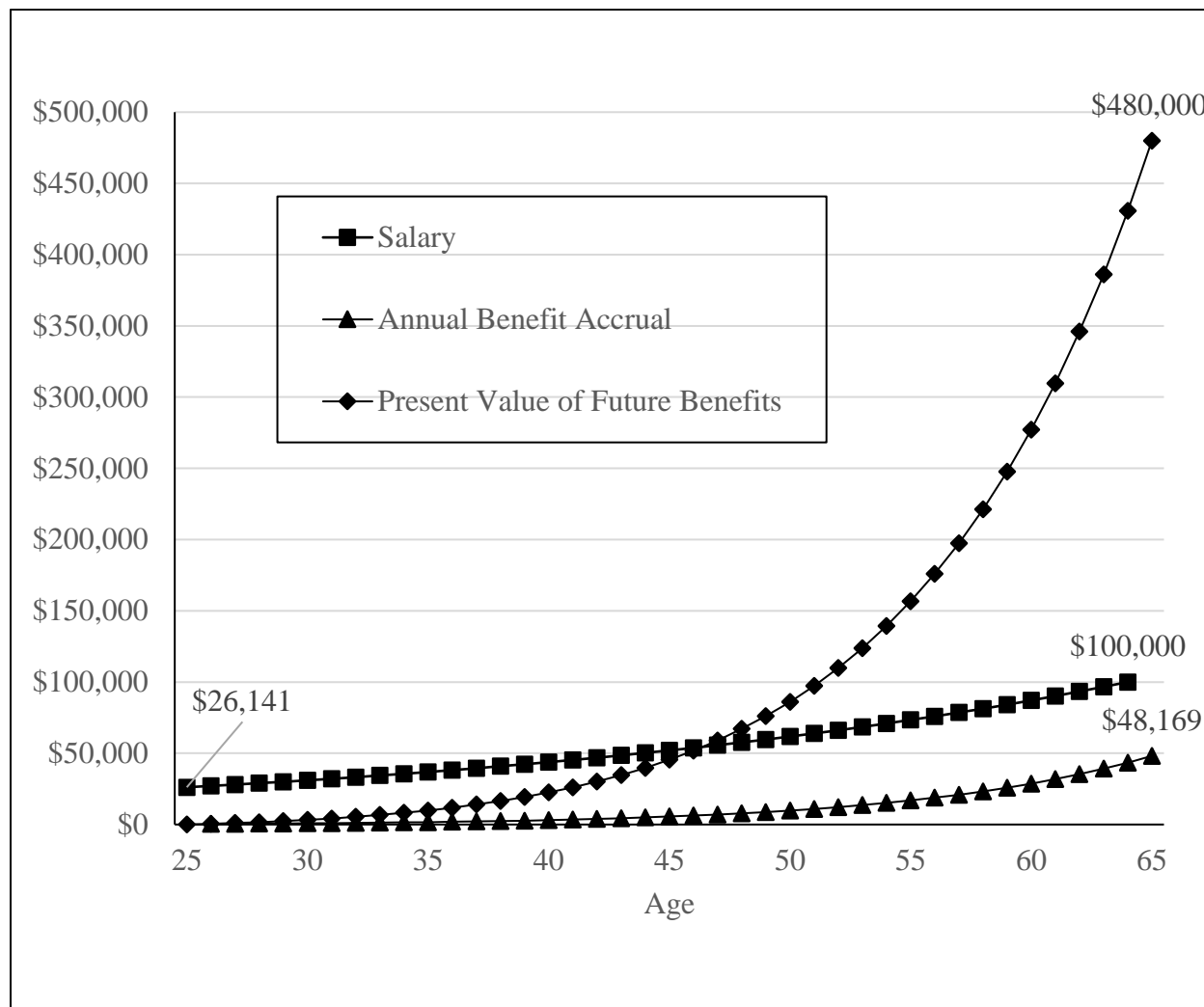
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<sup>124</sup> For simplicity, column 5 of Table 2 treats the pension benefit earned in a given year as if it accrued on the first day of the next year, i.e., after the year of service.

<sup>125</sup> The factor  $\sqrt{1.05}$  (i.e.,  $1.05^{1/2}$ ) is used here to model the interest that can be earned on a salary paid in installments throughout the year (e.g., monthly paychecks), and, conversely, the factor  $1 / \sqrt{1.05}$  is used to model a half-year discount rate (when needed in subsequent computations).

<sup>126</sup>  $\$536 B_{26} = (\$1,017 AB_{27} - \$468 AB_{26}) / \sqrt{1.05}$ .

Figure 1. Salary, Annual Benefit Accrual, and Present Value of Future Benefits in the Model Defined Benefit Plan

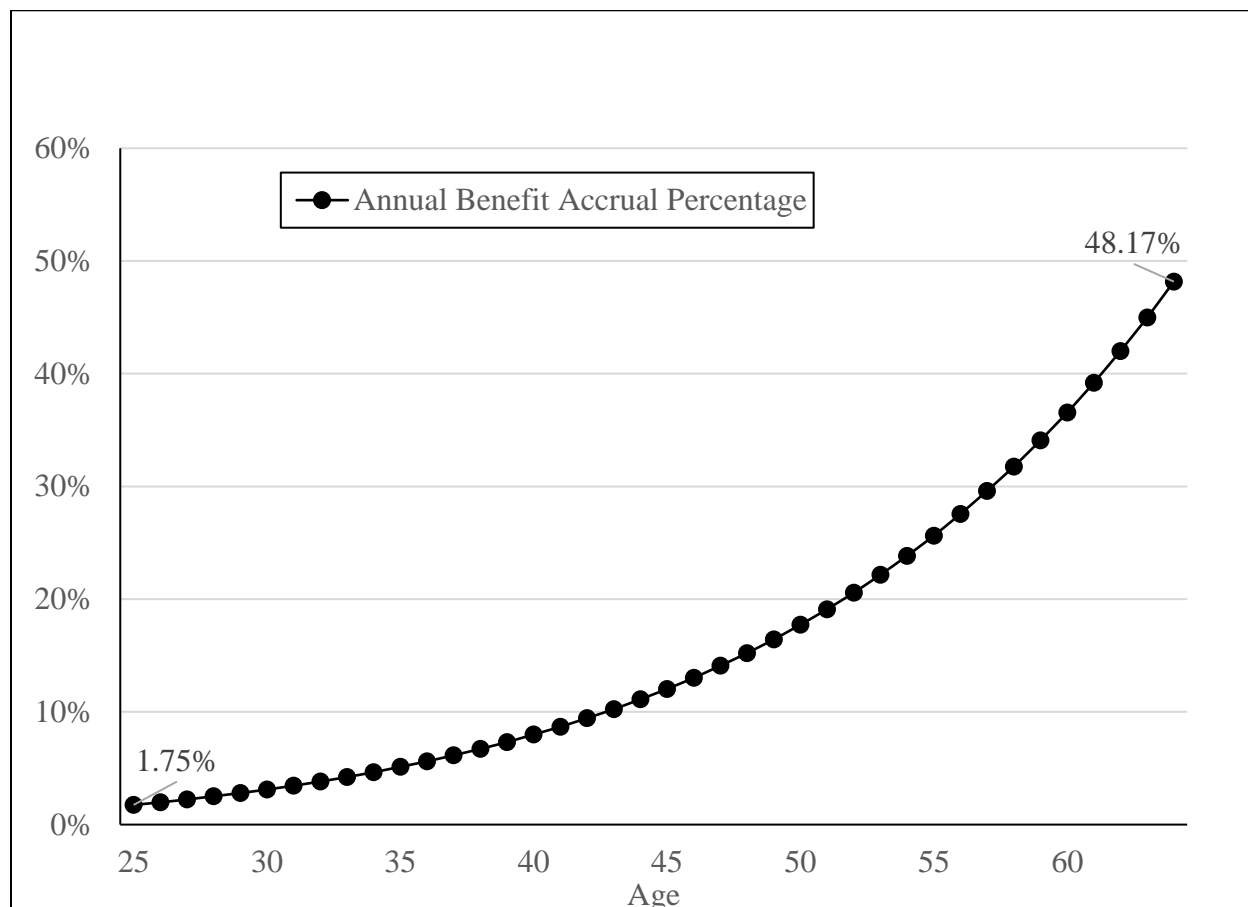


Finally, column 8 of Table 2 shows the hypothetical worker's *annual benefit accrual as a percentage of her salary* in the year that she earned that benefit ( $BP_x$ , i.e., her annual benefit accrual percentage). For example, by working through age 25, the hypothetical worker accrued a pension benefit worth \$457 ( $B_{25} = \$457$ , column 7 of Table 2), based on her salary *that year* of \$26,141 ( $S_{25} = \$26,141$ , column 2 of Table 2). Therefore, her annual benefit accrual as a percentage of her age-25 annual salary is 1.75% ( $0.0175 BP_{25} = \$457 B_{25} / \$26,141 S_{25}$ ). Similarly, her annual benefit accrual percentage at age 26 is 1.98% ( $0.0198 BP_{26} = \$536 B_{26} / \$27,056 S_{26}$ ), and the remainder of column 8 shows similar computations for subsequent years until the annual benefit accrual percentage will reach 48.17% at age 64 ( $0.4817 BP_{64} = \$48,169 B_{64} / \$100,000 S_{64}$ ).

