



Social Security

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As Deputy Commissioner for Retirement and Disability Policy at the Social Security Administration (SSA), I am extremely pleased to present this special retrospective issue of the *Social Security Bulletin*. It highlights 10 years of key contributions and significant research findings from the Retirement Research Consortium (RRC) and the Disability Research Consortium (DRC).

SSA funded the RRC and DRC extramural research programs through cooperative agreements with the Center for Retirement Research at Boston College, the University of Michigan Retirement Research Center, the Mathematica Center for Studying Disability Policy, and the National Bureau of Economic Research's Retirement Research Center and Disability Research Center. As Deputy Commissioner, I have seen firsthand how helpful this research has been to our understanding of the effects of the laws, regulations, policies, and administration of Social Security and Supplemental Security Income. I am pleased to now share the highlights of that information with you in this special edition of the *Bulletin*.

The RRC and DRC partnerships have increased our research capacity. By leveraging our internal data and staff resources and partnering with outside scholarship and expertise, we have been able to investigate topics that are important to the agency, policymakers, and the public. We greatly value these partnerships and appreciate the vital contributions made by the RRC and DRC in advancing the collective understanding of Social Security retirement and disability issues and in providing research-based input to the policymaking process.

This is an opportune time to reflect on those contributions. We last published a retrospective edition of the *Bulletin* in 2009, when we highlighted 11 years of outstanding work by the RRC. The current retrospective picks up where that prior edition left off and focuses on the breadth of significant research from both the RRC and the DRC over the last decade. Thus, the retrospective articles that follow highlight the contributions of the centers funded through those separate RRC and DRC grants.

As we look back on these past accomplishments, we also look forward with great anticipation. In October 2018, we merged the RRC and DRC to create the Retirement and Disability Research Consortium. This new research entity provides us with the flexibility and opportunity to consider issues related to our programs more holistically, as retirement and disability research questions frequently intersect. I hope that you find the articles in this issue of the *Bulletin* informative. Our extramural research partnerships benefit the American people and are essential to making the programs we administer strong, effective, and efficient.

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SOCIAL SECURITY BULLETIN

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1 A Look Back at the Last Decade of the Retirement Research Consortium and the Disability Research Consortium

by T. Lynn Fisher and John Jankowski

This article provides an overview of the Retirement Research Consortium (RRC) and the Disability Research Consortium (DRC) from the Social Security Administration's perspective, including a brief history of the development of the consortia, a discussion of their aims, and some thoughts on the future of extramural retirement- and disability-related research. The RRC and DRC planned and conducted research to develop information to assist policymakers, the public, and the media in understanding Social Security, retirement, and disability issues. Both consortia have been remarkably successful extramural research ventures that have expanded and advanced the knowledge base, trained new scholars to become the next generation of subject-matter experts, and provided objective, research-based input to the policymaking process.

7 The Contributions of the Center for Retirement Research at Boston College: 2008–2017

by Steven A. Sass

This article reviews the research contributions of the Center for Retirement Research at Boston College in its second 10 years of operation (2008–2017) and the implications of those findings for Social Security and retirement policy. The article highlights a number of studies on a variety of topics grouped into three broad and forward-looking categories: (1) the Social Security program and its role in retirement security, (2) private retirement saving and its role in retirement security, and (3) the medical risks and health expenditures faced by an aging population. The studies address issues such as the effects associated with labor force patterns, changes in the nation's retirement system, and growing life spans. In its 20 years, the center's contributions have expanded both the breadth and the depth of knowledge on issues relevant to retirement security in general and Social Security in particular.

19 Social Security Research at the University of Michigan Retirement and Disability Research Center

by John Laitner, Eric French, Alan L. Gustman, Michael D. Hurd, Olivia S. Mitchell, Kathleen J. Mullen, and Susan C. Barnes

In 1998, the Social Security Administration established the Retirement Research Consortium to encourage research on topics related to Social Security and the well-being of older Americans, and to foster communication between the academic and policy communities. The Michigan Retirement Research Center (MRRC) participated in the Consortium from its inception until 2019, when the MRRC expanded and became the Michigan Retirement and Disability Research Center. This article surveys a selection of the MRRC's output over its second 10 years (2008–2017), summarizes its innovative use of new data sources, and highlights several key themes in the center's research contributions.

31 Social Security and Financial Security at Older Ages

by Jeffrey Brown, James Choi, Courtney Coile, and Richard Woodbury

Beginning in September 2003, the Retirement Research Center at the National Bureau of Economic Research conducted a coordinated series of investigations on Social Security in an environment of continually changing demographics, health trends, longevity, labor markets, economic conditions, and other factors. The Center has supported extensive collaborative research over a multiyear horizon to achieve a more fully integrated understanding of Social Security's challenges and the changing environment in which it operates. This article highlights the key findings of the studies completed by the Center in the last 5 years.

41 Research to Inform Policy: Contributions of the Mathematica Center for Studying Disability Policy

by Gina A. Livermore, Jody Schimmel Hyde, Yonatan Ben-Shalom, Todd Honeycutt, and David C. Stapleton

This article summarizes findings from selected research conducted under the Social Security Administration's (SSA's) Disability Research Consortium (DRC) at the Mathematica Center for Studying Disability Policy. Mathematica researchers, often in collaboration with SSA and other research institutions, have conducted studies addressing five broad topic areas. Those topics are Social Security Disability Insurance applicants and their potential ability to remain in the labor force; factors affecting participation in the federal disability programs; the characteristics, well-being, and employment of disability program participants; special populations of people with disabilities; and access to health insurance for people with disabilities. The studies highlight how the DRC has supported a broad range of rigorous, policy-relevant research and made important contributions to the body of knowledge on those topics.

57 Disability Policy, Program Enrollment, Work, and Well-Being Among People with Disabilities

by David Autor, Nicole Maestas, and Richard Woodbury

From 2012 through 2018, the Disability Research Center (DRC) at the National Bureau of Economic Research conducted studies on issues related to the well-being of people with disabilities who are current or potential participants in the Social Security Administration's (SSA's) Disability Insurance and Supplemental Security Income programs. This article reviews the Center's research activities, examining topics such as program enrollment trends and determinants, application and screening processes, labor force participation, and interactions between SSA and other programs for people with disabilities.

A LOOK BACK AT THE LAST DECADE OF THE RETIREMENT RESEARCH CONSORTIUM AND DISABILITY RESEARCH CONSORTIUM

by T. Lynn Fisher and John Jankowski*

Introduction

Since its inception in 1935, the Social Security Administration (SSA) has supported research to help formulate policy and ensure that the agency meets the changing needs of the public. Studies conducted internally by SSA researchers and externally by grantees and contractors build an evidence base with which to better understand the populations the agency serves and to evaluate the effect of SSA's policies and procedures on their well-being.

In 1998, SSA launched the Retirement Research Consortium (RRC), an interdisciplinary extramural program, to broaden SSA's research capabilities and to attract and train a new generation of social scientists. The success of the RRC encouraged SSA to establish the Disability Research Consortium (DRC) in 2012 to foster research, communication, and education on matters relating to disability policy. Together, the RRC and DRC were remarkably successful in providing high-quality research to policymakers, scholars, and the public on matters related to SSA's retirement and disability programs and the populations they serve. The RRC and DRC together produced over a thousand research papers, policy briefs, and newsletters; organized 20 annual RRC conferences, 6 annual DRC conferences, and a series of workshops and seminars on specific topics; and supported hundreds of training grants to graduate students and junior scholars.

Perhaps more importantly, consortium research has helped inform the national retirement and disability policy debate. RRC- and DRC-funded researchers have been recognized as experts both by policymakers and

in academia. They have testified before Congress¹ and served on reform commissions and federal advisory boards addressing Social Security, retirement, disability, or health policy. They have presented their findings at various professional and academic conferences and, with prestigious awards such as Bates Clark Medals and MacArthur Fellowships, been recognized as outstanding in their fields. Not only did these well-known researchers publish articles based on their RRC/DRC projects in academic journals, their work affected policy. SSA's Office of Research, Evaluation, and Statistics is a federal statistical agency and, as such, is proscribed from developing, making, or advocating policies. However, the consortium research grants enhance the agency's internal efforts to provide essential information on SSA program effects and interactions and the resulting research findings and statistics inform the policy decisions formulated in other SSA components and Congress. DRC and RRC studies have thus developed an important body of evidence used by many stakeholders both inside and outside SSA.

In 2009, an issue of the *Social Security Bulletin* included a collection of articles highlighting accomplishments from the RRC's first decade.² This *Bulletin* issue updates and expands on that 2009 issue by

Selected Abbreviations

DI	Disability Insurance
DRC	Disability Research Consortium
NBER	National Bureau of Economic Research
OASI	Old-Age and Survivors Insurance

* The authors have served as the federal program officials for the Retirement and Disability Research Consortium. They work in the Office of Research, Evaluation, and Statistics, Office of Retirement and Disability Policy, Social Security Administration.

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Selected Abbreviations—Continued

RDRC	Retirement and Disability Research Consortium
RRC	Retirement Research Consortium
SSA	Social Security Administration
SSI	Supplemental Security Income

highlighting the accomplishments of the three RRC research centers (at Boston College, the University of Michigan, and the National Bureau of Economic Research [NBER]) during 2009–2018, and of the two DRC research centers (at Mathematica and the NBER) during 2012–2018. In the following five articles, each RRC and DRC center highlights its contributions to research and policymaking. This introductory article reviews the history of the RRC and the DRC; discusses the goals of the research centers; and explores the future of SSA-supported extramural research under the consolidated Retirement and Disability Research Consortium (RDRC), which the agency launched in 2018.

A Brief History of the RRC and DRC

SSA established the RRC to bring the academic and policymaking communities together and to foster high-quality research, communication, and education on matters relating to retirement policy.³ In 1998, SSA awarded the inaugural RRC cooperative agreements to two university-based multidisciplinary centers, one at Boston College and the other at the University of Michigan. After SSA awarded a third cooperative agreement to the NBER in 2003, the RRC comprised the centers at these three institutions until 2018.

Because competitively funded RRC research on high-priority issues built a rich evidence base for retirement-program policy, SSA established a parallel initiative focused on disability issues. The DRC launched in 2012 with competitive awards to establish research centers at Mathematica (then named Mathematica Policy Research) and the NBER.

From the outset, SSA actively encouraged research collaboration between consortium members and agency staff.⁴ Such joint ventures provided excellent opportunities to build productive research partnerships, disseminate important information and expertise about SSA programs, and extend research capabilities by enabling the use of Social Security administrative data, which are generally not accessible to the outside research community.

RRC and DRC Objectives

As noted earlier, the broad mission of the RRC and DRC was to serve as a national resource for research, communication, and education on matters related to retirement and disability policy. Specific aspects of those objectives are described in the following subsections.

Research, Evaluation, and Data Development

Each consortium center was charged with developing and conducting a program that appropriately balanced public policy research with retirement or disability program-specific issues. Public policy research addresses a broad range of economic issues such as business cycle effects, poverty, income, and inequality. Program-specific research addresses topics such as eligibility criteria, benefit determination, definition of disability, and program interactions. For each consortium center, SSA identified broad long-term priority areas and required that all proposed research address at least one of those areas.

