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⁹ M. Casares and B.T. McCallum, "An Optimizing IS-LM Framework with Endogenous Investment," NBER Working Paper No. 7908, September 2000.

¹⁰ B.T. McCallum, "Theoretical Analysis Regarding a Zero Lower Bound on Nominal Interest Rates," NBER Working Paper No. 7677, April 2000, and Journal of Money, Credit, and Banking, 32 (November 2000, pt. 2), pp. 870-904; and B.T. McCallum, "Monetary Policy Analysis in Models Without Money," NBER Working Paper No. 8174, March 2001, and Federal Reserve Bank of St. Louis Review, 83 (July/August 2001), pp. 145-60.

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¹² B.T. McCallum and E. Nelson, "Timeless Perspective vs. Discretionary Monetary Policy in Forward-Looking Models," NBER Working Paper No. 7915, September 2000; and B.T. McCallum, "Should Monetary Policy Respond Strongly to Output Gaps?" NBER Working Paper No. 8226, April 2001. Also relevant in this regard is A. Orphanides, "The Quest for Prosperity without Inflation," ECB Working Paper Series 2000-15, March 2000.

¹³ B.T. McCallum, "Analysis of the Monetary Transmission Mechanism," NBER Working Paper No. 7395, October 1999, and The Monetary Transmission Process: Recent Developments and Lessons for Europe, Deutsche Bundesbank, eds., Palgrave Publishers, 2001.

¹⁴ B.T. McCallum, "Issues in the Design of Monetary Policy Rules," NBER Working Paper No. 6016, April 1997, and J.B. Taylor and M. Woodford, eds., Handbook of Macroeconomics, North Holland: Elsevier Science, 1999; B.T. McCallum, "Indeterminacy, Bubbles, and the Fiscal Theory of Price Level Determination," NBER Working Paper No. 6456, March 1998, and Journal of Monetary Economics, 47 (February 2001), pp. 19-30; B.T. McCallum, "Monetary Policy Analysis in Models Without Money,"

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¹⁶ B.T. McCallum, "Role of the Minimal State Variable Criterion in Rational Expectations Models," NBER Working Paper No. 7087, April 1999, and International Tax and Public Finance, 6 (4) (November 1999), pp. 621-39.

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¹⁸ For example, J. Benhabib, S. Schmitt-Grohe, and M. Uribe, "The Perils of Taylor Rules," Journal of Economic Theory, 96 (January 2001), pp. 40-69.

Saving and Spending Retirement Wealth

Olivia S. Mitchell*

I am keenly interested in the mechanisms by which people accumulate and decumulate retirement wealth, as well as the factors that shape this process. The subject is of considerable international concern in light of looming Social Security shortfalls in most

developed nations, and the global shift from defined benefit to defined contribution pension systems. Future retirees clearly must bear a larger responsibility for ensuring their well being in retirement, yet there is reason to believe that existing retirement institutions do not always function efficiently and equitably. Accordingly, much of my work examines the form and function of public and private institutions that support saving for retirement and wealth decumulation after retirement. I also examine the regulatory environ-

ment for public and private pension institutions.

Building Retirement Wealth

My research on retirement wealth exploits a variety of detailed microeconomic datasets to examine accruals of pension wealth. For example, the Health and Retirement Study is an invaluable survey that links respondent answers to administrative data on life-

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time earnings, Social Security benefits, and company-provided pensions.¹ Using these data, I show that the *median* U.S. household on the verge of retirement anticipates total retirement assets of around \$475,000, with Social Security benefits representing one-third of this sum, private pensions close to \$125,000, and housing and other financial wealth amounting to about \$87,000 each (in 2001 dollars).² Households headed by unmarried persons are substantially worse off than their married counterparts: retirement wealth among the poorest quintile of married couples is equal to the wealth held by unmarried people in the middle of the wealth distribution. I also find that these sums are inadequate to smooth consumption in retirement if people retire at age 62, implying saving shortfalls of 15 percent of annual income. Delaying retirement helps, since the shortfall is cut in half for retirement at age 65.³

Detailed analyses of the interactions between pension rules and employee characteristics show that accruals of pension wealth tend to be extremely discontinuous, particularly in defined benefit plans. Moreover, the peaks and valleys in pension wealth profiles successfully predict retirement flows.⁴ Pension rules also produce benefit accruals that are markedly different for women than for men, mainly because of how different lifetime earnings and labor market histories translate into old age benefits.⁵ Thus, while three-quarters of older women near retirement today have worked enough to be entitled to Social Security old-age benefits based on their own accounts, it would take substantial extra employment to boost the remaining quarter over the eligibility threshold. Furthermore, one-third of older wives can expect no additional retirement benefit from contributing to Social Security late in life, since their net benefits are negative after taking into account Social Security contributions while employed.

I have also linked administrative records and worker reports of corporate pension provisions to evaluate the real-world environment in which employees make pension saving and

retirement decisions. Here I show that workers are often misinformed about their company-sponsored pensions; this myopia is troubling, since workers may save or consume suboptimally, change jobs, and retire earlier than they would have if they were equipped with better pension information.⁶ Related research evaluates the factors driving company pension accruals and how, in turn, these spikes in retirement wealth patterns influence corporate outcomes, including a tendency to influence worker turnover and to “buy out” older, more expensive workers.⁷

Annuities and Dissaving in Retirement

Even if people accumulate adequate retirement wealth, there remains the problem of how to draw it down sensibly over the retirement period. Key concerns at this stage are longevity risk (which may lead to outliving one’s wealth), inflation risk, and investment risk. One line of my research explores the role of the life annuity, an insurance product that pays out a periodic sum for life in exchange for a premium charge. Life annuities offer retirees the opportunity to insure against the risk of outliving their assets by pooling mortality experience across the group of annuity purchasers.