Figure 2 provides a graphic representation of these annual benefit accrual percentages ( $BP_x$ ). More specifically, Figure 2 shows that the hypothetical worker's annual benefit accruals are a much greater percentage of her salary at the end of her career than at the beginning; that is, her annual benefit accruals under the model defined benefit

plan are *backloaded* at the end of her career.<sup>127</sup> That is, traditional defined benefit plans provide disproportionately larger benefits for older workers than for younger workers. Indeed, well over half of the value of a worker’s traditional defined benefit plan pension can accrue in the last 5 or 10 years of her service.<sup>128</sup>

Figure 2. Annual Benefit Accrual in the Model Defined Benefit Plan as a Percentage of Current Salary



### 3. Funding The Model Defined Benefit Plan

Over the course of a 40-year career, the hypothetical worker covered by the model defined benefit plan would earn the right to a pension that would pay her \$40,000 a year from retirement at age 65 until her death, and that pension would be worth \$480,000 at age 65 (columns 5 and 6 of Table 2). The plan sponsor needs to pay those \$40,000-a-year annual pension benefits as they become due, and requiring plan sponsors to prefund their pension plan is the best way to ensure that retirees will actually get their promised pension benefits.

While there are a variety of actuarial cost methods that could prefund those promised future pension benefits over the course of their workers’ careers,<sup>129</sup> this Paper only explains one commonly-used funding method: *the entry age*

<sup>127</sup> Figure 1 also shows this backloading of annual benefit accruals (in dollars)—from  $B_{25} = \$457$  at age 25 to  $B_{64} = \$48,169$  at age 64; however, that backloading is less recognizable in Figure 1 because of the scale used in that figure.

<sup>128</sup> See, e.g., JONATHAN BARRY FORMAN, MAKING AMERICA WORK 227 (2006).

<sup>129</sup> See, e.g., Charles L. Trowbridge, *Fundamentals of Pension Funding* in SOCIETY OF ACTUARIES, 50TH ANNIVERSARY MONOGRAPH 101 (Monograph M-AV99-1, Oct. 1999), available at <https://www.soa.org/essays-monographs/50th-anniversary/>.

*normal cost level-percentage-of-salary method.* Under this method the pension plan actuary estimates each worker's total *projected* pension at retirement. For example, the hypothetical worker in the model defined benefit pension plan is projected to receive a \$40,000-a-year pension starting at age 65, and that pension will be worth \$480,000 when she retires at age 65. The actuary can then calculate contributions as a level percentage of salary over the course of each worker's career. For example, Table 3 shows how contributions equal to 8.73% of the hypothetical worker's salary each year would grow to approximately \$480,000 by the time she reaches age 65.<sup>130</sup>

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<sup>130</sup> Alternatively, under the entry age normal cost *level-dollar* method, the author has estimated that level contributions of \$3,878 a year for the 40 years from age 25 through age 64 would also result in the accumulation of approximately \$480,000 when the hypothetical worker reaches age 65.

**Table 3. Contributions Under the Entry Age Level-Percentage-of-Salary Method**

<i>Age (x)</i>	<i>Salary (S<sub>x</sub>)</i>	<i>Contributions (C<sub>L Px</sub>)</i>	<i>Value of the Accrued Benefit at the End of the Year (V<sub>L Px</sub>)</i>	<i>Contributions as a Percentage of Current Salary (C<sub>L PPx</sub>)</i>
25	\$26,141	\$2,282	\$2,338	8.73%
26	\$27,056	\$2,362	\$4,876	8.73%
27	\$28,003	\$2,445	\$7,625	8.73%
28	\$28,983	\$2,530	\$10,599	8.73%
29	\$29,998	\$2,619	\$13,812	8.73%
30	\$31,048	\$2,710	\$17,280	8.73%
31	\$32,134	\$2,805	\$21,019	8.73%
32	\$33,259	\$2,904	\$25,045	8.73%
33	\$34,423	\$3,005	\$29,376	8.73%
34	\$35,628	\$3,110	\$34,032	8.73%
35	\$36,875	\$3,219	\$39,032	8.73%
36	\$38,165	\$3,332	\$44,398	8.73%
37	\$39,501	\$3,448	\$50,152	8.73%
38	\$40,884	\$3,569	\$56,317	8.73%
39	\$42,315	\$3,694	\$62,918	8.73%
40	\$43,796	\$3,823	\$69,981	8.73%
41	\$45,329	\$3,957	\$77,535	8.73%
42	\$46,915	\$4,096	\$85,609	8.73%
43	\$48,557	\$4,239	\$94,233	8.73%
44	\$50,257	\$4,387	\$103,441	8.73%
45	\$52,016	\$4,541	\$113,266	8.73%
46	\$53,836	\$4,700	\$123,745	8.73%
47	\$55,720	\$4,864	\$134,917	8.73%
48	\$57,671	\$5,035	\$146,821	8.73%
49	\$59,689	\$5,211	\$159,502	8.73%
50	\$61,778	\$5,393	\$173,004	8.73%
51	\$63,940	\$5,582	\$187,374	8.73%
52	\$66,178	\$5,777	\$202,662	8.73%
53	\$68,495	\$5,980	\$218,923	8.73%
54	\$70,892	\$6,189	\$236,211	8.73%
55	\$73,373	\$6,405	\$254,585	8.73%
56	\$75,941	\$6,630	\$274,107	8.73%
57	\$78,599	\$6,862	\$294,844	8.73%
58	\$81,350	\$7,102	\$316,863	8.73%
59	\$84,197	\$7,350	\$340,238	8.73%
60	\$87,144	\$7,608	\$365,046	8.73%
61	\$90,194	\$7,874	\$391,367	8.73%
62	\$93,351	\$8,150	\$419,286	8.73%
63	\$96,618	\$8,435	\$448,893	8.73%
64	\$100,000	\$8,730	\$480,283	8.73%
65	(Annuity ~ \$40,000/year)			

At the outset, Column 1 of Table 3 again shows the worker’s age (x)—from age 25 to age 65 when she retires, and Column 2 again shows her salary (S<sub>x</sub>)—starting at \$26,141 at age 25 and growing to \$100,000 at age 64.

Next, Column 5 of Table 3 shows the 8.73% level-percentage-of-salary contribution rate ( $C_{LPx} = 8.73\%$ ). Column 3 then shows how actual dollar contributions will increase from \$2,282 at age 25 ( $C_{LP25} = \$2,282$ ) to \$8,730 at age 64 ( $C_{LP64} = \$8,730$ ).<sup>131</sup> Basically, contributions will increase modestly over time—at the assumed 3.5% annual salary growth rate. Finally, Column 4 shows how the value of the hypothetical worker’s accrued benefit at the end of each year will grow from \$2,338 at the end of the year she turns 25 ( $V_{LP25} = \$2,338$ )<sup>132</sup> to around \$480,000 at age 65 ( $V_{LP64} = \$480,283$ ), and that would be enough to provide her with a \$40,000-a-year pension.

## B. THE MODEL DEFINED CONTRIBUTION PLAN

### 1. The Design Of The Model Defined Contribution Plan

At the outset, the model defined contribution plan again assumes that the hypothetical worker wants her defined contribution plan to provide her with pension benefits that will replace around 40% of her final year’s salary. In that regard, the model plan again assumes that inflation is 2.5% each year, that the hypothetical worker starts working at age 25 with a salary of \$26,141 a year, that her salary grows by 3.5% a year to \$100,000 at age 64, that she retires at age 65, and that at age 65 she has a 20-year life expectancy.

The model defined contribution plan is also designed to ensure that the hypothetical worker will accumulate around \$480,000 by the time she reaches age 65. The model defined contribution plan also adopts two more assumptions from Section IVA, but here those assumptions are a bit heroic. First, the model defined contribution plan heroically assumes that the hypothetical worker can still earn a 5% rate of return on her investments—even though it is well-known that individual investors tend to earn lower rates of return than large, professionally-managed defined benefit plans earn.<sup>133</sup> Second, the model defined contribution plan heroically assumes that the hypothetical worker’s annuity factor is still 12 (i.e., that she can use \$480,000 in retirement savings to buy a lifetime annuity that will pay her \$40,000 a year over the course of her 20-year retirement)—even though it is well-known that individuals usually cannot buy annuities at the same favorable group-annuity rates that large defined benefit plans can.<sup>134</sup> In short, it might be more realistic if the model defined contribution plan instead used a 4.5% rate-of-return assumption and an annuity factor assumption of 15.<sup>135</sup> All in all, individuals in defined contribution plans will almost certainly need to save more each year and accumulate more savings by age 65 than plan sponsors save for participants in defined benefit plans.<sup>136</sup> Still, using the same assumptions for both the model defined benefit and defined contribution plans discussed in this Paper makes it easier to compare the two types of plans and to generalize about how to fund pensions that will last for a lifetime.

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<sup>131</sup>  $\$2,282 C_{LP25} = 8.73 C_{LP25} \times \$26,141 S_{25}$ ;  $\$8,730 C_{LP64} = 8.73 C_{LP64} \times \$100,000 S_{64}$ .

<sup>132</sup>  $\$2,338 V_{LP25} = \$2,282 C_{LP25} \times V1.05$ .

<sup>133</sup> See, e.g., Jonathan Barry Forman, *The Future of 401(k) Plan Fees*, in NEW YORK UNIVERSITY REVIEW OF EMPLOYEE BENEFITS AND EXECUTIVE COMPENSATION—2007 9-1 (2007).

<sup>134</sup> See, e.g., Forman, *Removing the Legal Impediments to Offering Lifetime Annuities in Pension Plans*, *supra* note 77, at 105–107.

<sup>135</sup> See *supra* note 123 and accompanying text. Even higher annuity factors might be appropriate for lifetime annuities purchased in the individual annuity marketplace. In that regard, the annuity factor for a lifetime annuity for a 65-year-old woman in the individual annuity market at the beginning of January of 2020 might be as high as 17, computed as follows. Recall that in December of 2019, for \$100,000, a 65-year-old woman could have bought an immediate, level-payment (lifetime) annuity that would pay her around \$5,736 a year. See *supra* note 77. Consequently, an annuity that would pay her \$40,000 a year would have cost around \$697,000 ( $\$697,350 = 6.97350 \times \$100,000$ ;  $6.97350 = \$40,000 / \$5,736$ ), and, if it took her \$697,000 to buy a \$40,000-a-year lifetime annuity, then the appropriate annuity factor would be around 17 ( $17.434 = \$697,000 / \$40,000$ ).