Long-Term Research Priorities. For the RRC, SSA established the following priority research areas for 2013 through 2018:

1. *Social Security and retirement.* This research examined how Social Security’s programs influence the nature and timing of retirement and the claiming of benefits, and the effect of Social Security program rule changes on trust fund solvency. SSA encouraged researchers to apply psychological theories of decision-making in examining the retirement decision.
2. *Macroeconomic analyses of Social Security.* Studies in this area included explorations of the effects of Social Security policy changes on national saving, investment, and economic growth. Macroeconomic analysis also included, but was not limited to, the intertemporal effects of capital formation, retirement saving, and the unified budget.
3. *Wealth and retirement income.* This research considered the role of Social Security in retirement income and wealth accumulation. It also analyzed other sources of retirement income such as employer-provided pensions, deferred compensation, private savings (including individual retirement accounts and other types of assets), and earnings from continued employment. Research in this area explored psychological and behavioral determinants of retirement saving; for example, researchers might

observe annuity markets and apply the resulting behavioral insights to the Social Security annuity.

4. *Program interactions.* This research examined the extent and the nature of interactions between Old-Age and Survivors Insurance (OASI), Supplemental Security Income (SSI), Medicare, and Medicaid, as well as other public programs, private pension plans, and personal saving. Also of interest were interactions between OASI and Disability Insurance (DI) for potential retired-worker beneficiaries who have reached early entitlement age but not full retirement age.
5. *International issues.* This research sought to learn from other countries' social-insurance experiences. Some studies compared social, demographic, and institutional characteristics across countries; others focused on specific countries in the process (or aftermath) of instituting reforms.
6. *Demographics.* Topics of this research included changes in mortality, fertility, immigration, health, and marital status, and their implications for retirement policy. Additional topics included the effects of Social Security policy alternatives on workers and beneficiaries, and differences by age, race/ethnicity, sex, and occupation.

For the DRC, SSA established the following priority research areas for 2012 through 2018:

1. *Demographics.* SSA sought studies of the demographic composition of people with disabilities—including but not limited to those receiving disability program benefits—and trends over time. This research addressed the role of the family, issues related to mortality, and variations among demographic and socioeconomic groups. For example, some research focused on children with disabilities enrolled in SSI and other federal programs that aim to assist them in their transition into adulthood.
2. *Economics.* This research examined how a broad range of economic factors affect individuals with disabilities, disability programs, and program beneficiaries. Economic factors studied included business cycles, poverty, income inequality, the income replacement rates of benefits, labor and housing markets, financial markets and institutions, and health care and insurance.
3. *Health.* This research focused on how health care, public and private health insurance, and health insurance reforms affect people with disabilities, disability programs, and program beneficiaries. It

included analyses of health impairments, functional limitations, and workplace injuries.

4. *Programmatic issues.* This research examined how disability programs provide benefits and services and how they determine program eligibility. Such studies might compare and contrast disability programs' definitions of disability, their processes for determining eligibility, the populations they serve, or the services they offer.
5. *Work and education.* This research sought to understand the effects of education and training, rehabilitation programs, and return-to-work services for SSA disability program participants. Such studies might compare the effects with those of similar services from other federal programs for people with disabilities.
6. *International comparisons.* This research sought to learn from other countries' experiences through cross-country comparisons of programs, processes, service populations, policies, and reforms.

Focused Annual Research Priorities. In addition to the broad research areas outlined above, SSA also issued detailed guidance each year on questions of particular current interest to the agency. SSA developed the annual focal areas through extensive consultations with internal and external stakeholders. The consortium centers used these directions to refine their annual research prospectuses.

Dissemination

One of the core responsibilities for each center was to disseminate its research findings to academics, policy-makers, and a range of public interests, including support service providers. SSA required research and dissemination to be nonpartisan, free of advocacy, and valuable to the range of audiences the RRC and DRC informed. As part of its Request for Applications, SSA encouraged the centers to develop creative methods of disseminating data and information, as appropriate for different audiences. In addition to posting scholarly and academic research papers on their public websites, the centers produced policy briefs, newsletters, blogs, and podcasts. They also used social media to make their research more accessible to policymakers and the public.

The centers also organized conferences, workshops, and seminars to share current research activities and findings. For example, the Michigan RRC center hosted a Financial Security Research Symposium

jointly with SSA and the Department of the Treasury in September 2016 and the NBER RRC center hosted a workshop titled “Implications of the Changes and Challenges Facing State Retirement Systems” in April 2018. Events such as these were valuable alternatives to academic research papers for sharing research results because they brought together a diverse audience of researchers, policymakers, and the public. In these settings, large bodies of research were made accessible and could be distilled in a way that encouraged discourse among the participants.

The foremost RRC and DRC events were their annual public meetings in Washington, DC, with agendas drawn from their funded research. The responsibility for organizing the meeting rotated from year to year and the hosting center worked jointly with SSA to develop the conference agenda and select keynote speakers. The meetings drew hundreds of registrants each year. Attendees represented a diverse array of institutions. Examples included SSA and other federal executive-branch agencies such as the Office of Management and Budget and the Treasury and Labor Departments. Participants from the legislative branch included the Congressional Budget Office, the Congressional Research Service, and staff of various House of Representatives and Senate committees. Nongovernment participants included the press, academia, think tanks, nonprofit research and policy institutions, the financial services industry, and the general public.

Training and Education

Under both the RRC and DRC, centers were encouraged to support the training and research activities of multidisciplinary graduate students, recent doctoral degree earners, and competitively selected scholars who were new to the fields of retirement and disability research. The RRC and DRC programs included a training objective to develop and expand a diverse corps of scholars and researchers who would focus their analytical skills and orient their academic careers toward studying high-priority topics in retirement and disability policy. The RRC and DRC funded training through dissertation grants, summer training programs, pre- and post-doctoral fellowships, and Steven H. Sandell grants for junior scholars. Some dissertation and Sandell scholars were selected to present their work at the annual meetings, which allowed them to interact with, and get technical feedback from, established scholars in their areas of research. Many training awardees became established researchers in

retirement and disability policy at top academic institutions, private research organizations, and government agencies. Furthermore, many of these trainees went on to become valuable members or leaders of the RRC/DRC centers’ core research teams, bringing new perspectives, skills, and cutting-edge methodologies to the pool of available talent.

Looking Forward: The RDRC

In November 2017, SSA announced that it would consolidate the RRC and DRC into a single entity, the RDRC, with a combined scope equivalent to those of the two existing programs. This realignment increased administrative efficiency and coordination in SSA and has provided greater flexibility for the research centers, which can focus on one or both areas with a single competitive application. The division between the consortia had limited the types of research that a center could conduct given its RRC/DRC designation, with the exception of a few topics of overlapping scope such as older workers or health. For example, an RRC center could not have funded work on a topic such as SSI child recipients, which is strictly disability-related. The first RDRC cooperative agreements were awarded in 2018 to four research centers: Boston College, the NBER, the University of Michigan, and the University of Wisconsin. Similar to the RRC and DRC, the four RDRC centers provide a comprehensive research program that benefits the public through research, evaluation, and data development; dissemination; and scholar training.

The centers strengthen SSA’s capacity to conduct necessary research, evaluation, and policy development for the OASI, DI, and SSI programs. All RDRC activities must be within the consortium program’s scope; at the broadest level, this means that they must be relevant to at least one of SSA’s programs, as outlined below:

1. **OASI.** Social Security retirement benefits are essential to the economic well-being of millions of aged Americans, supporting retired workers, their spouses and dependents, and the survivors of deceased insured workers. Policymakers rely on research that increases their understanding of the beneficiary population, assesses the effects of recent or proposed policy changes, and analyzes long-term program trends.
2. **DI.** Social Security disability benefits are paid to eligible workers who can no longer work because of a medical condition that is expected to last at least

1 year or result in death. The program also covers certain family members of DI-eligible workers. An example of research in this area is an investigation of how the disability determination factors (such as medical conditions, age, education, past work experience, and any transferable skills) interact with changes in medical science and labor markets over time.

3. **SSI.** This program provides cash payments to low-income individuals with disabilities. Research on SSI helps policymakers understand program trends and clarifies how work and other factors influence eligibility and well-being. Targeted research initiatives can evaluate the efficacy of specific program interventions or policy changes, or discover possible unmet needs and areas for program improvement.
4. **OASI and DI** (in combination or interaction). These two programs constitute what is commonly meant by “Social Security.” (These programs are funded primarily by payroll-tax contributions to dedicated trust funds; SSI payments, by contrast, are drawn from the general fund of the U.S. Treasury.) This research explores the economic and social factors that affect the Social Security programs and how reform plans may affect individual retirement planning and the U.S. economy as a whole. Research in this area also informs the Social Security Trustees and their annual trust funds analysis.
5. **DI and SSI** (in combination or interaction). Both administered by SSA, these two programs constitute the primary federal assistance programs for people with disabilities. This research requires comprehensive reviews of impairment classifications, medical developments, disability trends, and the wide array of social programs available for Americans with disabilities—including veterans’ benefits, privately organized programs, rehabilitation centers, and return-to-work initiatives. This research may also lead to better understanding of the events that precede application for disability benefits or to a focused evaluation of policy or service interventions.
6. **OASI and SSI.** Old-age income support can be provided through either of these programs. One of SSA’s objectives is to ensure that vulnerable groups have adequate income resources. This research considers retirement security, poverty measures, and sources of income for the aged and low-income populations.

7. **Cross-program topics.** None of the three SSA programs operates in a vacuum, and the obvious topical linkages between any two SSA programs are outlined in the three items listed immediately above. However, some research might cut across all three of SSA’s programs. Much of this work is forward-looking, whether in exploring and developing new data sources and improving projections or in gaining insights from social insurance program developments in other countries.

As the list above shows, some RDRC research projects directly address one or two programs, and some research topics—for example, changes in mortality, fertility, immigration, health, and marital status—are foundational and support policy evaluation relevant to all three. RDRC research activities employ multiple approaches across several disciplines—including descriptive and causal studies, simulations, and international comparisons—to contribute to the evidence base. As it did before the RRC/DRC consolidation, SSA provides annual focal areas to narrow research activities within these broader categories.⁵

As their predecessors did, the RDRC centers maintain websites containing their completed and in-progress work, publish quarterly newsletters, and use other means to disseminate their work. The RDRC also continues many of the RRC and DRC training programs while adding new opportunities through the RDRC center at the University of Wisconsin in Madison.⁶

Conclusion

From their inceptions through their merger, the RRC and DRC were vital contributors to SSA’s research portfolio and to ongoing debates on retirement and disability policy more broadly. The consortia not only supported research on important topics but also encouraged the next generation of researchers to focus their careers on matters pertaining to retirement and disability policy. With SSA’s ongoing support, the consolidated RDRC will continue to benefit the American public by expanding the knowledge base used for policymaking. Changes in the U.S. economy and labor force, and the challenges facing Social Security’s programs and its beneficiaries, make the continual improvement of such a knowledge base essential to develop evidence-driven public policy and program administration. Along with SSA’s internal research, RDRC efforts will help ensure that the agency continues to meet the evolving needs of the public.

Notes

¹ These experts have testified to Congress on matters not connected with their funded status. SSA does not provide financial support for witnesses to testify.

² That issue is available at <https://www.ssa.gov/policy/docs/ssb/v69n4/index.html>.

³ For a more detailed history of the RRC, see “The Retirement Research Consortium: Past, Present, and Future” (<https://www.ssa.gov/policy/docs/ssb/v69n4/v69n4p27.html>).

⁴ SSA researchers did not receive any funding through the RRC or DRC for their work on collaborative research projects.

