

Defined contribution plans, defined benefit plans, and the accumulation of retirement wealth

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Abstract

The private pension structure in the United States, once dominated by defined benefit (DB) plans, is currently divided between defined contribution (DC) and DB plans. Wealth accumulation in DC plans depends on a participant's contribution behavior and on financial market returns, while accumulation in DB plans is sensitive to a participant's labor market experience and to plan parameters. This paper simulates the distribution of retirement wealth under representative DB and DC plans. It uses data from the Health and Retirement Study (HRS) to explore how asset returns, earnings histories, and retirement plan characteristics contribute to the variation in retirement wealth outcomes. We simulate DC plan accumulation by randomly assigning individuals a share of wages that they and their employer contribute to the plan. We consider several possible asset allocation strategies, with asset returns drawn from the historical return distribution. Our DB plan simulations draw earnings histories from the HRS, and randomly assign each individual a pension plan drawn from a sample of large private and public defined benefit plans. The simulations yield distributions of both DC and DB wealth at retirement. Average retirement wealth accruals under current DC plans exceed average accruals under private sector DB plans, although DC plans are also more likely to generate very low retirement wealth outcomes. The comparison of current DC plans with more generous public sector DB plans is less definitive, because public sector DB plans are more generous on average than their private sector DB counterparts.

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1. Introduction

Private retirement arrangements in the United States were once predominantly defined benefit (DB) pension plans. In the last two decades, however, there has been a shift toward defined contribution (DC) arrangements. Very few firms have created new DB plans and many firms have moved toward greater reliance on DC plans, particularly for new workers. Many rapidly expanding industries have relied on DC rather than DB plans to provide for employee retirement. Buessing and Soto's (2006) analysis of data from Department of Labor Form 5500 filings shows that the number of individuals who participate only in a private sector DB plan has declined from 9.6 million in 1990 to 6.6 million in 2003. The number of individuals covered by both a DB and a DC plan has been roughly constant at nearly 14 million. The number of private sector employees with *only* DC coverage has risen from 11.5 million in 1990 to 30.1 million in 2003. These trends are likely to emerge in more recent data as well. Munnell and Soto (2007) explain that many firms have “frozen” DB plans since 2003.

Workers covered by DB plans are increasingly concentrated in the public sector. The U.S. Census Bureau (2006) reports 2659 federal, state, and local pension systems in the U.S., covering 17.9 million workers. Although the Census Bureau does not collect detailed data on plan type, a *Pensions and Investments* survey in 2004 shows that 224 of the 1000 largest pension plans were public sector plans, with DB assets representing 89.3% of all public sector pension assets. Among public sector plans, 62% have no DC assets, while for 89% DC assets are less than one fifth of combined DB and DC assets. The first *Pensions and Investments* survey in 1997 yields almost identical statistics.

The growth of private sector DC plans has given employees new responsibility for managing retirement assets and made retirement wealth accumulation a function of an employee's contribution and asset allocation decisions. Accrued benefits in DB plans do not depend on financial market returns, except in extreme circumstances such as plan insolvency. Benefits in DC plans, however, are a function of financial market returns. Some analysts have suggested that DC plans expose prospective retirees to greater risk than DB plans because of this link.

Several recent studies have examined financial market risk in DC plans and the role of asset allocation choices in controlling this risk. Shiller (2005) studies a variety of asset allocation rules in the context of a private accounts Social Security system — essentially a mandatory DC system. Poterba, Rauh, Venti, and Wise (hereafter PRVW, *in press*) examine how age-related adjustments in asset allocation, such as those associated with lifecycle mutual funds, affect the distribution of DC plan balances at retirement. Net-of-expense asset returns over the course of a DC plan participant's working life, asset allocation, and the participant's contribution rate are key determinants of these balances.

Although accumulations in DC plans are risky, they are not necessarily *riskier* than accumulations in DB plans. While many researchers have recognized that DB plan accumulations plans are uncertain from the participant's perspective, few have tried to compare the risks of DB and DC plans. Four previous studies are particularly noteworthy. Balcer and Sahin (1979) compare DB and DC plans in a lifecycle setting, recognizing that earnings uncertainty and job transitions have an important effect on the accumulated wealth of DB plan participants. Bodie, Marcus, and Merton (1988) note that DB and DC plans both entail risks, but that these risks are different. Neither of these studies make quantitative estimates of relative risks; two more recent studies do. Samwick and Skinner (2004) use data from the 1983 and 1989 Survey of Consumer Finances and the associated Pension Provider Supplement (PPS) to summarize DC and DB plan attributes. They generate synthetic earnings histories under the assumption that the logarithm of earnings follows a random walk with age-related drift, and they evaluate DB and DC wealth accumulation for these earnings histories. This approach may miss subtle stochastic properties of actual earnings histories. The

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