Similarly, the annuity factor for a lifetime annuity for a 65-year-old man in the individual annuity market also might be around 17, computed as follows. In December of 2019, for \$100,000, a 65-year-old man could have bought an immediate, level-payment (lifetime) annuity that would pay him around \$6,000 a year. See *supra* note 76. Consequently, an annuity that paid him \$40,000 a year would have cost around \$667,000 ( $\$666,667 = 6.66667 \times \$100,000$ ;  $6.66667 = \$40,000 / \$6,000$ ), and, if it took him \$600,601 to buy a \$40,000-a-year lifetime annuity, then the appropriate annuity factor would be almost 17 ( $16.675 = \$600,601 / \$40,000$ ).

Of course, defined contribution plans could allow individual participants to invest in lifetime annuities throughout their careers, in which case those individual participants should be able to buy lifetime annuities at much more favorable rates.

<sup>136</sup> Recall that defined benefit plans can save on benefit costs because some workers leave or die before retirement. See *supra* note 116 and accompanying text.



## 2. BENEFIT ACCRUAL AND FUNDING FOR THE MODEL DEFINED CONTRIBUTION PLAN

Under the model defined contribution plan, every year the plan sponsor will contribute 8.73% of the hypothetical worker's salary to the plan,<sup>137</sup> and Table 4 shows how her benefits would accrue under this level-percentage-of-salary plan.

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<sup>137</sup> The text says that the plan sponsor will make the contributions, but in reality it does not matter whether the contributions come from the plan sponsor, from the worker, or are split between the two. Thus, although this Paper focuses on the design of employer-sponsored defined contribution plans, the defined contribution plan models are equally applicable to workers trying to provide for their own retirement income needs with 401(k) or IRA contributions.

Table 4. Benefit Accrual in a Level-Percentage-of-Salary Model Defined Contribution Plan

<i>Age (x)</i>	<i>Salary (S<sub>x</sub>)</i>	<i>Years of Service (Y<sub>x</sub>)</i>	<i>Contribution Rate (CP<sub>x</sub>)</i>	<i>Contribution Amount (C<sub>Px</sub>)</i>	<i>Account Balance at Year End (AB<sub>x</sub>)</i>
25	\$26,141	1	8.73%	\$2,282	\$2,338
26	\$27,056	2	8.73%	\$2,362	\$4,876
27	\$28,003	3	8.73%	\$2,445	\$7,625
28	\$28,983	4	8.73%	\$2,530	\$10,599
29	\$29,998	5	8.73%	\$2,619	\$13,812
30	\$31,048	6	8.73%	\$2,710	\$17,280
31	\$32,134	7	8.73%	\$2,805	\$21,019
32	\$33,259	8	8.73%	\$2,904	\$25,045
33	\$34,423	9	8.73%	\$3,005	\$29,376
34	\$35,628	10	8.73%	\$3,110	\$34,032
35	\$36,875	11	8.73%	\$3,219	\$39,032
36	\$38,165	12	8.73%	\$3,332	\$44,398
37	\$39,501	13	8.73%	\$3,448	\$50,152
38	\$40,884	14	8.73%	\$3,569	\$56,317
39	\$42,315	15	8.73%	\$3,694	\$62,918
40	\$43,796	16	8.73%	\$3,823	\$69,981
41	\$45,329	17	8.73%	\$3,957	\$77,535
42	\$46,915	18	8.73%	\$4,096	\$85,609
43	\$48,557	19	8.73%	\$4,239	\$94,233
44	\$50,257	20	8.73%	\$4,387	\$103,441
45	\$52,016	21	8.73%	\$4,541	\$113,266
46	\$53,836	22	8.73%	\$4,700	\$123,745
47	\$55,720	23	8.73%	\$4,864	\$134,917
48	\$57,671	24	8.73%	\$5,035	\$146,821
49	\$59,689	25	8.73%	\$5,211	\$159,502
50	\$61,778	26	8.73%	\$5,393	\$173,004
51	\$63,940	27	8.73%	\$5,582	\$187,374
52	\$66,178	28	8.73%	\$5,777	\$202,662
53	\$68,495	29	8.73%	\$5,980	\$218,923
54	\$70,892	30	8.73%	\$6,189	\$236,211
55	\$73,373	31	8.73%	\$6,405	\$254,585
56	\$75,941	32	8.73%	\$6,630	\$274,107
57	\$78,599	33	8.73%	\$6,862	\$294,844
58	\$81,350	34	8.73%	\$7,102	\$316,863
59	\$84,197	35	8.73%	\$7,350	\$340,238
60	\$87,144	36	8.73%	\$7,608	\$365,046
61	\$90,194	37	8.73%	\$7,874	\$391,367
62	\$93,351	38	8.73%	\$8,150	\$419,286
63	\$96,618	39	8.73%	\$8,435	\$448,893
64	\$100,000	40	8.73%	\$8,730	\$480,283
65	(Annuity ~ \$40,000/year)				

At the outset, column 1 of Table 4 again shows the hypothetical worker's age ( $x$ )—from age 25 to age 65, and column 2 again shows her salary ( $S_x$ )—starting at \$26,141 at age 25 and growing to \$100,000 at age 64. Column 3 then shows the number of years of service she has completed by the end of each year ( $Y_x$ )—starting at 1 year of service at the end of the year that she started working ( $Y_{25} = 1$ ) and increasing to 40 years of service by the end of the year that she turns age 64 ( $Y_{64} = 40$ ).

Column 4 of Table 4 then shows the 8.73% of salary contribution rate ( $CP_x$ ), and Column 5 shows the resulting annual contribution amounts ( $C_{Px}$ ), starting at \$2,282 at age 25 ( $C_{P25} = \$2,282$ ) and growing to \$8,730 at age 64 ( $C_{P64} = \$8,730$ ).<sup>138</sup>

Finally, column 6 of Table 4 shows the account balance at the end of the year ( $AB_x$ ) (i.e., the accrued benefit at the end of the year). For simplicity, the model again treats annual contributions as made at the midpoint of the prior year. For example, given that the model defined contribution plan assumes a 5% discount rate, a little mathematics shows that the initial age-25 contribution of \$2,282 would grow to \$2,338 by the end of that year ( $AB_{25} = \$2,338$ ).<sup>139</sup> Similarly, by working through age 26, the balance in the account of this hypothetical worker will grow to \$4,876 by the end of that year ( $AB_{26} = \$4,876$ , column 6 of Table 4).<sup>140</sup> At retirement, the balance in her account will grow to around \$480,000 ( $AB_{64} = \$480,283$ ), and given the assumed annuity factor of 12, that balance could be used to buy her an annuity that would pay her around \$40,000 a year for life<sup>141</sup>—which is again roughly 40% of her \$100,000 final salary at age 64.

## Section V: Bringing in Some Real-World Considerations

Both of the simple model pension plans described in Section IV would provide the hypothetical worker with a pension starting at age 65 that would replace 40% of her preretirement earnings. So far, however, those model plans have failed to account for many of real-world complications, and this Section addresses some of the most important of those complications.

### A. UNDERFUNDING IN THE REAL WORLD

The model pension plans described in Section IV are designed to provide pensions that would replace 40% of the preretirement earnings of workers, and they would largely succeed in that task. In the real world, however, relatively few retirees have pensions that replace 40% of their preretirement earnings. With respect to defined contribution plans, it is fairly easy to see that not many workers have 8.73% of their salaries saved for retirement over a 40-year career. In particular, many employers do not offer defined contribution plans, and many of those that do offer plans contribute just 3% of salary—or less.<sup>142</sup> As a result, only a portion of workers ever manage to reach that 8.73%-of-salary contribution hurdle, let alone over 40 years of service.

<sup>138</sup> The numbers in this column are the same as those in column 3 of Table 3.

<sup>139</sup>  $\$2,338 = \$2,282 C_{P25} \times \sqrt{1.05}$ . The numbers in this column are the same as those in column 4 of Table 3.

<sup>140</sup>  $\$4,876 = \$2,338 AB_{25} \times 1.05 + \$2,362 C_{P26} \times \sqrt{1.05}$ .

<sup>141</sup>  $\$40,023.58 = \$480,283 AB_{64} / 12$ .

<sup>142</sup> See e.g., Tim Parker, *What is a Good 401(k) Match?*, INVESTOPEDIA (last updated Nov. 10, 2019), <https://www.investopedia.com/articles/personal-finance/120315/what-good-401k-match.asp> (noting that “[t]he majority of companies offer some sort of matching contribution for an average of 2.7% of a person’s pay”); G.E. Miller *Does your 401K Match Up Against the Averages?*, 20 SOMETHING FINANCE (Jan. 13, 2019), <https://20somethingfinance.com/401k-match/> (noting that the average 401(k) match is around 3.5%); *Employer Costs for Employee Compensation – March 2019*, 4 tbl.1 (U.S. Department of Labor News Release USDL-19-1002, June 18, 2019), available at <https://www.bls.gov/bls/news-release/ecec.htm#2019> (showing that defined contribution plans were just 2.0% of the compensation of civilian workers in December 2018); Eli R. Stoltzfus, *Defined contribution retirement plans: Who has them and what do they cost?*, 5(17) BEYOND THE NUMBERS: PAY & BENEFITS (U.S. Bureau of Labor Statistics, Dec. 2016), <https://www.bls.gov/opub/btn/volume-5/defined-contribution-retirement-plans-who-has-them-and-what-do-they-cost.htm> (showing that just 44% of private-sector workers participated in defined contribution plans in March of 2016 and that employers spent an average of just \$1.59 per hour worked on these plans); Vanguard, *How America Saves*

As for traditional defined benefit plans, even if these plans are designed to provide pensions that replace at least 40% of preretirement earnings, they often fall short of that target. Many of those shortfalls have to do with the fact that traditional defined benefit plans are backloaded (see, e.g., Figure 1 above), and, as more fully explained in Section VC below, only workers who spend their careers with a single employer are likely to get pensions that replace at least 40% of their preretirement earnings.