⁵ The annual focal area lists are available on SSA’s Extramural Projects web page at <https://www.ssa.gov/policy/extramural/index.html#RDRC>.

⁶ For a list of current training programs, students and junior scholars can consult SSA’s Funding Opportunities web page at <https://www.ssa.gov/policy/about/research-funding.html>.

THE CONTRIBUTIONS OF THE CENTER FOR RETIREMENT RESEARCH AT BOSTON COLLEGE: 2008–2017

by Steven A. Sass*

Introduction

The Social Security Administration (SSA) created the Retirement Research Consortium in 1998 “to expand the knowledge base upon which Social Security and retirement policy decisions are made.” The need to know more was critical, as the nation’s retirement income system was rapidly transforming. The demographic transition to an older population was eroding the finances of Social Security and other government programs for the aged. Private-sector employers were shifting from providing defined benefit (DB) pensions to offering defined contribution (DC) plans, such as 401(k)s, with workers assuming primary responsibility for accumulating enough savings for retirement over their working years. In planning their retirement income, workers also had to account for steeply rising medical costs and the potential need for expensive long-term care. Major socioeconomic changes, such as rising wealth inequality, the increased labor force activity of women, and the declining prevalence of married-couple households were also affecting household financial preparations.

The Center for Retirement Research (CRR) at Boston College, in affiliation with the Brookings Institution, Syracuse University, and the Urban Institute, has expanded the knowledge base by producing roughly 200 research studies on key policy issues. The CRR also manages SSA-sponsored dissertation fellowship and junior-faculty grant programs to further enlarge the knowledge base and expand the pool of qualified researchers in the field. CRR studies have been broadly disseminated through working papers, issue briefs, blog posts, journal articles, and public-education booklets such as *The Social Security Claiming Guide* (Sass, Munnell, and Eschtruth 2016).

A previous *Bulletin* article reviewed the contributions of the CRR from 1998 to 2007, its first 10 years of existence (Sass 2009). This article covers the contributions of the CRR over its second 10 years, from 2008 to 2017. The first section reviews studies that address the Social Security program and its role in retirement security going forward. The second section does the same for private retirement saving. The third section reviews studies that address the medical risks and health expenditures facing an aging retiree population. The fourth section concludes by summarizing the CRR’s key research contributions.

The Role of Social Security Going Forward

Although Social Security is the foundation of the nation’s retirement income system, it is not designed to be the sole source of income for most retirees. Instead, it is intended to provide a base of support that replaces a portion of a household’s preretirement earnings, with low earners receiving the highest replacement rates. CRR studies have assessed the effect of demographic transition and ongoing socioeconomic changes on the replacement rates that Social Security will provide in the future.

Selected Abbreviations

CRR	Center for Retirement Research
DB	defined benefit
DC	defined contribution
DYNASIM	Dynamic Simulation of Income Model
FRA	full retirement age
HRS	Health and Retirement Study
IRA	individual retirement account

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Selected Abbreviations—Continued

MINT	Modeling Income in the Near Term
NRRI	National Retirement Risk Index
SSA	Social Security Administration

The Challenge of the Demographic Transition

Social Security is funded largely by a payroll tax on workers and their employers, and it pays retirement benefits for as long as recipients live. Following long-term increases in both the retirement-age population and average lifespans, only 2.3 workers will be paying payroll taxes for every Old-Age, Survivors, and Disability Insurance beneficiary by 2035, down from 3.4 at the end of the 20th century (Board of Trustees 2019, Table IV.B3). Congress, anticipating the demographic transition, enacted reforms in 1983 that increased Social Security revenues; for example, by accelerating scheduled payroll-tax increases and by taxing some benefits and returning the proceeds to the Social Security trust fund.¹ The 1983 reforms also lowered benefits by incrementally raising the full retirement age (FRA), at which workers can claim unreduced benefits, for individuals born after 1937.² Despite these changes, the program’s trustees project that the trust fund reserves will be depleted in 2035, after which payroll taxes will be sufficient to fund only 75–80 percent of scheduled benefits.

To the extent that workers with older FRAs claim benefits commensurately later, one policy option to reduce Social Security’s financing shortfall while maintaining the same replacement rate (albeit over a shorter period) is to raise the FRA again. The average retirement age of men—defined as the age at which half of men do not participate in the labor force—has increased by about 2 years from its level in the mid-1990s, based on Census Bureau data. The average retirement age for women has increased even more, as women’s labor force participation patterns have been converging with those of men (Munnell 2015).

CRR studies find that the 1983 changes to FRAs were not the main factor behind the rise in the average retirement age, suggesting that unless other factors lead to later retirements going forward, any further increase in FRAs might not be accompanied by a commensurate rise in retirement ages. Hou and others (2017), using a structural model of retirement timing based on Gustman and Steinmeier (2009) and data from the University of Michigan’s Health and Retirement Study (HRS), find that the shift from employer

provision of DB pensions to DC plans and population-wide improvements in health condition were the most important factors driving later retirement ages. The authors find that the FRA and other Social Security program changes had lesser effects.³ Rutledge, Gillis, and Webb (2015) use HRS data to examine the factors behind the increase in average retirement ages between the mid-1990s and 2010. They find that the declining prevalence of DB pensions and retiree health insurance benefits each accounts for about 1 additional year in average retirement age, and that the change in the FRA from 66 for workers born 1943–1954 to 67 for those born in 1960 or later further raised the average retirement age, but by only 0.3 years. Burtless (2013) attributes more than half of the 9 percentage-point rise from 1985 to 2010 in the labor force participation rate of men aged 60–74 to an increase in educational attainment.

The factors these studies identify as primarily responsible for the rise in the average retirement age may have largely played out. DB pensions and retiree health insurance benefits have been relatively rare in the private sector for more than a decade. Significant further improvement in the educational attainment of workers approaching retirement is also unlikely (Burtless 2013). However, the relative health of workers approaching retirement could further improve while the physical demands of work, a factor not explicitly addressed in these studies, could continue to ease.⁴ Rutledge, Gillis, and Webb (2015) estimate that the factors identified in their study will raise the average retirement age by an additional year over the next three decades.

Early Claiming Patterns

Although workers on average are claiming Social Security benefits later, a substantial percentage of people still claim at 62, the earliest age of eligibility. Because benefits claimed before the FRA are actuarially reduced, the maximum possible reduction is greater for those with older FRAs. For example, monthly benefits claimed at age 62 are 80 percent of the “full” benefit for a worker whose FRA is 65, 75 percent for a worker whose FRA is 66, and 70 percent for a worker whose FRA is 67.⁵ The varying reductions mean that Social Security will provide less income relative to preretirement earnings to the earliest claimers with older FRAs.

To be clear, the share of workers claiming benefits at 62 has sharply declined. As recently as 1996, 50 percent of men and 57 percent of women claimed at

age 62. By 2017, the shares had dropped to 35 percent of men and 40 percent of women (SSA 2018). Munnell and others (2016b), however, suggest that roughly two-thirds of workers who claim at age 62 could lack the resources to maintain their standard of living in retirement even if they annuitize their financial assets.⁶ Notably, however, the debate on whether a substantial share of workers will actually fall short in their retirement preparation is ongoing.⁷

Although workers claim retirement benefits at age 62 less frequently today than they did in the mid-1990s, the share of insured workers aged 55–59 receiving Social Security disability benefits in 2015 was about 3 percentage points higher than it was in the mid-1990s (SSA 2016). Johnson, Favreault, and Mommaerts (2010) find that disability awards rise sharply among less-educated workers as they age into their 50s and early 60s, with the households of recipients of Social Security Disability Insurance, Supplemental Security Income, workers' compensation, or veterans' benefits generally experiencing a sharp decline in income and an increased incidence of poverty. The study also finds that many less-educated workers experience work-limiting health impairments as they age but fail to qualify for disability benefits. Others have difficulty finding employment. These factors result in material hardship among less-educated workers that is reduced when they reach age 62 and can claim Social Security retirement benefits (Johnson, Mermin, and Murphy 2007; Johnson and Mermin 2009).

Munnell, Sanzenbacher, and Rutledge (2015) examine the kinds of shocks that push workers out of the labor force before their planned retirement age. Interestingly, they find that financial shocks have little effect on retirement timing. Instead, health shocks are most important, followed by layoffs, then family issues and, finally, financial shocks.⁸

Women's Labor Market Trends and Benefits Received by Couples and Mothers

Most workers enter retirement as part of a married-couple household. Historically, Social Security spousal and survivor benefits significantly increased the retirement incomes that married couples received. Spousal and survivor benefits were created in 1939, soon after the program's inception, when most households entering retirement were one-earner couples. The spousal benefit guarantees the lower earner (traditionally the wife) a monthly payment equal to one-half of the amount to which the higher earner would be entitled if the claim were filed at FRA (regardless of when the

higher earner actually claims); the survivor benefit guarantees the widow(er) a monthly payment equal to the higher earner's actual benefit.

If the lower earner qualifies for a Social Security retired-worker benefit but the benefit amount is lower than the spousal benefit, he or she receives a "top-up" to bring the payment to the spousal benefit amount. Such a beneficiary is considered "dually entitled" because he or she receives both the worker's benefit on his or her own earnings record and the spousal top-up.

SSA actuaries estimate that retired-worker benefits claimed at FRA replace about 40 percent of a typical worker's preretirement earnings.⁹ Thus, for a one-earner couple, if the earner claimed at FRA, the household's benefits replace about 60 percent of the worker's preretirement earnings (because the spousal benefit is equal to one-half the earner's benefit). If the sole earner dies, the survivor benefit equals two-thirds of the combined amount the couple had received, which approximates an "equivalent" benefit for a single individual under standard equivalence scales (Forster and Levy 2013).¹⁰

Most married women today work outside the home and qualify for Social Security retirement benefits based on their own earnings record. It is also increasingly common for workers to enter retirement as part of an unmarried-couple household or as a divorced or unmarried parent who is not eligible for spousal or survivor benefits.¹¹ CRR studies have assessed the effect of these changes on retirement income from Social Security.

The employment of married women increased dramatically in the 1960s and 1970s. This trend increased household preretirement incomes but the increase in household Social Security benefits was not commensurate. Wu and others (2013), using SSA's Modeling Income in the Near Term (MINT) microsimulation model, find that declining spousal benefits were the main contributor to a decline in average household Social Security replacement rates. Those rates dipped from 50 percent for the birth cohorts whose members entered the labor force in the 1950s to 45 percent for those who entered in the 1960s and 1970s.

Although spousal benefits are declining in importance (both as a share of total recipients and as a share of the total benefits received by those who are dually entitled), survivor benefits remain important, as married women generally continue to earn less than their husbands. However, Butrica and Smith (2012a), using MINT, estimate that one-third of married women who

entered the labor force in the 1990s will earn as much as or more than their husbands, compared with 18 percent of married women who entered the labor force in the 1960s. As a result, these women will not receive survivor benefits and their household Social Security income will decline more after their husbands' death than it did for previous generations. For example, assuming that both spouses claim at their FRA, the average widow in the 1966–1975 birth cohort will get only 54 percent of what the couple received when the husband was still alive, down from 59 percent for widows born during 1936–1945.