Some of my analysis examines how annuities are priced. This work indicates that the expected present value of payouts associated with single-premium, immediate life annuities is approximately 80 cents per premium dollar if we use mortality rates for the general population. By contrast, the money’s worth of such annuities is much higher for people who actually purchase annuities, since their mortality is lower on average than in the population as a whole. Using annuitant mortality rates, the payouts rise to 90-95 cents per dollar of premium (in expected present discounted value). My evidence also suggests that administrative load charges for annuity products in the United States are low and declining to less than 10 percent of the premium value.⁸ Analysis of annuity markets in other countries finds even lower loads, particularly in countries

such as Singapore where there is apparently little adverse selection.⁹

This work goes on to evaluate the welfare gains from having retirement wealth payout in annuity form. I conclude that the gains are substantial, particularly those associated with inflation-adjusted annuities. Using plausible measures of risk aversion, I conclude that a variable payout equity-linked annuity could be even more valuable than a real annuity when the additional real returns associated with common stocks more than compensate for the volatility of prospective payouts.

Determinants of Pension Performance

In addition to examining how pensions influence retirement wealth saving and dissaving, I also investigate the factors shaping pension system performance and structure. One research thread explores pension plan efficiency, funding, governance, and performance.¹⁰ The analysis shows that the way pension plans are governed and supervised, as well as their structure, influences key pension outcomes including administrative expenses, funding patterns, and investment performance. A second research thread explores regulatory policy toward retirement saving and dissaving. In one study I show that older Americans receiving annuities pay more taxes once they live beyond their life expectancy, although one could argue that living longer would warrant a lower tax burden.¹¹ Another study explores the pros and cons of guaranteeing a lifetime benefit from a defined contribution pension program.¹² Several pension systems recently have introduced an option to let participants trade a defined benefit pension at retirement for a lump sum amount, with potential cost consequences for plan participants as well as taxpayers. My ongoing research focuses on the question of how to make retirement systems more resilient, including offering credible guarantees for protecting retirement wealth.¹³

¹ *The HRS is supported by the National Institute on Aging, the Social Security Administration, and the U.S. Department of*

Labor among other sources; see:

<http://www.umich.edu/~brswww/>.

² In reporting these statistics, we rank HRS households by total wealth rather than just financial wealth. As a result, the data indicate more financial wealth held by the median household than would be found if one ranked households by financial wealth alone.

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⁴ G.S. Fields and O.S. Mitchell, *Retirement, Pensions and Social Security*, Cambridge, MA: MIT Press, 1984.

⁵ S. Pozzobon and O.S. Mitchell, "Married Women's Retirement Behavior," NBER Working Paper No. 2104, December 1986, and in *Journal of Population Economics*, 2 (1989), pp. 39-53; O.S. Mitchell, "Social Security Reforms and Poverty Among Dual-Earner Couples," NBER Working Paper No. 2382, September 1987, and in *Journal of Population Economics*, 2(1) (1991), pp. 39-53; P.J. Levine, O.S. Mitchell, and J.W. Phillips, "Worklife Determinants of Retirement Income Differentials Between Men and Women," NBER Working Paper No. 7243, July 1999, and in Z. Bodie, B. Hammond, and O.S. Mitchell, eds., *Innovations in Financing Retirement*, Philadelphia, PA: UPP Press, 2002, pp. 50-76; and O.S. Mitchell and J.W.R. Phillips, "Retirement Responses to Early Social Security Benefit Reductions," NBER Working Paper No. 7963, October 2000.

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⁷ O.S. Mitchell and G.S. Fields, "Rewards for Continued Work: The Economic Incentives for Postponing Retirement," NBER Working Paper No. 1204, September 1983, and in M. David and T. Smeeding, eds., *Horizontal Equity, Uncertainty, and Economic Well-Being*, Chicago: University of Chicago Press, 1985; O.S. Mitchell and R.A. Lutzadis, "Firm-Level Policy Toward Older Workers," NBER Working Paper No. 1579, March 1985, and in *Industrial and Labor Relations Review*, 12 (October 1988) pp. 100-108; R.A. Lutzadis and O.S. Mitchell, "Explaining Pension Dynamics," NBER Working Paper No. 3084, August 1989, and in *Journal of Human Resources*, 26 (Fall 1991), pp. 679-703; A.L. Gustman, O.S. Mitchell, and T.L. Steinmeier, "The Role of Pensions in the Labor Market," NBER Working Paper No. 4295, March 1993, and in *Industrial and Labor Relations Review*, 47 (3) (April 1994), pp. 417-38; and A.L. Gustman and O.S. Mitchell, "Pensions and the U.S. Labor Market," NBER Working Paper No. 3331, April 1990, and in Z. Bodie and A. Munnell, eds., *Pensions and The U.S. Economy*, Philadelphia: Irwin, 1992.

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¹³ See the recent *Final Report of the President's Commission to Strengthen Social Security* (www.csss.gov).

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