Moreover, many defined benefit plans are underfunded and will not be able to pay their promised benefits in full. To be sure, traditional defined benefit plans that use the entry age normal cost level-percentage-of-pay method to determine their contributions—and, in fact, make those required contributions—should almost certainly be *overfunded* (absent extraordinarily adverse investment experience). However, defined benefit pension plans are not required to make contributions that follow the entry age normal cost level-percentage-of-pay method. While ERISA imposes minimum funding requirement on plan sponsors, those requirements are not all that demanding.<sup>143</sup> Moreover, if a plan sponsor falls behind in funding its plan, ERISA typically gives the plan sponsor 7 years to make up the shortfall.<sup>144</sup> Making even these minimum contributions can be difficult for employers with aging or declining workforces as contribution burdens increase dramatically as workers complete more years of service (see Figure 2). Not surprisingly, in the real world many single-employer and multiemployer defined benefit plans are underfunded.<sup>145</sup>

State and local government defined benefit plans are even more underfunded than private-sector plans.<sup>146</sup> ERISA does not apply to State and local governmental plans (i.e., does not require them to make *any* contributions),<sup>147</sup> and while the Government Accounting Standards Board (GASB) requires that State and local governments use the entry age normal cost method *for financial reporting purposes*, GASB encourages State and local governments to develop their own funding policies separate from their financial reporting obligations.<sup>148</sup> Unfortunately, even when State and local governments have such funding policies, they often fail to make their “required” contributions.<sup>149</sup> For example, New Jersey made just 38.0% of its required contributions over the 2001–2013 period, and Pennsylvania made just 41.2% of its required contributions over that period; and those funding shortfalls led to precipitous declines in the funding levels of those State plans.<sup>150</sup>

## B. COST-OF-LIVING ADJUSTMENTS (COLAS)

The model pension plans assumed that the typical retiree would collect a level-dollar pension throughout her retirement (e.g., \$40,000-a-year for life for a worker with a final salary of \$100,000 at age 64). In the real world, however, retirees face inflation, and that inflation will erode the real value of any level-dollar pension. This Subsection explains how greater savings would be needed to offset those deleterious effects of inflation. In short,

2018 20–25 (June 2018), [https://pressroom.vanguard.com/nonindexed/HAS18\\_062018.pdf](https://pressroom.vanguard.com/nonindexed/HAS18_062018.pdf) (discussing the range of employer contributions to defined contribution plans).

<sup>143</sup> See *supra* note 99 and accompanying text. Basically, ERISA allows plan sponsors to fund their plans using something like the backloaded *traditional unit credit method*. To be sure, the Financial Accounting Standards Board (FASB) does require companies to use a less backloaded actuarial method—the projected unit credit actuarial cost method—to account for their accruing pension benefits for *financial accounting purposes* (i.e., what they report to managers, shareholders, lenders, suppliers, tax authorities, and regulators). Sylvester J. Schieber, *The Evolution and Implications of Federal Pension Regulation*, in *THE EVOLVING PENSION SYSTEM: TRENDS, EFFECTS AND PROPOSALS* 11, 36 (William G. Gale, John B. Shoven & Mark J. Warshawsky, eds., 2005).

<sup>144</sup> For example, when a private-sector, single-employer defined benefit plan becomes underfunded, the funding rules generally require it to make up the shortfall by making level installment payments amortized over 7 years. I.R.C. § 430(c)(2)(A); ERISA § 303(c)(2)(A), 29 U.S.C. § 1083(c)(2)(A).

<sup>145</sup> See *supra* Section IIIC.

<sup>146</sup> *Id.*

<sup>147</sup> ERISA § 4(b)(1), 29 U.S.C. § 1003(b)(1).

<sup>148</sup> See, e.g., Kim Nicholl & Paul Angelo, *GASB Approves New Accounting Standards for Public Sector Pension Plans and Sponsoring Employers*, SOCIETY OF ACTUARIES PENSION SECTION NEWSLETTER (Nov. 2012), <https://www.soa.org/news-and-publications/newsletters/pension-section-news/2012/november/psn-2012-iss78/gasb-approves-new-accounting-standards-for-public-sector-pension-plans-and-sponsoring-employers/>.

<sup>149</sup> See, e.g., Keith Brainard & Alex Brown, *The Annual Required Contribution Experience of State Retirement Plans, FY 01 to FY 13* (National Association of State Retirement Administrators, Insight on . . . , Mar. 2015), [https://www.nasra.org/files/JointPublications/NASRA\\_ARC\\_Spotlight.pdf](https://www.nasra.org/files/JointPublications/NASRA_ARC_Spotlight.pdf).

<sup>150</sup> *Id.* at 8.

more money must be saved if retirees want pensions that will retain their real value over time. In passing, it is worth recalling that Social Security benefits *are* adjusted for post-retirement inflation.<sup>151</sup>

### 1. How Will Post-Retirement Inflation Affect A Level-Dollar Pension?

At the outset, Table 5 shows how inflation can erode the real value of any level-dollar pension over time. Column 1 shows the retiree's age (x) from age 65 through age 110. In that regard, columns 6 and 7 show the Social Security Administration's estimates of period life expectancy in 2016 for males and females of various ages, respectively.<sup>152</sup> While the average life expectancy of a 65-year-old then was around 20 years, many will live to be 100 or more.<sup>153</sup>

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<sup>151</sup> See *supra* note 27 and accompanying text.

<sup>152</sup> Social Security Administration, *Actuarial Life Table*, *supra* note 115.

<sup>153</sup> For example, the Social Security Administration's 2016 period life table shows 994 live males at age 100 (compared with 79,893 living 65-year-old males), and 2,892 live females at age 100 (compared with 87,574 living 65-year-old females). *Id.*

**Table 5. Postretirement Inflation, from Age 65 to Age 110**

<i>Age (x)</i>	<i>Nominal Pension (NVP<sub>x</sub>)</i>	<i>Inflation Rate (r<sub>x</sub>)</i>	<i>Real Value of a \$40,000 Pension (RVP<sub>x</sub>)</i>	<i>Nominal Pension with a Constant Real Value of \$40,000 (NRP<sub>x</sub>)</i>	<i>Social Security 2016 Period Life Expectancy for Males (MLE<sub>x</sub>)</i>	<i>Social Security 2016 Period Life Expectancy for Females (FLE<sub>x</sub>)</i>
65	\$40,000	2.5%	\$40,000	\$40,000	17.92	20.49
66	\$40,000	2.5%	\$39,024	\$41,000	17.20	19.69
67	\$40,000	2.5%	\$38,073	\$42,025	16.49	18.89
68	\$40,000	2.5%	\$37,144	\$43,076	15.78	18.11
69	\$40,000	2.5%	\$36,238	\$44,153	15.09	17.33
70	\$40,000	2.5%	\$35,354	\$45,256	14.40	16.57
71	\$40,000	2.5%	\$34,492	\$46,388	13.73	15.82
72	\$40,000	2.5%	\$33,651	\$47,547	13.07	15.09
73	\$40,000	2.5%	\$32,830	\$48,736	12.43	14.37
74	\$40,000	2.5%	\$32,029	\$49,955	11.80	13.66
75	\$40,000	2.5%	\$31,248	\$51,203	11.18	12.97
76	\$40,000	2.5%	\$30,486	\$52,483	10.58	12.29
77	\$40,000	2.5%	\$29,742	\$53,796	10.00	11.62
78	\$40,000	2.5%	\$29,017	\$55,140	9.43	10.98
79	\$40,000	2.5%	\$28,309	\$56,519	8.88	10.35
80	\$40,000	2.5%	\$27,619	\$57,932	8.34	9.74
81	\$40,000	2.5%	\$26,945	\$59,380	7.82	9.15
82	\$40,000	2.5%	\$26,288	\$60,865	7.32	8.58
83	\$40,000	2.5%	\$25,647	\$62,386	6.84	8.04
84	\$40,000	2.5%	\$25,021	\$63,946	6.38	7.51
85	\$40,000	2.5%	\$24,411	\$65,545	5.94	7.01
86	\$40,000	2.5%	\$23,815	\$67,183	5.52	6.53
87	\$40,000	2.5%	\$23,235	\$68,863	5.12	6.07
88	\$40,000	2.5%	\$22,668	\$70,584	4.75	5.64
89	\$40,000	2.5%	\$22,115	\$72,349	4.40	5.23
90	\$40,000	2.5%	\$21,576	\$74,158	4.08	4.85
91	\$40,000	2.5%	\$21,049	\$76,012	3.78	4.50
92	\$40,000	2.5%	\$20,536	\$77,912	3.50	4.18
93	\$40,000	2.5%	\$20,035	\$79,860	3.25	3.88
94	\$40,000	2.5%	\$19,546	\$81,856	3.03	3.61
95	\$40,000	2.5%	\$19,070	\$83,903	2.83	3.37
96	\$40,000	2.5%	\$18,605	\$86,000	2.66	3.16
97	\$40,000	2.5%	\$18,151	\$88,150	2.51	2.96
98	\$40,000	2.5%	\$17,708	\$90,354	2.37	2.79
99	\$40,000	2.5%	\$17,276	\$92,613	2.25	2.63
100	\$40,000	2.5%	\$16,855	\$94,928	2.13	2.48
101	\$40,000	2.5%	\$16,444	\$97,301	2.02	2.33
102	\$40,000	2.5%	\$16,043	\$99,734	1.91	2.19
103	\$40,000	2.5%	\$15,651	\$102,227	1.81	2.06
104	\$40,000	2.5%	\$15,270	\$104,783	1.71	1.93
105	\$40,000	2.5%	\$14,897	\$107,403	1.61	1.81
106	\$40,000	2.5%	\$14,534	\$110,088	1.52	1.69
107	\$40,000	2.5%	\$14,181	\$112,840	1.43	1.58
108	\$40,000	2.5%	\$13,834	\$115,661	1.35	1.47
109	\$40,000	2.5%	\$13,496	\$118,552	1.27	1.37
110	\$40,000	2.5%	\$13,167	\$121,515	1.19	1.27