Another study by Butrica and Smith (2012b) using MINT projects an increase in the share of mothers entering retirement who never married or are divorced from a marriage that lasted fewer than 10 years—from 7 percent of war baby mothers (born 1936–1945) to 15 percent of generation X mothers (born 1966–1975).¹² Although these women are not entitled to spousal or survivor benefits, child-rearing responsibilities are likely to have limited the time they spent in the labor market, impeded their advancement to better-paying jobs, and limited their potential Social Security retired-worker benefits. Rutledge, Zulkarnain, and King (2017), using data from the HRS and linked Social Security administrative data, find that the benefits of mothers are 16 percent less than the benefits of women with no children, and each additional child reduces benefits by about another 3 percent. Although widows currently constitute the largest poverty population among the aged, divorced and never-married mothers have much higher poverty rates and are projected to account for increasing shares of the aged population (Johnson, Favreault, and Goldwyn 2003).

Potential Changes to Social Security

The CRR studies reviewed above address how current programmatic, claiming, and labor force patterns might affect household Social Security income levels relative to preretirement earnings. Going forward, Social Security faces a long-term financing shortfall. To address it, experts have presented many policy proposals. One example, the bipartisan National Commission on Fiscal Responsibility and Reform's 2010 Bowles-Simpson proposal, would reduce the FRA benefit for higher earners; raise the FRA and earliest age of eligibility in line with rising longevity, while exempting low earners; and provide an enhanced minimum benefit for long-career low-wage workers.¹³

Using the Urban Institute's Dynamic Simulation of Income Model (DYNASIM), Favreault and Steuerle

(2012) assess how Bowles-Simpson could affect poverty and other key outcomes for the aged. Despite the proposal's protections for low earners, the authors find that poverty would increase relative to levels projected based on currently scheduled benefits.¹⁴ The study also points out that Bowles-Simpson does not address issues raised by changing marital patterns beyond the proposal's protections for all low-income beneficiaries.¹⁵

The CRR study highlights the tradeoffs that policymakers face in addressing Social Security's long-term financing shortfall while continuing to provide retirement income security. Bowles-Simpson and similar proposals highlight the importance of minimizing old-age poverty and preserving benefits for low earners. To date, program responses to demographic transitions, changing marital patterns, and increased income inequality have suggested that Social Security is likely to play a reduced role for workers who retire early and for married couples and widow(er)s who will increasingly enter retirement without spousal or survivor benefits. If Social Security adopted reforms similar to those proposed by Bowles-Simpson, benefits would be lower—relative to preretirement earnings—than in the past, especially for middle and higher earners. If the role of Social Security changes, retirees may increasingly depend on income provided by their own retirement savings.

The Role of Retirement Savings Going Forward

Besides Social Security, the major source of retirement income is savings accumulated over the course of a working career. Such savings include financial assets (which for most retirees consist primarily of employer-sponsored DC plans) and home equity (which can be tapped to cover living expenses).

In recent decades, most private-sector employers have switched from providing DB pensions to offering DC plans to their employees.¹⁶ The transition, which began in the 1980s, is now largely complete. Although many workers entering retirement today still have DB pension benefits that accrued earlier in their careers, DB pensions are declining as a source of retirement income.

Munnell and others (2016a) use data from the HRS to assess the effect of the DB-to-DC transition on the household pension wealth of workers approaching retirement. Comparing the combined amount of DC plan and individual retirement account (IRA) balances with DB pension accruals, the authors

find that DC/IRA balances accounted for 35 percent of the pension wealth of households headed by individuals aged 51–56 in 1992, with DB pension accruals accounting for the other 65 percent. In 2010, the respective shares were 62 percent and 38 percent. Although average and median pension wealth remained much the same across the period, the share of households with no pension wealth had increased, and high-income households held a greater share of pension wealth in 2010. Assuming households annuitized their savings *at retirement*, the share of preretirement earnings that was replaced by the resulting income stream was smaller in 2010 than in 1992, as households in 2010 had higher preretirement earnings, would have to use commercially available annuities (which provide less income from a given amount of savings than would a DB plan), and were adversely affected by declining interest rates.¹⁷

The Pension Protection Act of 2006 facilitated the widespread adoption of an important 401(k) plan innovation: automatic enrollment for new employees, increasingly accompanied by automatic annual contribution escalation, with the employee able to opt out of either feature.¹⁸ Automatic enrollment with automatic contribution escalation tends to significantly increase the participation and contribution rates of young and low-income workers (Madrian and Shea 2001; Madrian 2012).¹⁹ Chetty and others (2013) use detailed Danish data on household finances and confirm that workers who were “nudged” into contributing more to their retirement plans did not make offsetting reductions in other types of saving. The authors also find that workers generally do not respond to changes in retirement-saving tax incentives, which require an active decision to change how much they save. The study concludes that automatic enrollment can increase a worker’s retirement saving much more than government tax subsidies can, and do so at much lower cost.²⁰

Butrica and Karamcheva (2012) and Soto and Butrica (2009) report that employers too have found automatic enrollment to be more effective than financial incentives at influencing worker retirement saving.²¹ Butrica and Karamcheva, using data from the National Compensation Survey, find that plans with automatic enrollment have higher participation rates with relatively low default contributions and employer-match rates. These results suggest that behavioral nudges such as automatic enrollment can increase plan participation while potentially allowing firms to keep their employee benefit costs roughly constant.²² In this situation, employees who previously did not participate

could end up saving more while others might save less because of the reduced default rate and match.

Another major component of wealth for many retirees is home equity. More than 80 percent of retirees own their own homes and home equity is a larger store of savings than financial assets for most low- and moderate-income households. The Federal Housing Administration’s Home Equity Conversion Mortgage (HECM) program provides reverse mortgage loans for homeowners aged 62 or older.²³ HECM allows households to tap their home equity, without requiring any repayments, for as long as they live in the house. Mudrazija and Butrica (2017) estimate that the HECM program could raise the income of an aged homeowner at the median by more than one-third, and reduce the share of homeowners with incomes below 50 percent of median household income by 6–7 percentage points, leaving just 13–14 percent under that low-income benchmark.²⁴

Projecting Retirement Saving and Preparedness

Butrica, Smith, and Iams (2012) and Johnson and others (2017) use MINT to project retirement incomes assuming households annuitize 80 percent of their financial savings. Both studies find that retirement incomes will replace a declining share of preretirement incomes of all households, particularly among higher- and middle-income households, as retirement savings are not projected to offset reduced replacement rates from Social Security.²⁵

Munnell, Rutledge, and Webb (2014) seek to reconcile differences between conflicting estimates of retirement preparedness. The authors compare estimates from the CRR’s National Retirement Risk Index (NRRI) with others from a Michigan Retirement Research Center study (Scholz and Seshadri 2008) based on HRS data and a model of optimal lifetime consumption. The NRRI is constructed using data from the Survey of Consumer Finances. It projects replacement rates for current working-age households at retirement, assuming they will retire at age 65 and annuitize all their DC/IRA savings and the proceeds of a reverse mortgage. The authors compare the projected replacement rates with target replacement rates to calculate the share of households that are at risk of inadequate retirement income. The authors estimate that in 2004, 35 percent of households aged 50–58 were at risk.

Scholz and Seshadri (2008) find more optimistic results. They estimate that only 8 percent of households in their 50s in 2004 had not saved adequately

for retirement. Munnell, Rutledge, and Webb (2014) find that the difference between the Scholz and Seshadri and the NRRI assessments is largely due to two assumptions. First, unlike the NRRI, Scholz and Seshadri assume that households choose a declining consumption path in retirement—that those households devote a smaller share of their resources to support consumption as they age and the likelihood of survival declines. Second, Scholz and Seshadri assume that when children leave home, the household saves the income it formerly spent on the children. The NRRI assumes that household saving remains the same, which increases the income spent on the parents' consumption and raises their standard of living. The Scholz and Seshadri assumption results in a lower target retirement income and more savings for meeting that target. However, Dushi and others (2015), using data from the HRS and the Survey of Income and Program Participation, show that household saving does not change much when children leave home.²⁶

Changes That Could Facilitate More Retirement Saving

The studies reviewed above indicate that future retirees cannot expect income derived from savings to offset the projected declines in household Social Security benefit replacement rates and the diminution of DB pension income. To assure future retirees of income levels similar to those of current retirees, workers will need to save more, take on more risk with their assets, work longer, or draw more income out of their savings than current retirees have had to do.

Further behavioral or informational innovations could increase household retirement saving. For example, some states have introduced automatic IRA-enrollment programs, which require all employers above specified sizes who do not offer a DB or DC plan to enroll their workers in a payroll-deduction IRA, from which workers can then opt out. Butrica and Smith (2016), using DYNASIM to generate pre-implementation estimates of the program's potential effect, find that such initiatives might only modestly increase retirement saving. They find that program design factors, including the number of firms covered, contribution limits, default contribution rates, and investment options will determine the extent of its effect. To date, the early-implementation states have adopted some design features associated with the higher participation and saving estimates in the Butrica and Smith model. For example, Oregon covers all employers, has a 5-percent default contribution

rate that automatically escalates in subsequent years to 10 percent, and designates a target date fund as the default investment choice. In initial results from Oregon's program, the majority of eligible workers participate and generally stick with the default contribution rate. One challenge facing Oregon and other auto-IRA states appears to be helping employers who are unfamiliar with the program to provide timely and accurate data and to process payroll deductions (Belbase and Sanzenbacher 2018).²⁷

By itself, accumulating savings does not solve the problem of preparing for retirement. As employer pension offerings have switched from DB plans to DC plans, the need for retirees to draw an adequate income out of their savings has become more acute. Projections of retirement income adequacy assume that retirees either annuitize their savings or put them to use under an optimal drawdown strategy; but retirees generally do neither (Poterba, Venti, and Wise 2011). Pashchenko (2013) identifies various economic reasons retirees may tend not to follow these assumptions, such as bequest motives, medical expense uncertainty, and the illiquidity of housing wealth. Reviews of the Retirement Research Consortium literature (Sass 2016b; 2017) identify powerful behavioral and informational factors that impede retirees from drawing down their financial assets and home equity, which would allow them to increase current consumption. However, pressures to tap their savings will be greater going forward than they have been in the past.

Medical Risks Going Forward

The aged need more medical care than younger people do, and for many years, the cost of care has risen faster than wages, gross domestic product, and retirement incomes. That trend is expected to continue. The need for long-term services and supports to compensate for age-related declines in physical and mental abilities will also spike when the large baby boomer cohorts reach advanced old age. Studies conducted by the CRR and its affiliates assess the magnitude of these challenges and how they might be addressed.

Rising Costs

Because of rising medical costs, the federal government created Medicare and Medicaid in 1965 to help the aged and other vulnerable populations. As the cost of care continued to rise, the programs expanded. Medicare covers about 80 percent of the hospital and physician costs of retirees and, since 2006, it has offered prescription drug coverage. Medicaid insures

the very-low-income aged, covers the cost of long-term care for retirees who cannot afford it, and since 1990, covers the Medicare copayments and premiums for low-income retirees with incomes above the Medicaid eligibility limits.²⁸

Even though Medicare and Medicaid bear most of the cost, retirees spend a large and growing share of their incomes on medical care. For example, McInerney, Rutledge, and King (2017), using HRS data, find that median-income aged households spend nearly one-quarter of their Social Security benefits and more than 10 percent of their incomes on medical care, and project that those shares will increase over the next decade. Favreault (2015), using DYNASIM, projects that medical expenditures will require more than one-half of the Social Security benefits and nearly 20 percent of the total incomes of median-income aged households by 2055.²⁹ For lower-income households not eligible for Medicaid and households with above-average medical needs, the projected burden is significantly greater.

The Burdens of Advanced Old Age

The incidence of physical and mental impairments rises sharply after age 85. As a result, individuals in this age group often cannot perform activities of daily living (such as eating, dressing, and bathing) and instrumental activities of daily living (such as shopping, cooking, and managing money) without assistance. The oldest baby boomers will cross this age threshold in 2031, and the share of the population that is aged 85 or older will rise rapidly until it stabilizes—at a much higher level—by the middle of the century.

CRR studies address key challenges in negotiating advanced aging. For example, Belbase and Sanzenbacher (2016; 2017) assess the effect of the high incidence of dementia in advanced old age on the management of household finances. Using data from the Johns Hopkins University's National Health and Aging Trends Study, the authors find that 85 percent of respondents with dementia have family members—typically, adult children and nonimpaired spouses—to help them manage their finances, primarily in paying bills. Representative payees, guardians, or other formally appointed caretakers assist another 10 percent, many of whom have no family members living nearby. The study finds that such assistance is effective. Among those who receive help, the incidence of financial hardship is much the same as that for otherwise similar individuals without dementia—and is much lower than that for the 5 percent of respondents with dementia who do not get any assistance.

The Effect on Government Budgets

Rising medical costs and declining family supports will stress government budgets as well as the budgets of aged households. The federal government covers 80 percent of an aged household's Medicare costs and federal and state governments cover much of the cost of Medicaid benefits. Because the median age of the population will continue to rise, governments will need to support many more aged households with medical and long-term care needs.

In the past, Congress expanded the Medicare and Medicaid programs in response to the rising cost of care. It added optional prescription drug coverage to Medicare and had Medicaid cover the Medicare premiums and copayments of low-income aged households that were not eligible for means-tested Supplemental Security Income payments. If medical costs rise as projected, policymakers might take additional action to address the cost burden to households.³⁰

Favreault (2015) estimates future retiree incomes and medical expenditures under different assumptions, including an across-the-board cut in Social Security benefits in response to the program's financing shortfall and a more rapid increase in medical costs. If Social Security benefits are cut, more retirees will qualify for Medicaid. A more rapid increase in medical costs will further stress government budgets. The study's projections indicate that the ability of future retirees to manage out-of-pocket health costs will be substantially affected by cost growth, Medicare and Medicaid spending, and the income levels provided by Social Security and private retirement-income plans.

Conclusion

Twenty years have passed since the SSA created the Retirement Research Consortium, and the demographic, economic, and programmatic forces transforming the nation's retirement income system are now largely in place. We are entering the final phase of the long upward trend in the nation's median age. The shift from employer-provided DB pensions to DC plans in the private sector is largely complete. Marital-status trends have changed and employment among women has increased. Changes in the distribution of income and wealth are hard to predict, and inequality might stabilize, decline, or further expand. The one trend expected to continue is the cost of medical care rising faster than household incomes.

The CRR studies reviewed here suggest that retirees and governments will likely face challenges in

maintaining the level of income security that retirees experienced in the past. Now, the nation faces a critical and action-forcing event: The Social Security trust fund reserves currently are projected to be depleted in 2035, only 15 years away. At that point, Social Security will be able to pay only 75–80 percent of scheduled benefits—to *existing* and new beneficiaries. In that scenario, households entering retirement will have lower benefits, little or no DB pension income, and higher out-of-pocket medical costs.

No consensus yet exists on how to respond to the key challenge facing the nation’s retirement income system: the finances of the government’s Social Security, Medicare, and Medicaid programs. The CRR has helped “expand the knowledge base upon which Social Security and retirement policy decisions are made” by contributing studies on longevity, interactions between the government’s medical insurance and cash benefit programs for the aged, and the likely effect of changing family structures on the demand for government-funded services when the baby boomers enter advanced old age. Changes in fertility rates, given women’s changing economic roles, could also significantly affect the long-term solvency of government programs for the aged. As the depletion of the Social Security trust fund reserves draws nearer, these issues will be increasingly important research priorities.

Notes

¹ Taxation of benefits applies to beneficiaries with incomes above specified nominal dollar amounts.

² The FRA remained 65 for workers born in 1937 or earlier. The new FRAs rose in 2-month increments for members of each successive birth cohort from 1938 through 1942, became 66 for members of the 1943–1954 birth cohorts, again rose in 2-month increments for members of each successive birth cohort from 1955 through 1959, and became 67 for workers born in 1960 or later.

³ Other Social Security changes that encouraged later retirement included raising the existing delayed retirement credits, which provide higher monthly benefits if claimed after FRA; and eliminating the retirement earnings test for beneficiaries who work after attaining their FRA.

⁴ Physical job demands and declining physical abilities are commonly cited as resulting in the “superannuation” of some older blue-collar workers. In addition, Belbase and others (2015) and Belbase, Sanzenbacher, and Gillis (2015) find that cognitive job demands and declining cognitive abilities result in the superannuation of some older white-collar workers. As blue-collar employment declines and white-collar employment expands, cognitive job demands and declining cognitive abilities will become more important. Belbase,

Sanzenbacher, and Gillis nevertheless find that older blue-collar workers are especially susceptible to superannuation.

⁵ Because the age-67 FRA applies to workers born in 1960 or later, the first year such workers will be eligible to claim is 2022.

⁶ The authors estimate that the share of age-62 claimers who were unable to maintain their preretirement standard of living rose from 60 percent of those who reached age 62 during 1993–1998 to 66 percent of those who reached age 62 during 2004–2009. Age-62 claimers who had the resources to maintain their standard of living were better educated, had higher incomes and wealth, and were much more likely to have employer-provided DB pensions and retiree health insurance than those who did not.

⁷ See, for example, the discussion in Munnell, Rutledge, and Webb (2014).

⁸ Financial shocks are highly correlated with labor market shocks, and have offsetting effects on retirement behavior: Downturns increase a worker’s desire to remain employed and delay retirement, but also reduce employer demand for workers.

⁹ Specifically, Clingman, Burkhalter, and Chaplain (2019) estimate that the benefit of a worker with scaled medium earnings who retires at FRA in 2019 replaces 41.0 percent of preretirement earnings.

¹⁰ The survivor benefit initially guaranteed the widow(er) 75 percent of the higher earner’s benefit, and was increased to 100 percent in 1972. Survivors are also guaranteed 82.5 percent of the higher earner’s FRA benefit, if greater than the higher earner’s actual benefit. Both spousal and survivor benefits are reduced if claimed prior to the recipient’s FRA.

¹¹ Divorced individuals are entitled to spousal and survivor benefits based on their ex-spouse’s earnings record if the marriage lasted 10 years or more.

¹² Specifically, the study finds that 10 percent of generation X mothers will never have been married, versus 3 percent of war baby mothers; and that 5 percent of generation X mothers will have been divorced from a marriage of fewer than 10 years, versus 4 percent of war baby mothers.

¹³ Bowles-Simpson would also adjust the maximum taxable-income level so that 90 percent of U.S. earnings would be subject to payroll taxes; adopt an inflation measure that would reduce Social Security cost-of-living increases, which would be offset by an increase in benefits for long-term beneficiaries; and require all new state and local government workers to participate in the program. Exempting low-wage workers from the FRA and early-eligibility age increases was justified by the fact that longevity has risen primarily for high-wage workers, and less so for low-wage workers, as documented in CRR studies (Bosworth and Burke 2014; Bosworth, Burtless, and Zhang 2015; Bosworth and Zhang 2015; Sanzenbacher and others 2017; Sanzenbacher and Ramos-Mercado 2016).

¹⁴ The authors suggest that one reason for the projected increase in aged poverty is that the proposal bases its minimum benefit and hardship exemptions on career lengths and thus offers less protection for the chronically poor.

¹⁵ The study focuses on the proposal's failure to address issues of horizontal equity, or differences in the ratio of household benefits to household taxes, in the current spousal and survivor benefit design. The study also assesses Bowles-Simpson incentives for workers to delay retirement relative to the current incentives and "reasonably feasible" alternatives.

¹⁶ Most public-sector workers, who comprise about 15 percent of the total nonfarm workforce (Bureau of Labor Statistics 2019), still have DB plans.

¹⁷ The study combines IRA balances and DC assets because most IRA assets are 401(k) plan rollovers. It uses standard methods (developed in Gustman, Steinmeier, and Tabatabai 2010) for valuing DB accruals and the authors estimate the income from DC-plan savings by annuitizing projected account balances while accounting for the higher retirement ages of more recent cohorts and declining interest rates. Sorokina, Webb, and Muldoon (2008); Munnell, Aubry, and Crawford (2015); and Karamcheva and Sanzenbacher (2010) also study the effects of the DB-to-DC shift on trends in pension holdings and retirement savings.

¹⁸ The act provided various safe harbors for employers implementing automatic enrollment, such as default investment allocations, and affirmed that state payroll withholding laws applied to 401(k) defaults (Beshears and others 2010).

¹⁹ Automatic-enrollment plans have a default investment vehicle, typically a "target date fund," which usually performs better than what workers would otherwise elect. Munnell, Orlova, and Webb (2012) discuss the limited importance of asset allocation and Kopcke and others (2013) discuss uncertainty in determining optimal asset allocations.

²⁰ Note that the Danish and U.S. tax systems differ and, because of declining marginal tax rates and changes in the tax treatment of investment income in the United States, the value of government tax preferences for retirement saving has significantly declined (Burtless and Toder 2010). For this and other reasons, the findings for Denmark may not necessarily translate to the United States.

²¹ One possible explanation is that behavioral defaults enable employers to meet antidiscrimination tests less expensively than matching contributions do (Sass 2016a).

²² Default contributions are typically much lower than contributions to traditional plans, which tend to gravitate toward the maximum level that the employer matches. However, employers are increasingly adopting automatic escalation of the default contribution amount (Vanguard 2017).

²³ Munnell and Sass (2014) discuss the HECM program as revised in 2013. The program was further revised in 2017.

²⁴ The results are based on the HECM program prior to the 2017 revision. Wimer and Manfield (2015) also consider

the role of reverse mortgages in estimating potential income available to aged households.

²⁵ Sass (2018b) also assesses the resource adequacy of future retirees.

²⁶ Coe and Webb (2010) study household consumption (rather than saving) among empty nesters.

²⁷ Sass (2014) and Cribb and Emmerson (2019) describe a universal automatic-enrollment program with both employer and government matching contributions, recently rolled out in the United Kingdom. That program should be more effective in raising retirement saving, but at a higher cost to the government.

²⁸ Specifically, Medicaid covers the Medicare premiums and copayments of aged individuals with income below the federal poverty level and the Medicare premiums of many retirees with incomes up to 135 percent of the federal poverty level (Sass 2018a).

²⁹ The model uses data from the HRS and the Centers for Medicare and Medicaid Services' Medicare Current Beneficiary Survey. The baseline model assumes that Social Security benefits are not reduced, retirees annuitize their financial assets, medical costs rise as projected in the Medicare Trustees' baseline estimate, and medical expenditures and supplementary insurance purchases respond to changes in medical costs and household incomes.

³⁰ Sass (2018a) summarizes the trends that point toward the expansion of Medicaid; Butrica, Murphy, and Zedlewski (2010) examine the effect of medical expenditures on the projected incidence of poverty among aged households.