Column 2 of Table 5 shows that the nominal value of the hypothetical worker's model pensions developed in Section IV was \$40,000 a year ( $NVP_x = \$40,000$ ), and Column 3 of Table 5 assumes that postretirement inflation is 2.5% (the same as it was before retirement). Consequently, column 4 shows how the real value of a level-dollar pension would decline throughout retirement. For example, while a nominal pension of \$40,000 at age 65 ( $NVP_{65} = \$40,000$ , column 2 of Table 5) would also have a real value of \$40,000 at age 65 ( $RVP_{65} = \$40,000$ , column 4 of Table 5); a nominal pension of \$40,000 at age 66 ( $NVP_{66} = \$40,000$ , column 2 of Table 5) would be worth just \$39,024 in real dollars at age 66 ( $\$39,024 RVP_{65} = \$40,000 / 1.025 = \$40,000 / (1.000 + 0.025)$ , column 4 of Table 5). All in all, column 4 shows how the real value of the hypothetical worker's pension will decline from a real value of \$40,000 ( $RVP_{65} = \$40,000$ ) at age 65 to just \$25,021 ( $RVP_{84} = \$25,021$ ) at age 84, to just \$16,855 at 100 ( $RVP_{100} = \$16,855$ ), and to just \$13,167 at age 110 ( $RVP_{110} = \$13,167$ ).

## 2. How Can A Cost-Of-Living Adjustment (Cola) Maintain The Real Value Of A Pension?

In order to ensure that a retiree's pension maintains its real value throughout retirement, that pension should be adjusted for inflation each year. For example, if inflation is 2.5% at age 65, then the retiree's \$40,000 pension should increase to \$41,000 at age 66 in order to retain its real value ( $\$41,000 = \$40,000 \times 1.025$ ). Accordingly, column 5 of Table 5 shows how the hypothetical worker's nominal pension should increase each year in order to maintain a constant real value of \$40,000: starting at \$40,000 at age 65 ( $NRP_{65} = \$40,000$ ), her pension should grow to \$63,946 at age 84 ( $NRP_{84} = \$63,946$ ), \$94,928 at age 100 ( $NRP_{100} = \$94,928$ ), and \$121,515 at age 110 ( $NRP_{110} = \$121,515$ ).

## 3. How Much More Should Be Saved To Pay For That Cola?

To be sure, with \$480,000 saved when the hypothetical worker reaches age 65, she could be provided with an inflation-adjusted pension—but not one that would pay \$40,000 a year in real dollars. In short, an inflation-adjusted pension would cost more than \$480,000. In that regard, the author estimates that the model pensions outlined in Section IV would need to accumulate around 23% more assets by age 65 to be able to provide a 2.5% cost-of-living increases over the course of the hypothetical worker's retirement.<sup>154</sup> That is, contributions would need to be roughly 23% higher. For example, since career-long contributions of 8.73% of payroll were enough to provide the hypothetical worker with a level-dollar pension of \$40,000 a year under the entry age normal cost level-percentage-of-salary method, then career-long contributions of 10.74% of salary would be necessary to instead provide her with an inflation-adjusted pension starting at \$40,000 a year and growing to \$63,946 at age 84 and eventually to \$121,515 at age 110 ( $10.74\% = 1.23 \times 8.73\%$ ). In short, in order to provide an inflation-adjusted pension that would replace 40% of a worker's preretirement earnings after a 40-year career, every year almost 11% of salary should be saved for retirement.

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<sup>154</sup> As a rough estimate, the author thought about the problem in the following way. The model pensions in Section IV of this Paper all assumed that if there was \$480,000 available at age 65, then, given the annuity factor of 12, and 20-year life expectancy, that \$480,000 would lead to an average of 20 nominal payments of \$40,000. It turns out that the present value of 20 \$40,000 payments from age 65 through age 84 at a 5% discount rate is actually \$523,412. On the other hand, the present value at age 65 of the first 20 entries of column 5 of Table 5 (the first 20 payments under the inflation-adjusted pension) at a 5% discount rate is \$642,470; and  $\$642,470 / \$523,412 = 1.22747$ . Accordingly, if \$480,000 is enough to make 20 annual payments of \$40,000, then roughly 23% more retirement savings would be needed (at age 65) in order to make the first \$40,000 pension payment and the next 19 inflation-adjusted pension payments in column 5 of Table 5 ( $0.22747 = 1.22747 - 1.0$ ). (To be sure, the \$523,412 present value does seem anomalous when compared with the \$480,000 actually accumulated retirement savings for the model pensions, but for simplicity this Paper assumed an annuity factor of 12 rather than actually generating a model-specific annuity factor based on the other economic and demographic assumptions. Moreover, for purposes of the 23% estimate computed in this footnote, all that really matters are the *relative* values of the level-dollar pension and the 2.5%-inflation-adjusted pension, and the absolute values of the two pensions are irrelevant.) Accordingly, if \$480,000 would be enough for a \$40,000-a-year level-dollar pension, then \$589,000 would be enough for an inflation-adjusted pension starting at \$40,000 at age 65 and growing to \$63,946 at age 84 ( $\$589,183 = 1.22746517 \times \$480,000 = \$480,000 \times \$642,470 / \$523,412$ ).

A proper estimate of the cost of a real-world COLA would require using real life expectancies and would involve using an annuity factor that itself takes the cost-of-living adjustment rate into account. See, e.g., Forman & Sabin, *Tontine Pensions*, *supra* note 122, at 793 n.143.



## C. WORKING CAREERS AND BENEFIT ACCUMULATION IN THE REAL WORLD

In the real world, not every worker actually has a 40-year career. Moreover, even if a worker has a 40-year career, she may not actually accrue benefits under a pension in every one of those 40 years. Finally, even if a worker accrues benefits under a pension every one of those 40 years, she may not actually vest in all of those accrued benefits. Accordingly, if saving around 11% a year for retirement would provide a worker with a 40-year career with an inflation-adjusted pension that would replace 40% of her preretirement earnings, then workers who have shorter careers or accrue or vest in less retirement savings would need to save more than 11% of salary in the years that they do accumulate retirement savings. On the other hand, workers who accumulate retirement savings in more years—for example, because they do not retire until age 70—could have secure pensions even if they save less than 11% of salary in each year that they work.

This Subsection highlights many of real-world factors that impede the accumulation of sufficient retirement savings to ensure that every retiree has a pension that would replace 40% of her preretirement earnings. In thinking about this problem, it can make sense to compare the current, voluntary pension system with an imaginary *universal pension system* that would ensure that virtually every worker would accumulate meaningful retirement savings in every job she works. For example, imagine a simple system of individual retirement savings accounts added on top of the current Social Security system. Under such a universal pension system, an additional, say, 10% of payroll could be withheld from every worker's paycheck and contributed to her individual account.<sup>155</sup> In short, this Subsection highlights many of the ways that our current, voluntary pension system falls short of that imaginary universal pension system and so cannot reasonably be expected to provide most Americans with lifetime pensions that will replace 40% of their preretirement earnings.

### 1. Work Patterns In The Real World

In the real world, relatively few employees actually work for 40 years before retiring,<sup>156</sup> let alone for 40 years with the same employer.<sup>157</sup> Many workers come in and out of the workforce as they pursue higher education, raise children, take care of aging parents and partners, or change jobs. Many Americans also work part-time jobs for significant portions of their careers.<sup>158</sup> In planning for adequate retirement incomes however, workers should want

<sup>155</sup> The details of whether those individual retirement savings accounts are held by the government or privately are irrelevant for this thought experiment, but see *infra* Section VIB for more discussion.

<sup>156</sup> Estimating the average career length of American men and women is a challenge. The U.S. Department of Labor's Bureau of Labor Statistics stopped producing worklife estimates in 1986. U.S. Department of Labor, Bureau of Labor Statistics, *Labor Force Statistics from the Current Population Survey*, <https://www.bls.gov/cps/lfcharacteristics.htm#worklife> (last modified Jan. 18, 2019); U.S. Department of Labor, Bureau of Labor Statistics, *Worklife Estimates: Effects of Race and Education* (Bulletin No. 2254, Feb. 1986), <https://www.bls.gov/opub/reports/worklife-estimates/archive/worklife-estimates-1986.pdf>. Since then, various forensic economists have developed worklife expectancy charts to help answer tort damages questions like "How much would a 40-year-old doctor killed in a car accident have earned over the rest of his then-expected working career?" See, e.g., Kurt V. Krueger & Frank Slesnick, *Total Worklife Expectancy*, 25(1) JOURNAL OF FORENSIC ECONOMICS 51, 61 tbl.3 (2014), <https://www.journalofforensiceconomics.com/doi/pdf/10.5085/jfe.25.1.51> (e.g., estimating that 25-year-old males who were actively participating in the labor force would spend about 33.67 more years in the labor force, and active 25-year-old females would spend about 27.36 years in the labor force).

Another approach for estimating average career length involves looking at Social Security records. In order to compute an individual's Social Security benefits, the Social Security Administration reviews each worker's earnings in covered employment. In that regard, a recent study used Social Security administrative data files to determine the median number of Social-Security-covered work years from ages 14–61 for a sample of birth cohort 1945 individuals who were newly eligible for retired worker benefits in 2007; and it found that the median worker had around 36 years in covered employment (41 years for males and 31 years for females). Hilary Waldron, *The Sensitivity of Proposed Social Security Benefit Formula Changes to Lifetime Earnings Definitions*, 72(2) SOCIAL SECURITY BULLETIN 1, 13 tbl.5 (2012), available at <https://www.ssa.gov/policy/docs/ssb/v72n2/ssb-v72n2.pdf> (this author's extrapolations from the table). Pertinent here, 48% of men and 42% of women who claimed retired-worker benefits in 2013 were age 62. Alicia H. Munnell & Anqi Chen, *Trends in Social Security Claiming 1* (Boston College, Center for Retirement Research, Issue in Brief No. 15-8, May 2015), [http://crr.bc.edu/wp-content/uploads/2015/05/IB\\_15-8.pdf](http://crr.bc.edu/wp-content/uploads/2015/05/IB_15-8.pdf).

<sup>157</sup> See *supra* note 94. and accompanying text.

<sup>158</sup> See, e.g., Megan Dunn, *Who chooses part-time work and why?*, MONTHLY LABOR REVIEW (Mar. 2018), <https://www.bls.gov/opub/mlr/2018/article/who-chooses-part-time-work-and-why.htm> (noting that 27.7 million people usually worked part time in 2016).

to earn some kind of pension coverage in almost every job that they hold and certainly on almost every job from age 25 until retirement. Unfortunately, workers do not always accumulate meaningful retirement savings on every job.

## 2. The Current Pension System Does Not Provide For Universal Participation And Coverage

Private employers are not required to offer pension plans to their employees, and, as already mentioned, at any point in time only around 56% of private-sector workers are covered by a pension.<sup>159</sup> In that regard, even if an employer does offer a plan, it does not have to cover all of its workers. Basically, in part to make plan administration relatively simple, ERISA permits employers to exclude many employees from participation and coverage. For example, employers do not have to allow workers under the age of 21 to participate in their plans, nor do employers have to permit workers to participate until those workers have completed one year of service.<sup>160</sup> Moreover, while employers must usually cover a significant percentage of their workers under the minimum coverage rules, they certainly do not have to cover all of their workers.<sup>161</sup>

## 3. Workers Do Not Always Accrue Significant Benefits on Every Job

Moreover, ERISA does not mandate any specific benefit levels for participating employees, nor does it require that benefits accrue evenly over time.<sup>162</sup> In short, benefits can be significantly backloaded in favor of long-service employees (see Figure 2). All in all, traditional final-average-pay defined benefit plans tend to penalize younger and mobile employees.<sup>163</sup>

## 4. Workers Do Not Always Vest in Their Accrued Benefits

Even if workers accrue valuable retirement benefits, they do not always vest in those benefits. While employees always immediately vest in their own contributions to ERISA-covered plans, they can be required to wait up to 5 years to vest in a defined benefit plan and up to 3 years to vest in employer contributions to a defined contribution plan.<sup>164</sup> Given how mobile the workforce is,<sup>165</sup> many employees simply will not vest in all of the benefits that they accrue.

## 5. Retirees Do Not Always Annuitize Their Retirement Savings

As already mentioned, while defined benefit plans typically provide lifetime annuities as the default option for retirees,<sup>166</sup> defined contribution plans usually provide lump sum distributions.<sup>167</sup> While annuities hold at least some of their value over time, when retirees take lump sum distributions, it seems likely that they will dissipate those distributions over just a few years and not use them to generate retirement income that can last a lifetime. Defined contribution plans are particularly leaky: they often allow participants to withdraw all or a portion of their individual

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<sup>159</sup> U.S. Department of Labor, Bureau of Labor Statistics, *National Compensation Survey: Employee Benefits in the United States—March 2019*, *supra* note 15, at tbl.2.

<sup>160</sup> I.R.C. § 410(a); ERISA § 202, 29 U.S.C. § 1052.

<sup>161</sup> I.R.C. § 410(b). An employer can satisfy the so-called ratio percentage coverage test if it covers just 70% of its non-highly-compensated workers. I.R.C. § 410(b)(1)(A).

<sup>162</sup> *See, e.g.,* Forman, *Pensions and retirement*, *supra* note 97, at 549.

<sup>163</sup> *Id.* at 565–566; William J. Wiatrowski, *Retirement Plan Design and the Mobile Workforce*, COMPENSATION AND WORKING CONDITIONS ONLINE U.S. Department of Labor, Bureau of Labor Statistics, Sept. 28, 2005), <https://www.bls.gov/opub/mlr/cwc/retirement-plan-design-and-the-mobile-workforce.pdf>.

<sup>164</sup> I.R.C. § 411(a); ERISA § 203, 29 U.S.C. § 1053.

<sup>165</sup> *See supra* note 97 and accompanying text.

<sup>166</sup> *See supra* note 7 and accompanying text.

<sup>167</sup> *See supra* note 14 and accompanying text.

accounts when they change jobs, and many plans allow participants to borrow against their accounts.<sup>168</sup> All in all, a significant portion of those premature distributions and loans will be dissipated before retirement.<sup>169</sup>

#### D. SOCIAL SECURITY REPLACEMENT RATES VARY WITH LIFETIME INCOME

The model pensions in Section IV assumed that Social Security would replace around 35% of preretirement earnings for the typical worker, and that is a plausible rough estimate. In the real world, however, Social Security replaces a larger percentage of the preretirement earnings of workers with low lifetime earnings than it replaces for those with higher lifetime earnings. That suggests that in the real world, low-income workers can plan to save a lower percentage of their salaries for their pensions and still be able to replace, say, 75% of their preretirement earnings.<sup>170</sup> On the other hand, high-income workers will need to save a larger percentage of their salaries in order to be able to replace 75% of their preretirement earnings.

In that regard, the Congressional Budget Office recently estimated that for workers born in the 1950s (baby-boomers), Social Security is replacing 52% of the preretirement earnings of workers in the lowest quintile of lifetime household earnings, but just 39% of the preretirement earnings of workers in the middle quintile—and just 23% for those in the top quintile.<sup>171</sup>

For workers born in the 2000s (generation Z), Social Security is *scheduled* to replace 68% of the income of workers in the lowest quintile of lifetime household earnings, 41% for those in the middle quintile, and 21% for those in the top quintile.<sup>172</sup> However, if Social Security's underfunding problem is not addressed, across-the-board benefit cuts would result in Social Security benefits *payable* that would replace just 47% of the earnings for workers in the lowest quintile of lifetime household earnings, just 28% for those in the middle quintile, and just 15% for those in the top quintile.<sup>173</sup>

Regardless of what happens to Social Security's finances, the pension-savings burden for low-income workers in the real world is actually lower than the estimates based on the model pensions developed in Section IV; that is, lower pension contribution rates should be adequate for them. On the other hand, high-income workers who hope to replace 75% of their preretirement earnings already need to save a greater percentage of their salaries than the model pensions in Section IV suggest, and, depending on how the Social Security underfunding problem is resolved, perhaps, a much greater percentage.

#### E. SPOUSAL ISSUES

The model pensions in Section IV assume that pension benefits will be paid in the form of a single-life annuity, but the model plans could easily be enhanced to pay benefits in the form of a qualified joint and survivor annuity (QJSA).<sup>174</sup> As the joint life expectancy of a couple would be longer than that of a single participant,<sup>175</sup> an actuarial reduction would be needed, and the QJSA would not replace 40% of preretirement earnings. At the same time,

<sup>168</sup> See, e.g., *Reducing Retirement Savings Leakage*, 37(9) EMPLOYEE BENEFIT RESEARCH INSTITUTE NOTES 2 (Aug. 2016), [https://www.ebri.org/docs/default-source/ebri-notes/ebri\\_notes\\_07-no9-aug16.pdf?sfvrsn=d1c5292f\\_0](https://www.ebri.org/docs/default-source/ebri-notes/ebri_notes_07-no9-aug16.pdf?sfvrsn=d1c5292f_0); U.S. Government Accountability Office, *401(k) Plans: Policy Changes Could Reduce the Long-term Effects of Leakage on Workers' Retirement Savings* (GAO-09-715, Aug. 2009), <https://www.gao.gov/assets/300/294520.pdf>.

<sup>169</sup> See, e.g., *The Impact of Leverages on 401(k) Accumulations at Retirement Age* (testimony of Jack VanDerhei before the ERISA Advisory Committee, June 17, 2014), <https://www.dol.gov/sites/default/files/ebsa/about-ebsa/about-us/erisa-advisory-council/2014-facilitating-lifetime-plan-participation-vanderhei-06-17.pdf>.

<sup>170</sup> See, e.g., Brady et al., *The Success of the U.S. Retirement System*, *supra* note 2.

<sup>171</sup> Congressional Budget Office, *CBO's 2019 Long-Term Projections for Social Security: Additional Information*, *supra* note 2, at B-8.

<sup>172</sup> *Id.*

<sup>173</sup> *Id.*

<sup>174</sup> ERISA § 205, 29 U.S.C. § 1055; I.R.C. § 401(a)(11). A QJSA is an immediate annuity for the life of the pension plan participant and a survivor annuity for the life of the participant's spouse. ERISA § 205(d)(1), 29 U.S.C. § 1055(d)(1); I.R.C. § 417(b).

<sup>175</sup> See, e.g., *supra* notes 10–11 and accompanying text

however, married couples are eligible for additional spousal benefits under Social Security that would probably more than offset the actuarial reductions that can result from selecting a QJSA over a single-life annuity.<sup>176</sup>

Pertinent here, while a QJSA is the default form of benefit for defined benefit plans, the usual rule for defined contribution plans is instead that the balance in a participant's account is payable to the spouse at death.<sup>177</sup> In short, the typical defined contribution participant is generally free to spend her defined contribution savings as she pleases and may not end up leaving anything for the benefit of her surviving spouse, let alone a survivor annuity. The rules governing IRAs are even more relaxed: an individual with an IRA is free to spend the balance in her account as she wishes and, furthermore, is free to designate whoever she wants as her beneficiary.<sup>178</sup> Congress could help protect nonemployee spouses by extending the QJSA regime to defined contribution plans and IRAs, or by requiring that the nonemployee spouse consent to the cash out of defined contribution plans and IRAs.<sup>179</sup>

## F. VARIABILITY IN ECONOMIC AND DEMOGRAPHIC VARIABLES

The model plans could easily accommodate simple alternative assumptions about economic and demographic variables. Modelling real-world fluctuations and variance in such variables as the interest rate (i.e., the rate-of-return of investments) and the inflation rate would be more challenging but certainly possible. However, the most important assumptions to reconsider are the ones that relate to mortality.