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SOCIAL SECURITY RESEARCH AT THE UNIVERSITY OF MICHIGAN RETIREMENT AND DISABILITY RESEARCH CENTER

by John Laitner, Eric French, Alan L. Gustman, Michael D. Hurd, Olivia S. Mitchell, Kathleen J. Mullen, and Susan C. Barnes*

Preface

The Michigan Retirement Research Center (MRRC) expanded to include research on issues related to disability in late 2019. The center is now named the Michigan Retirement and Disability Research Center (MRDRC). This article discusses the work of the MRRC prior to its transition to the MRDRC and its inclusion of disability-related research activities.

Introduction

The Social Security Administration sponsors the MRRC to study topics of concern for Social Security and retirement policy, build a community of scholars with experience and expertise in analyzing these issues, disseminate research findings, and attract new generations of scholars to the field. The MRRC is one of three such centers, along with the Center for Retirement Research at Boston College and the National Bureau of Economic Research's Retirement Research Center. The MRRC is proud to have participated in the retirement research program and this article highlights some of its recent projects.

The MRRC seeks to deliver a balance of theoretical and empirical work. MRRC research often takes the lifecycle model developed by Modigliani (1986) and others as its conceptual foundation. The model analyzes household planning for lifetime needs. It emphasizes household incentives to save during peak earning years in preparation for retirement and it lays

out the tradeoffs between leisure and earnings that households must confront in determining the age at which to retire. MRRC researchers extend the original lifecycle framework to include uncertainties about longevity, health, and asset returns; to highlight the role of family composition changes and differences; and to incorporate public policies and study their effects. Above all, they have attempted to use varied data sources with their models both to estimate key parameters and to test the models' real-world implications.

New data sources have been central to MRRC efforts. The MRRC is based at the University of Michigan's Institute for Social Research, which also houses the Health and Retirement Study (HRS). A number of MRRC executive committee members are, or have been, copincipal investigators on the HRS, including Michael D. Hurd, Olivia S. Mitchell, David Weir, and Kathleen McGarry. They are intimately familiar with the data set's many features. Likewise, a

Selected Abbreviations

ACA	Patient Protection and Affordable Care Act
ALP	American Life Panel
DB	defined benefit
DC	defined contribution
HRS	Health and Retirement Study
IRA	individual retirement account

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Selected Abbreviations—Continued

LTCI	long-term care insurance
MRRC	Michigan Retirement Research Center
O*NET	Occupational Information Network
UK	United Kingdom

number of MRRC projects employ Internet panel data collected in the American Life Panel (ALP) at RAND and the Understanding America Study (UAS) at the University of Southern California’s Dornsife Center for Economic and Social Research. The baseline respondent information in these surveys is patterned after that of the HRS. Although they are less extensive in time and scope, the ALP and UAS allow rapid, precisely targeted data collection; specialized subsample panels; and questions using sophisticated graphics. International data—designed for comparison with the HRS—are now available for Europe and emerging-market economies, and MRRC researchers are on the forefront of their use. MRRC scholars also make extensive use of data from the Medical Expenditure Panel Survey, the Panel Study of Income Dynamics, the Survey of Income and Program Participation, the Current Population Survey, the American Community Survey, the Survey of Consumer Finances, and the Consumer Expenditure Survey. They also use shared private-sector data (for example, the Vanguard Research Initiative, briefly discussed below) and independent, researcher-collected data (such as audit and correspondence surveys, also discussed below).

The subjects of MRRC study include Social Security and retirement, macroeconomic analysis of Social Security, wealth and retirement income, program interactions, demography, and international research. For the sake of brevity, however, the present summary focuses on MRRC research on two broad topic areas: (1) preparation for and well-being during retirement and (2) public policy, health, and other determinants of retirement timing and labor force participation at older ages.

Preparation for and Well-Being During Retirement

In an era of longer lifespans and a changeover from defined benefit (DB) to defined contribution (DC) pensions, household wealth accumulation in preparation for retirement is of rising concern. Fortunately, for research purposes, the HRS provides evidence on how households are coping.

The HRS assembles household balance sheets that account for all major components of net worth. For most respondent households, the HRS can provide, on a restricted-use basis, lifetime Social Security earnings records for both the head of household and the spouse. Primary respondents are aged 51 to 61 when introduced to the survey, and panel data are collected every 2 years thereafter. The HRS began in 1992; the first respondents were in the 1931–1941 birth cohort. Additional cohorts were added in subsequent survey waves.¹

Fang, Brown, and Weir (2016) use wealth and income data from the HRS to assess the household finances of adults reaching ages 51 to 56 in 1992, 1998, 2004, and 2010. Each wave of the HRS fields an extensive battery of questions about private wealth, with categories such as housing equity, financial assets, and pensions measured separately. Survey questions also collect measures of debt, which are netted out of the wealth measures. Notably, the HRS makes a substantial effort to measure pension wealth accurately, which includes estimating the capitalized value of future DB pension income.²

Fang, Brown, and Weir compute the average ratio of net worth to lifetime earnings for individuals in the different cohorts. They find that average real earnings per cohort rose steadily, increasing by one-third from 1992 to 2010. By contrast, wealth, including the capitalized value of DB pensions, DC pensions, individual retirement accounts (IRAs), and Social Security benefits, declined slightly. Mean real wealth (in 2010 dollars) rose from about \$428,000 in 1992 to \$464,000 in 2004, but then declined to \$414,000 in 2010. The ratio of wealth to lifetime earnings declined from about 0.45 for the 1992 near-retirement cohort to about 0.33 for the 2010 cohort.

Caveats apply. Nonpension wealth, which made up more than 40 percent of household net worth in 1992, actually rose faster than lifetime earnings from 1992 to 2004. However, housing and financial asset prices fell sharply during the Great Recession, reducing 2010 nonpension wealth in the study’s data to 1992 levels. The asset declines in many cases proved temporary. Moreover, the growth in lifetime earnings during the study period is not necessarily straightforward to interpret, as this was a time of structural economic change. Although men’s lifetime earnings gains from 1992 to 2010 were small, women’s earnings doubled. However, this study, like most others, omits the value of home production—that is, the housekeeping and related tasks forgone to enter the labor force. House, Laitner, and Stolyarov (2008) estimate that

that omission may cause an overstatement of gains in household income by about one-third.

Nonetheless, Fang, Brown, and Weir's results appear to bolster public concern that declines in the prevalence of DB pensions are not being fully offset by greater use of DC and IRA alternatives. The authors conclude that "retirement preparation among the American nonelderly (at least when measured in financial wealth) seems to have weakened since the turn of this century."

As a rule of thumb, conventional assessments of retirement preparation recommend income replacement rates—postretirement income as a percentage of earnings in the period just before retirement—that will preserve preretirement living standards. Traditional postretirement income calculations sum Social Security benefits and DB annuity income, but DB pensions are increasingly less common—and many of the DC plans and IRAs that replace them do not provide annuitized retirement income. Further, retiree households may have sizable nonpension net worth—including, for instance, their house.

Hurd and Rohwedder (2015) reexamine retirement readiness using variants of the income replacement-rate model. Their study sample includes HRS respondents (both singles and couples) aged 66–69 at any point from 2000 to 2008 with any preretirement earnings at ages 59–61. The authors begin with a conventional benchmark replacement-rate target of 70 percent³ and examine whether a respondent's household income meets that target under a traditional income concept (Social Security benefits plus DB pension annuity income) and an alternative definition that augments the traditional concept with asset draw-downs from household net worth (including DC plans, IRAs, and home equity). They find that 35 percent of single-person households meet the target replacement rate under the first definition and 46 percent do so under the second. For couples, the corresponding percentages are 34 percent and 46 percent.

Acknowledging differences in household tastes and demographic composition, Hurd and Rohwedder also analyze consumption data in their 2015 study. Using panel data from the HRS Consumption and Activities Mail Survey (CAMS), they compute rates at which consumption changes with age, health condition, and demographic composition for singles and couples. Then, given a particular household's consumption level early in retirement, they simulate its future consumption under random health and mortality shocks and corresponding CAMS-based average growth rates. If the household's initial resources are sufficient

to finance a lifetime path in at least 95 percent of its simulations, the household is deemed adequately prepared for retirement. With this consumption-based approach, the authors find that 59 percent of single households and 81 percent of couples are prepared for retirement. These shares are substantially higher than those estimated using either of the study's income measures—especially in the case of couples.⁴

Knowledge and Planning

The MRRC has longstanding interest in the roles that knowledge and understanding of Social Security benefits, private investment options, probable longevity, and other aspects play in retirement preparation (Armour 2017; Lusardi, Michaud, and Mitchell 2017; Hurd and McGarry 1995). Recent work examines the way people think about retirement issues, as well as the information they have on hand (Gottlieb and Mitchell 2015).

Armour (2017) uses the ALP Internet survey to study the effect and the value of mailing paper *Social Security Statements* to individuals once every 5 years, as the agency has done since 2014. The ALP has a nationally representative sample. It provides an extensive set of baseline covariates, longitudinal information on respondents' knowledge of their Social Security entitlements, and subsamples of those who do or do not have an online *my Social Security* account (with which an individual can view his or her current-year *Statement* online) and who have or have not received a paper *Statement* since 2014.

Sixty-one percent of paper *Statement* recipients find it useful for retirement planning or Social Security claiming, and report that receiving the *Statement* makes them more optimistic that benefits will in fact be available when they reach retirement. Seventy-four percent of *my Social Security* accountholders find them especially helpful.

This project illustrates how useful an Internet panel survey can be for policy evaluation. Researchers can quickly derive and field such a survey instrument to measure respondent awareness of and reactions to newly instituted policies. They can also easily link new data to existing records; and, if policy implementation is staggered, researchers may be able to measure results for different groups separately, as each is affected in turn.

In the United States, nursing home care is both expensive and prevalent: 50–70 percent of adults may need such services at some point in their lives. Nevertheless, few have long-term care insurance (LTCI).

Gottlieb and Mitchell (2015) use data from an experimental 2012 module of the HRS to examine the question: Why do so few Americans buy LTCI? The authors specifically consider the effect of a behavioral tendency called narrow framing, in which a respondent chooses inconsistently between two equal risk-versus-reward scenarios depending on whether a scenario is framed as a potential gain (such as insurance benefits) or a potential loss (such as premium costs).

The researchers designed the HRS module with questions in which a restricted focus on losses yielded answers that differed from those that would be expected of respondents seeking rationally to get the most from their money (that is, expected utility maximization, which takes into account gains as well as losses in all circumstances). Among a study sample of roughly 1,700, less than 12 percent had LTCI. About one-quarter of the respondents manifested narrow concentration on insurance costs rather than also considering possible benefits during health emergencies. The authors find that this group was significantly less likely to own LTCI. Other covariates, such as sensitivity to risk, were either insignificant or only marginally important.

Neoclassical economic models might explain low LTCI take-up based on insurance transaction costs, adverse selection, or the availability of Medicaid nursing home coverage (Friedman and Warshawsky 1990; Mitchell and others 1999). However, Gottlieb and Mitchell's experimental HRS module tests a behavioral-theory hypothesis and finds that narrow framing affects at least one-quarter of the sample.

Well-Being During Retirement

Well-being during retirement is likely to depend heavily on health status, which may involve factors such as out-of-pocket medical spending and the need for assistance with activities of daily living. Several MRRC projects have focused on these factors, including long-term care expenses (De Nardi, French, and Jones 2015) and the costs of Alzheimer's disease (Hurd and others 2013). Yet another determinant of retirement security could be age-related vulnerability to careless mistakes and fraud.

DeLiema and others (2017) examine the prevalence of fraud and financial exploitation of older Americans, along with the factors associated with their victimization. The authors designed an experimental HRS module, fielded in 2016, that used incident-based questions; that is, each respondent was asked if he or she had been exposed to any of six specific types of fraud and three specific types of scam. Each type was

identified with a one- to three-sentence description. To assess overall prevalence, the authors tallied a respondent's reported exposure across all nine categories. The module included a financial literacy test and a self-rating of financial knowledge.⁵

DeLiema and others find that about 8 percent of respondents reported some form of investment fraud. Noninvestment scams were more common still. In particular, about 30 percent of respondents said someone had attempted to access their credit cards or bank accounts. Questions about experiences with a list of specific frauds and scams yielded higher prevalence rates than those merely asking each respondent for the number of instances they had experienced. (Notably, the authors took particular care to avoid embarrassing respondents with questions about victimization.) On the other hand, few of the covariates turn out to be significant predictors of fraud or scam prevalence.

Kariv and Silverman (2015) examine the economic rationality of Dutch Internet panel respondents. Participants were given 25 hypothetical budgeting problems. The authors look for violations of the properties of preferences that are commonly associated with logical thinking. They devise metrics for summarizing the number of violations per participant. The study finds that, after correcting for education and sex, age has a significant negative effect on rationality—18 percent to 30 percent of a standard deviation, depending on the measure. Belonging to a precomputer- or postcomputer-era birth cohort does not affect rationality, nor does one's cognitive score or health status.

Factors of Retirement Timing and Labor Force Participation at Older Ages

Many MRRC studies examine public policy, health, labor market, and other determinants of the decision to retire or to continue working at older ages. This section summarizes a selection of those studies.

The Patient Protection and Affordable Care Act (ACA)

The ACA provides a current example of a government policy that targets one issue but may have collateral effects in other spheres. In particular, economic theory suggests that the ACA might lead to decreased labor force participation.

The ACA took effect in January 2014. One of its primary intents was to make health insurance less expensive for adults who have not reached the age of Medicare eligibility and who lack employer-sponsored

alternatives. Health insurance exchanges, with means-tested subsidies, opened in every state. Medicaid expanded coverage to low-income adults in the states that accepted the provision (Levy, Buchmueller, and Nikpay 2016).

French, von Gaudecker, and Jones (2016) construct a structural lifecycle model to examine whether the ACA will encourage early retirement (that is, before age 65). Low labor force participation among individuals aged 55–64 has recently concerned policymakers (Furman 2015). French, von Gaudecker, and Jones calibrate their model using the Medical Expenditure Panel Survey and the HRS and its simulations generate quantitative results. The model predicts lower employment for older workers as they gain access to the ACA exchanges or Medicaid. Interestingly, the model also suggests that middle-income workers are the most likely to leave employment, perhaps because high-income households are ineligible for the ACA subsidies and low-income individuals may be willing to take their chances without insurance and rely on emergency-room assistance as a backup.

Levy, Buchmueller, and Nikpay (2015) use Current Population Survey data for January 2005–June 2015 to study ACA effects on retirement and part-time work. They discern little change since the advent of the ACA, even when they compare states with and without Medicaid expansion. Although the study is an early assessment, the topic’s importance means that even early data-driven results are of great interest.

In contrast with the reduced-form approach of Levy, Buchmueller, and Nikpay (2015), Gustman, Steinmeier, and Tabatabai (2016) use a structural model with estimated parameters. They split an HRS sample of employed individuals into three groups: those with employer-sponsored health insurance while working, but not after retirement; those with employer-sponsored health insurance while working and in retirement; and those with no employer-sponsored health insurance at all. The authors find that even simulations of the law’s long-run consequences indicate no more than very small employment effects. One possible explanation is that the ACA is likely to affect only a fraction of employees strongly. A second is that health insurance is only one of many determinants of retirement timing.

Deng and Benitez-Silva (2015) explore the relationship between health insurance and retirement from a different perspective. The authors use Medicare Current Beneficiary Survey data for 1999–2010 to study Medicare program savings resulting from labor force participation past age 65. For an individual who works

at age 65 or older in a job with employer-sponsored health insurance, or for a partner receiving spousal coverage, Medicare is the secondary payer. The authors calculate savings to Medicare from employer-sponsored health insurance of \$3.22 billion a year in 2009 dollars. Future year-to-year savings to Medicare may be even greater: The age for full retirement benefits is 65 for those born in 1937 or earlier, but it rises in increments for those born in subsequent years, until reaching 67 for those born in 1960 or later. That, as well as increases in longevity, may encourage more people to work past age 65, thereby keeping them in employer-sponsored health insurance coverage.

Human Capital and Retirement

Average life spans increased throughout the last century.⁶ At first, declines in infant mortality were a major factor. More recently, declines in mortality at older ages have been important. An open question is whether longer life spans will lead to proportionate increases in career lengths and retirement ages or almost exclusively to longer retirement periods instead. The outcome will have major implications for the labor supply, household resources during retirement, and Social Security solvency.

Fan, Seshadri, and Taber (2017) examine the lifecycle profile of household earnings and assess how its shape may adjust as lifespans lengthen. In the lifecycle model, a household derives utility from both consumption and leisure, and work ceases when the incremental increase in leisure from retirement fully counterbalances the lost earnings. In the standard paradigm, wages rise with experience but decline with age (reflecting, for example, deteriorating health). In practice, wages tend to rise from about age 22 to a peak at ages 50 to 55, and then decline. When wages decline enough, a worker retires. If hours of work are roughly constant, the pattern of a household’s earnings, with respect to age, tends to form an inverted U.

Ben-Porath (1967) proposes an alternative formulation in which a household purposefully allocates its work hours between on-the-job skill enhancement—that is, human capital investment—and work. A larger fraction of the workday devoted to the latter raises current earnings; a larger fraction devoted to the former raises future wages but diminishes current earnings. Early in one’s career, a worker has incentive to invest heavily, as there are many years of future work over which to reap the benefits. Late in one’s career, on the other hand, a worker will want to devote most employment hours to (currently) remunerative production.

In a conventional lifecycle model, as longevity increases, extending one's career may involve accepting lower and lower wages. Continuing employment can quickly become unattractive. In the Ben-Porath model, by contrast, as lifespans increase, workers can invest more, and longer, in human capital, delaying the age at which their wages begin to decline. Thus, they can benefit more from a later retirement age.

Fan, Seshadri, and Taber develop a lifecycle model of the Ben-Porath type, calibrate some of its parameters, and estimate the remainder from Survey of Income and Program Participation data. The authors use their model to simulate the effects of various potential Social Security policy changes. They find, for instance, that less generous benefits result in higher labor force participation later in the lifecycle, as workers adjust their human capital investments over time.

Laitner and Silverman (2017) present a lifecycle model with which they simulate saving-versus-consumption decisions for couples at all ages, as well as choice of retirement age.⁷ The model uses Consumer Expenditure Survey data to estimate lifecycle consumption profiles and HRS panel data to estimate retirement ages and household net worth. It also uses linked Social Security lifetime earning histories, available to researchers on a restricted-access basis, to estimate each adult's lifetime wage-and-salary income. Laitner and Silverman use their model to study a potential policy change that has been suggested in the past: They simulate the effect of a Social Security "vesting age" after which a worker would be exempt from the payroll tax. The policy would also raise the prevesting-age payroll tax to maintain revenue neutrality for the Social Security system. With a vesting age of 54, for example, the simulations show that men's careers would lengthen by 1.27 years on average.

Health as a Determinant of Retirement

Declining health is an important determinant of retirement timing. MRRC researchers have used international and restricted data, as well as novel survey methods, to explore the complex relationship between aging workers' health shocks (and those of their family members) and employment declines.

Blundell and others (2016; 2017) use data from the HRS and its sister survey in the United Kingdom (UK), the English Longitudinal Study of Ageing (ELSA), to study the effect of health shocks on employment. One of their goals is to derive a convenient, one-dimensional summary of an individual's health at

a given age. This can facilitate policy studies, international comparisons, and other analyses. Modern data sets often include numerous health measures—the HRS and the ELSA, for example, have three subjective measures of health and many objective measures. Blundell and others consolidate the available information into a single index. Among a number of candidate indices, they recommend what statisticians call the first principal component of the subjective measures.⁸

Another goal is to show that regressions analyzing the relationship between, for example, retirement age and health condition should include lagged values of health (and lagged labor supply variables) as well as current health. Health problems can be either transitory or chronic, and the latter tend to have the strongest effect on labor supply. Lagged explanatory variables can help to capture the effect of chronic conditions; omitting lagged values, the authors show, leads to biased coefficients on current health.

A third goal of these studies is to compare UK and U.S. results. From a policymaker's standpoint, there are intriguing early results. For example, UK labor force participation tails off rapidly among women in their late 50s, but U.S. women do not show a similar decrease. The state pension age for women is 60 in the UK, but the U.S. Social Security full retirement age for retirement-eligible women (and men) during the 1996–2012 study period was 65 to 66, depending on year of birth. On the other hand, declining health affects male retirement more strongly in U.S. regressions than in UK results. The authors note that the relative generosity of DI benefits (including access to public health insurance) and unemployment insurance in the United States is greater than that of the UK's corresponding programs. Thus, in both countries, policies may provide part of the explanation for the differences in outcomes.

Giustinelli and Shapiro (2018) examine the potential value of using survey questions that allow respondents to choose among hypothetical alternatives. The authors use such questions to obtain more extensive information on linkages between health and retirement than conventional data sets provide. The project uses data from the Vanguard Research Initiative, a survey of individuals aged 55 or older who have at least \$10,000 in financial assets in Vanguard Group accounts, augmented with additional surveys providing background covariates and fielding specialized questions about investor preferences. Vanguard provided the data and facilitated the surveys. The

authors' analysis focuses on responses to three sets of hypothetical questions:

- What is the probability that you will be in good (bad) health 2(4) years from now?
- What is the probability that you will be retired 2(4) years from now?
- What is the probability that you will retire 2(4) years from now if you are in good (bad) health at that time?

By contrast, a conventional (panel) survey would ask about employment and health status at different ages, enabling analysts to observe the survey participant's health at retirement, but not revealing whether the respondent would have retired at that time were his or her health status different.

Among workers aged 58 or older, a change from high (good) to low (poor) health reduces the self-reported odds of working by 28.5 percentage points. The responses to detailed hypothetical questions offer analysts the chance to estimate causal relationships that would be difficult to identify with conventional data.

Fahle and McGarry (2017) study a different link between health and labor force participation. The authors examine the characteristics of adult children who are the most likely to provide care to elderly parents, and how care for parents affects children's labor market participation. The analysis uses the HRS panel and linked (and restricted-access) Social Security earnings histories. It focuses on women aged 51 or older who were interviewed during 1992–2010 and who were not providing care in 1992 but had at least one living parent or parent-in-law. About half of those women provided elder care at some subsequent point. The study asks: Is the selection of those providing care positively or negatively related to previous work experience? Somewhat surprisingly, the selection is positive. More schooling, more past work experience, and higher earnings raise the likelihood of providing care for parents by 5 percent to 10 percent.

Age Discrimination and Demand for Labor

Many retirement studies focus on labor supply issues; for instance, on how long employees want to continue to work before retiring. However, demand factors may be important as well. If employers are reluctant to hire and keep older individuals, policies designed to encourage those individuals to extend their careers may not be effective.