First, the model pensions in Section IV assumed that all workers lived from age 25 to 65. In fact, only around 85% are likely to live from age 25 to age 65 and collect a pension.<sup>180</sup> As those workers who die before 65 do not need pensions, the actual cost of providing pensions for the survivors should be somewhat lower than what the model pensions estimated (ignoring any surviving spousal benefits). As already mentioned, with defined benefit plans, the plan sponsor's aggregate funding obligation would be lower because the accrued benefits of those who die before age 65 are typically forfeited.<sup>181</sup> Participants in defined contribution plans (and IRAs) could also benefit from those *mortality gains* (i.e., save less) if, throughout their careers, they invested their individual accounts in lifetime annuities.<sup>182</sup>

Second, while the assumed life expectancy for a 65-year-old retiree is 20 years, the model pensions could probably do a better job at estimating the costs of providing those pensions. For simplicity, the model pension plans estimated pension costs by modeling 20 pension payments—from age 65 through age 84, but, of course, not every retiree lives exactly 20 years in retirement. A more complicated model should estimate pension costs based on the full range of retiree lives.

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<sup>176</sup> A retirement-age wife or husband of a retired worker can claim a monthly benefit equal to 50% of the worker's primary insurance amount (PIA). 42 U.S.C. § 402. Consequently, a retired worker and retirement-age spouse can claim a monthly benefit equal to 150% of what the retired worker alone could claim. For example, if a retired worker could claim a benefit equal to \$1,000 a month, a retired couple could claim a benefit of \$1,500 a month. In addition, a retirement-age widow or widower of the worker is entitled to a monthly surviving spouse benefit equal to 100% of the worker's PIA. For example, if a retired worker could claim a benefit of \$1,000 a month (and a retired couple benefit of \$1,500 a month), the surviving spouse could claim a benefit of \$1,000 a month.

<sup>177</sup> ERISA § 205, 29 U.S.C. § 1055; I.R.C. § 401(a)(11).

<sup>178</sup> Internal Revenue Service, *Retirement Topics – Beneficiary* (last updated Jan. 8, 2020), <https://www.irs.gov/retirement-plans/plan-participant-employee/retirement-topics-beneficiary>.

<sup>179</sup> See, e.g., S. 975, 116<sup>th</sup> Cong. (2019) (Women's Retirement Protection Act introduced by Senator Patty Murray [D-WA]).

<sup>180</sup> See *supra* note 115 and accompanying text.

<sup>181</sup> See *supra* note 116 and accompanying text.

<sup>182</sup> Individuals who invest in annuity-like products have mortality gains and losses depending on when they die. Individuals who live longer than their peers get mortality gains from those who precede them, while individuals who die earlier than their peers suffer mortality losses. See David Blake, *Annuity Markets: Problems and Solutions*, 24 GENEVA PAPERS ON RISK AND INSURANCE 358, 371 (1999) (explaining that a mortality cross-subsidy "arises because some annuitants will die shortly after taking out an annuity thereby releasing a 'mortality profit' which insurance companies share with longer-surviving annuitants").

Finally, it should be noted that life expectancy varies with such demographic factors as gender, income, educational level, and race and Hispanic origin.<sup>183</sup> For example, as already mentioned, women tend to live longer than men.<sup>184</sup> Policymakers need to bear in mind that some policies to encourage greater annuitization might have undesirable distributional consequences.

## Section VI: Fully Funded Pensions: Discussion and Some Options for Reform

How can we ensure that retirees will have fully funded pensions that will provide them with adequate incomes throughout their retirement years? First, we should make sure that the Social Security system is fully funded. Second, we should make sure that virtually every retiree also has an inflation-adjusted pension that will replace a meaningful percentage of her preretirement earnings. These are discussed in turn.

### A. FUND SOCIAL SECURITY

First, we should make sure that the Social Security system is fully funded. As explained in Section IIIB, the Social Security system operates largely on a pay-as-you-go basis (PAYG) and is currently underfunded by \$13.9 trillion. The federal government should commit to eliminating that funding shortfall, and Table 6 shows how some representative changes to the Social Security system could reduce the program's underfunding.<sup>185</sup> The Social Security Administration also routinely provides actuarial estimates of Social Security reform proposals.<sup>186</sup> In that regard, for example, the recently-introduced Social Security 2100 Act would raise taxes enough to both expand benefits for many elderly Americans and also ensure that the Social Security system is solvent for the rest of the century.<sup>187</sup>

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<sup>183</sup> See, e.g., the various sources at U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Health Statistics, *Life Expectancy*, <http://www.cdc.gov/nchs/fastats/life-expectancy.htm> (last visited Feb. 3, 2020).

<sup>184</sup> See, e.g., *supra* note 10 and accompanying text.

<sup>185</sup> Social Security Administration, Office of the Actuary, *Summary of Provisions that Would Change the Social Security Program* (July 1, 2020), <https://www.ssa.gov/oact/solvency/provisions/summary.pdf>.

<sup>186</sup> Social Security Administration, *Office of the Chief Actuary's Estimates of Proposals to Change Social Security*, *supra* note 90.

<sup>187</sup> H.R. 860, 116<sup>th</sup> Congress (2019) (introduced on Jan. 30, 2019 by Representative John B. Larson (D-CT)); Social Security Administration, Office of the Actuary, *Estimates of the Financial Effects on Social Security of the "Social Security 2100 Act"* (letter to Representative John Larson, Senator Richard Blumenthal, and Senator Chris Van Hollen, Jan. 30, 2018), [https://www.ssa.gov/oact/solvency/LarsonBlumenthalVanHollen\\_20190130.pdf](https://www.ssa.gov/oact/solvency/LarsonBlumenthalVanHollen_20190130.pdf).

**Table 6. How Various Changes Could Reduce the Social Security Underfunding**

<i>Description of proposed provisions</i>	<i>Shortfall Eliminated</i>
Starting December 2021, reduce the annual COLA by 1 percentage point.	59%
Price indexing of PIA factors beginning with those newly eligible for OASDI benefits in 2027: Reduce factors so that initial benefits grow by inflation rather than by the SSA average wage index.	86%
After the normal retirement age (NRA) reaches 67 for those age 62 in 2022, increase the NRA 2 months per year until it reaches 69 for individuals attaining age 62 in 2034. Thereafter, increase the NRA 1 month every 2 years.	38%
Increase the payroll tax rate (currently 12.4%) to 15.8% in 2021 and later.	101%
Eliminate the taxable maximum in years 2021 and later, and apply full 12.4% payroll tax rate to all earnings. Provide benefit credit for earnings above the current-law taxable maximum.	55%
Starting in 2021, tax Social Security benefits in a manner similar to private pension income. Phase out the lower-income thresholds during 2021-2020.	6%

Source: Social Security Administration, Office of the Actuary, *Summary of Provisions that Would Change the Social Security Program* (July 1, 2020), <https://www.ssa.gov/oact/solvency/provisions/summary.pdf>.

**B. FULLY FUND PENSIONS FOR VIRTUALLY ALL WORKERS**

Second, we should make sure that virtually every retiree also has a secure and adequate pension that will help provide lifetime income security. These pensions could take the form of traditional defined benefit plans, newer defined benefit plans, or defined contribution plans. The key is to make sure that enough retirement savings are accumulated for each retiree and that those accumulated savings are used to provide lifetime income—ideally in the form of an inflation-adjusted lifetime annuity.

To be sure, there are many ways to increase the incomes of retirees. In particular, it would make sense to expand Social Security and Supplemental Security Income programs to ensure that all elderly Americans have enough retirement income to keep them out of poverty.<sup>188</sup> In this Subsection, however, the focus is on how *pensions alone* could be used to provide additional retirement income—on top of Social Security. At the outset, building on the model pensions developed in Section IV, this Subsection shows how a universal pension system could be designed to replace, say, 40% of preretirement earnings. Finally, this Subsection also considers a variety of less extensive reform options that could help increase the number of retirees whose pensions would replace a meaningful percentage of their preretirement earnings.

**1. A Universal Pension System**

As outlined in Section VC, one can imagine a universal pension system consisting of a system of individual retirement savings accounts added on top of the current Social Security system. In 1981, for example, the

<sup>188</sup> See, e.g., Jonathan Barry Forman, *Universal Pensions*, 2 CHAPMAN LAW REVIEW 95, 109–114 (1999), <https://digitalcommons.chapman.edu/cgi/viewcontent.cgi?referer=https://www.google.com/&httpsredir=1&Paper=1016&context=chapman-law-review>.

President's Commission on Pension Policy recommended adoption of a Minimum Universal Pension System (MUPS) that would have required all employers to contribute at least 3% of wages to private pensions for their workers.<sup>189</sup> The simplest design for such a universal pension system would be to piggyback a system of individual retirement savings accounts onto the existing Social Security withholding system, and over the years, many analysts have recommended adding such individual accounts on top of the current Social Security system.<sup>190</sup>

These universal pension accounts could be held by the government or by large financial institutions. Either way, the funds should be invested, and universal pension account balances should be paid out as lifetime annuities. Presumably, contributions to these universal pension accounts would be made with respect to every job of every worker in Social-Security-covered employment, and all contributions would vest immediately.

As the model pensions in Section IV showed, over a 40-year career, contributions of around 9% of salary to such universal pension accounts would result in enough assets at retirement to fund a level-dollar pension that would initially replace around 40% of preretirement earnings. Similarly, as the discussion of cost-of-living adjustments in Section VB showed, contributions of around 11% of salary could result in an inflation-adjusted pension that would replace 40% of preretirement earnings in real dollars for life. The actual contribution rates might be set even lower as work on Social Security covered employment before age 25 and after age 64 would also result in contributions to these individual retirement savings accounts.

In the present political climate, however, it seems unlikely that the federal government will enact a mandatory universal pension system, let alone a system that would require workers to contribute 9% of compensation (or more) to individual retirement savings accounts. Realistically, however, the federal government might create a voluntary universal pension system—one where workers are automatically enrolled unless they opt out. In that regard, a number of States are already creating such universal pension systems—at least for workers who are not already covered by an employer-sponsored pension.<sup>191</sup>

Contributions to these universal pension accounts could be automatically withheld from the salaries of every worker on every job, unless that worker opts out (i.e., *automatic enrollment*). Moreover, every worker should automatically be reenrolled each year, although each worker could again opt out (i.e., *automatic reenrollment*). Such automatic enrollment features would almost certainly lead to high participation rates—and high levels of retirement savings.<sup>192</sup> These universal pension accounts could also be designed to invest in target-date funds and/or annuities, unless the worker elects otherwise (i.e., *qualified default investment alternatives*).<sup>193</sup>

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<sup>189</sup> President's Commission on Pension Policy, *Coming of Age: Toward a National Retirement Income Policy* (Washington, D.C.: President's Commission on Pension Policy, 1981); *Report of the President's Commission on Pension Policy: Executive Summary*, 44(5) SOCIAL SECURITY BULLETIN 14 (May 1981), <https://www.ssa.gov/policy/docs/ssb/v44n5/v44n5p14.pdf>.

In the long run, such 3% add-on individual accounts could provide an annual retirement benefit equal to anywhere from 10 to 15% of preretirement earnings. From the hypotheticals in this Paper, lifetime contributions of 3% of salary would lead to a pension that would replace around 13.7% of preretirement earnings ( $13.7457 = 3\% \times 40\% / 8.73\%$ ), although it would take lifetime contributions of around 3.7% of salary for that pension to keep up with inflation ( $3.69\% = 3\% \times 1.23$ ). See also Adam L. Carasso & Jonathan Barry Forman, *Tax Considerations in a Universal Pension System* (Urban-Brookings Tax Policy Center Discussion Paper No. 28, Dec. 2007), <https://www.urban.org/sites/default/files/publication/46936/411593-Tax-Considerations-in-a-Universal-Pension-System-UPS-.PDF> (estimating that a 3% universal pension system could replace an additional 14.4% of final wages for all men retiring at 65 [and 13.3% of final wages for all women]).

<sup>190</sup> See, e.g., Forman, *Universal Pensions*, *supra* note 188, at 108–116; TONY JAMES & TERESA GHILARDUCCI, *RESCUING RETIREMENT: A PLAN TO GUARANTEE RETIREMENT SECURITY FOR ALL AMERICANS* (Disruption Books 2016) (calling for mandatory 3%-of-salary guaranteed retirement accounts).

<sup>191</sup> See, e.g., Pension Rights Center, *State-based retirement plans for the private sector*, <http://www.pensionrights.org/issues/legislation/state-based-retirement-plans-private-sector> (last visited Feb. 3, 2020); AARP Public Policy Institute, *State Retirement Savings Resource Center*, <https://www.aarp.org/ppi/state-retirement-plans.html> (last visited Feb. 3, 2020).

<sup>192</sup> See, e.g., OECD, *OECD PENSIONS OUTLOOK 2012* 45–76 (2012), [http://www.oecd-ilibrary.org/finance-and-investment/oecd-pensions-outlook-2012\\_9789264169401-en](http://www.oecd-ilibrary.org/finance-and-investment/oecd-pensions-outlook-2012_9789264169401-en).

<sup>193</sup> Cf., I.R.C. § 404(c) (which allows 401(k) sponsors to choose qualified default investment alternatives for workers who do not otherwise direct their own investments).



Finally, these universal pension accounts could also be used to automatically combine each worker's past pensions into a single account (i.e., *auto-portability*).<sup>194</sup> With auto-portability workers would be much less likely to dissipate pensions when they change jobs, and they would never lose a pension because they forgot about it: old pensions would automatically be combined into the worker's new universal pension account. Thus, auto-portability would help reduce leakage and preserve retirement savings—for retirement purposes.<sup>195</sup>

## 2. Strengthening the Current Pension System

Short of adopting add-on Social Security accounts or creating some other form of universal pension accounts, there are many reforms that could increase the lifetime incomes of many retirees. In particular, it would make sense to toughen the minimum funding rules for defined benefit plans. For example, defined benefit plans should be pushed towards faster prefunding methods, and larger contributions should be required of employers that sponsor defined contribution plans.

Government policies could also be designed to encourage workers to save more for retirement, to get better returns on their investments, to work longer, and to preserve their retirement savings until they retire.<sup>196</sup> Government could also do more to mandate or at least encourage the annuitization of retirement savings.<sup>197</sup> In particular, the government could even get into the market of selling annuities. For example, one recent proposal would allow workers to purchase additional Social Security retirement benefits on an actuarially fair basis.<sup>198</sup>

Other government efforts to expand participation and coverage could also increase retirement savings.<sup>199</sup> In particular, toughening the minimum requirements for plan participation, coverage, and vesting should help part-time workers and mobile workers accumulate more savings for retirement.

## Section VII: Conclusion

Longevity is one of the greatest risks facing retirees now and in the future.<sup>200</sup> While Social Security provides significant lifetime income for retirees, under the current pension system, many pensions are not funded well enough to provide workers with meaningful retirement benefits. At the outset, this Paper noted that Social Security benefits will typically replace around 35% of the typical worker's preretirement earnings and that the typical worker will want to have a pension that would replace another 40% of preretirement earnings.

This Paper then developed a model defined benefit plan and a model defined contribution plan and showed how those model pensions could replace 40% of preretirement earnings. More specifically, this Paper showed that over a 40-year career from age 25 to age 65, annual contributions of around 9% of salary could generate enough

<sup>194</sup> Cf., Brian Croce, *Auto portability program gets thumbs up by regulators*, PENSIONS & INVESTMENTS (July 31, 2019), <https://www.pionline.com/regulation/auto-portability-program-gets-thumbs-regulators>; Retirement Clearinghouse, *Auto Portability - Increasing Retirement Security for Americans*, <https://rch1.com/auto-portability> (last visited Feb. 3, 2020).

<sup>195</sup> See, e.g., Jack VanDerhei, *The Impact of Auto Portability on Preserving Retirement Savings Currently Lost to 401(k) Cashout Leakage* (Employee Benefit Research Institute, Issue Brief No. 489, Aug. 15, 2019), [https://www.ebri.org/docs/default-source/ebri-issue-brief/ebri\\_ib\\_489\\_autoport-15aug19.pdf?sfvrsn=80723c2f\\_4](https://www.ebri.org/docs/default-source/ebri-issue-brief/ebri_ib_489_autoport-15aug19.pdf?sfvrsn=80723c2f_4).

<sup>196</sup> See, e.g., Forman, *Removing the Legal Impediments to Offering Lifetime Annuities in Pension Plans*, *supra* note 77, at 112–122.

<sup>197</sup> *Id.* at 128–136.

<sup>198</sup> Ian Ayres & Jacob Hacker, *Social Security Plus*, 26 ELDER LAW JOURNAL 261 (2019), <https://theelderlawjournal.com/2019/02/18/ayres-and-hacker/>. See also Margarida Correia, *Thaler pushing retirement idea*, PENSIONS & INVESTMENTS (Apr. 29, 2019), <https://www.pionline.com/article/20190429/PRINT/190429886/thaler-pushing-retirement-income-idea> (discussing Nobel laureate Richard H. Thaler's recent proposal to allow workers to use a portion of their retirement savings to buy additional annuities from the Social Security Administration).

<sup>199</sup> See, e.g., Common Wealth & Aspen Institute Financial Security Program, *Portable Non-Employer Retirement Benefits: An Approach to Expanding Coverage for a 21st Century Workforce* (Feb. 2019), [https://assets.aspeninstitute.org/content/uploads/2019/02/Portable-nonemployer-retirement-benefits.pdf?\\_ga=2.157195193.347029611.1551971220-935375820.1551971220](https://assets.aspeninstitute.org/content/uploads/2019/02/Portable-nonemployer-retirement-benefits.pdf?_ga=2.157195193.347029611.1551971220-935375820.1551971220);

<sup>200</sup> See, e.g., Forman, *Removing the Legal Impediments to Offering Lifetime Annuities in Pension Plans*, *supra* note 77, at 32–33.

retirement savings to fund a level-dollar pension that would initially replace around 40% of preretirement earnings. Similarly, contributions of around 11% of salary could generate enough retirement savings to fund an inflation-adjusted pension that would replace 40% of preretirement earnings in inflation-adjusted dollars for life (i.e., real dollars).

Finally, this Paper offered some recommendations about how to improve the current pension system. In particular, this Paper showed how to design a universal pension system that could replace 40% of preretirement earnings for virtually every worker. While the prospects for adopting such a *mandatory* universal pension system are dim, the time is ripe for the federal government—or the States—to create a voluntary universal pension system—one where workers are automatically enrolled unless they opt out. Every worker would have an individual account to hold and invest her retirement savings, and, over time, those individual accounts would collect significant contributions, earn significant income, and ultimately pay meaningful pension benefits that would last a lifetime. Ideally, each year an individual works should make a significant contribution to the ultimate pension that that worker receives, and having a universal pension system could help achieve that result.

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