Neumark and others (2016) extend a study of potential age discrimination in employment (Neumark,

Song, and Button 2015) by responding to retail job postings with résumés that include subtle age identifiers and measuring whether callback rates differ based on state age- and disability-discrimination laws. In each of the 50 states, the authors submit four résumés per job posting, indicating an older man (age 64 to 66), a younger man (age 29 to 31), an older woman, and a younger woman. They find that callback rates for older applicants of both sexes are about 30 percent lower than are those for younger applicants. For both sexes, tests reject the hypothesis that callback rates are independent of age. In a part of the project funded by MRRC, Neumark and others add information on state age-discrimination laws and test whether callback rates are less age-dependent in states with stronger laws. The results are not decisive: Coefficients are often not statistically significant, or are of variable sign. It is possible that laws designed to protect older workers sometimes backfire. For example, stronger laws may lead prospective employers to worry that they could have difficulty firing older hires who turn out to be poor matches.

Job Attributes and Retirement

As Americans live longer, working at older ages may become increasingly financially desirable, from both private and public standpoints. MRRC researchers have studied the relationship between job characteristics and workers' willingness to stay on the job at older ages. Much of their analysis relies on the HRS and a new resource from the Department of Labor's Employment and Training Administration, the Occupational Information Network (O*NET). For other studies, researchers collect their own specialized data.

Although the HRS is rich in covariates on work history and retirement expectations, it collects only subjective information on job attributes. Such measures may reflect respondent biases and personality traits. The O*NET database can provide objective information by combining job-analyst and worker surveys and then compiling matrices of cognitive, interpersonal, and physical requirements for different occupations.

Helppie-McFall and others (2015) and Sonnega and others (2017) study the potential effects of job attributes, as measured both subjectively and objectively, on expected retirement ages. To obtain objective measures, both studies merge the list of respondent jobs in the HRS with the occupational categories in the O*NET.⁹ The authors find that the subjective HRS covariates are statistically significant in explaining retirement timing,

whereas only a subset of the O*NET regressors are comparably useful. In fact, adding the O*NET regressors to the subjective covariates seems to contribute only marginal associations with retirement outcomes.

In related research, Angrisani, Kapteyn, and Meijer (2015) analyze HRS and O*NET job-attribute measures separately, then link occupational codes from each data source to compare results.¹⁰ The authors also attempt to account for unobservable characteristics by including information from an HRS Leave-Behind Questionnaire, which is administered, on a rotating basis, to 50 percent of the HRS sample at each wave. (In other words, each HRS respondent is covered every 4 years.) The questionnaire asks respondents about their life circumstances, subjective well-being, and lifestyle, and specifically asks them to rate themselves on their “Big Five” personality traits: openness to experience, conscientiousness, neuroticism, extraversion, and agreeableness. From the HRS core surveys, the authors draw data on individual demographics, labor force participation, pensions, finances, health, risk aversion, length of financial-planning horizon, and retirement expectations. They find that subjective job perceptions may tend to be related to individuals’ decisions to move from full- to part-time work, while objective measures may tend to determine retirement decisions.

Maestas and others (2016; 2019) take a different approach. They collect a new data set, the American Working Conditions Survey (AWCS), using an ALP subsample. The data include details on location and pace of work and on worker’s control over hours. Respondents also state their preferences among different working conditions (such as autonomy and availability of employer-sponsored health insurance). First conducted in 2015, the AWCS has fielded follow-up surveys at 6- and 12-month intervals.¹¹ The Sloan Foundation and the Social Security Administration jointly fund the AWCS.

The studies find that, except for on-the-job training and career advancement, older workers generally report better working conditions than younger workers do. Older workers are less likely to report mismatches between actual and desired working conditions. They also rate formal benefits as less important than autonomy, the physical demands of the job, and control over their own pace. Interestingly, 4 in 10 workers aged 65–71 report that they had retired but have since returned to the labor force. Further, more than half of those aged 50 or older and not currently working would consider reemployment if the right job were available.

Conclusion

The MRRC has developed dynamic models of household behavior, estimated their coefficients, and simulated the effects of proposed policy changes. The HRS, with its extensive array of covariates and its panel structure, is a premier resource for conducting this type of research. MRRC researchers have played key roles in developing HRS data and have pioneered its use. Indeed, data development and theoretical modeling often stimulate one another, and the MRRC enthusiastically participates in that process. The ultimate goal of the MRRC is to strengthen the scientific basis for economic policy by developing more sophisticated models and better data sources.

Notes

¹ The HRS longitudinal birth-cohort groupings include 1923 and earlier; 1924–1930; 1931–1941; 1942–1947; 1948–1953; 1954–1959; and 1960–1965.

² Beginning in 2010, the Department of Labor required annual electronic submission of pension benefit information using its Form 5500 series. These recently available data greatly augment HRS analysis of DB pensions.

³ Scholz and Seshadri (2008) consider alternative target replacement rates.

⁴ Other MRRC studies that examine retirement preparation generally or replacement rates in particular include Hurd and Rohwedder (2006; 2009; 2012) and Scholz, Seshadri, and Khitatrakun (2006).

⁵ A study by two of DeLiema’s coauthors (Lusardi and Mitchell 2017) is one example of those authors’ longstanding expertise in the measurement of financial literacy. Other examples include Hastings and Mitchell (2010) and Lusardi (2010).

⁶ However, that trend may not be ongoing, at least for some population groups. For a discussion of possible recent setbacks, see Bound and others (2014) and Geronimus and others (forthcoming).

⁷ The authors examined similar topics in earlier studies (Laitner and Silverman 2006; 2012).

⁸ To be precise, think of the data set as a matrix X . The rows correspond to separate (person, age) observations. The columns present different health measures. We construct a new matrix X^* with the same rows, but a single column. The latter is the linear combination of the columns of X that best “fits” all of the columns of X . (In other words, we choose X^* to minimize the sum of squared residuals from regressions of each column of X on X^* .)

⁹ The researchers’ HRS-O*NET crosswalks are publicly available at <https://sites.google.com/site/phudomiet/research>.

¹⁰ Related studies include Angrisani and others (2013) and Hurd and McGarry (1993).

¹¹ The AWCS data are publicly available and can be linked to other ALP surveys (<https://www.rand.org/pubs/tools/TL269.html>).

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SOCIAL SECURITY AND FINANCIAL SECURITY AT OLDER AGES

by Jeffrey Brown, James Choi, Courtney Coile, and Richard Woodbury*

Introduction

The age-based component of Social Security—Old-Age and Survivors Insurance (OASI)—is a major source of income for most older Americans. For the insured worker, benefit eligibility begins at age 62; and by deferring the claim (up to age 70), the beneficiary is entitled to actuarial increases in the monthly benefit amount. Once claimed, monthly benefits continue, with annual cost-of-living adjustments, for the remaining years of life. It would be hard to overstate the importance of this annuitized income stream to people's financial security at older ages. There are nearly 54 million current OASI beneficiaries, including retired workers and their dependents and survivors (Social Security Administration 2019, Table 2).

Although the core functions of Social Security remain largely unchanged, the program operates in an environment of continually changing demographics, health trends, longevity, labor markets, economic conditions, government finances, household finances, and related public and private programs. The dynamic evolution of these influences makes the ongoing monitoring and evaluation of Social Security policy and its implications an important subject of research attention and the explicit focus of the Retirement Research Center (RRC) at the National Bureau of Economic Research (NBER). The NBER RRC has been active since 2003 and operates through a cooperative agreement with the Social Security Administration. This article highlights key findings from the last 5 years of the NBER RRC's research. Findings from the NBER's companion Disability Research

Center are described in a separate article in this issue of the *Social Security Bulletin*.

Work, Retirement, and Claiming Social Security Benefits

A number of RRC studies address decisions about work at older ages, retirement, and Social Security claiming. Many factors influence such decisions, including the worker's health, family circumstances, health insurance availability, assets, employer-provided pension coverage, earnings, and local and national labor market conditions, as well as Social Security policy. Many Social Security provisions feature implicit financial incentives to retire or claim earlier or later, such as the ages of eligibility for benefits, the treatment of earnings and benefits for those who continue or return to work, the benefit adjustment formulas that apply to claiming at different ages, the benefit amounts, and the tax treatment of benefits.

Shoven and Slavov (2014) track the changes in Social Security's implicit financial incentives over time. They look first at policy changes, such as the phased

Selected Abbreviations

FRA	full retirement age
NBER	National Bureau of Economic Research
OASI	Old-Age and Survivors Insurance
RRC	Retirement Research Center
TSP	Thrift Savings Plan

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increase in the delayed retirement credit from 3 percent per year after the full retirement age (FRA) for workers born in 1924 or earlier to 8 percent per year for workers born in 1960 or later, and the relaxation of restrictions on the timing of claims for nonearning spouse benefits. They find that the rule changes increased the gains from delayed claiming by 1–2 percentage points for singles, 5–6 percentage points for two-earner couples, and 2–4 percentage points for one-earner couples, and that most of those increases are attributable to the rise in the delayed retirement credit. The authors also find that longer life expectancies and real interest rate declines over the study period further increased the financial reward for delayed claiming.

Börsch-Supan and Coile (forthcoming) summarize a cross-national project documenting changes in social security policy in the United States and 11 other higher-income countries over the last three decades and review how those reforms affected financial incentives to retire at different ages. They find that most but not all of the reforms lessened the effective tax on work at older ages. Such changes in work incentives in the United States and elsewhere partially explain why labor force participation at older ages has increased since 1990, reversing a previous trend toward younger retirement.

Other RRC projects analyze the effect of specific reforms on behavior, often drawing, like Börsch-Supan and Coile, from the wider scope of reforms implemented in other countries. Four recent studies find a strong relationship between changes in benefit eligibility ages and labor market behavior. Lalive and Staubli (2014) analyze how women’s work, retirement, and claiming behavior changed in response to a Swiss reform that increased the FRA from 62 to 64. They find that a 1-year increase in the FRA delays labor-market exit by 7.9 months and social security claiming by 6.6 months. In a follow-up study, Lalive, Magesan, and Staubli (2017) find that some of that delay is caused by “rule of thumb” behavior in which workers accept the FRA passively, and some of the delay results from changes in financial incentives caused by the reform. Manoli and Weber (2016) find that a 1-year increase in Austria’s early retirement age leads to a 0.4-year increase in the average age of job exit and a 0.5-year increase in the average pension claiming age. Manoli and Weber (2018) focus on developing firm-level data for Austria, but also report preliminary evidence that firms employ increasing numbers of men aged 60–63 and women aged 55–58 as increases in the eligibility age for early retirement benefits phase in.

Two recent studies look at changes in the formula for adjusting retirement benefits according to claiming age. Brinch, Vestad, and Zweimüller (2016) analyze a 2011 reform in Norway that allows pension claiming anytime from age 62 through 75, with actuarially neutral pension adjustments for claiming at different ages. Cumulatively, the reforms replaced the old system’s implicit tax on earnings after age 62 with incentives to retain employment. The study finds that registered employment among those aged 62 to 65 increased 26 percent, earnings increased 15 percent, and the rate of retirement at age 62 dropped substantially from prereform levels. Lalive and Staubli (2016) analyze a Swiss reform that doubled the benefit reduction for early retirement from 3.4 percent to 6.8 percent annually. They find that the adjusted formula led to a 4–5 month delay in pension claiming, but no change in labor force exit in that country.

A recent three-phase RRC project explores the effect of the Social Security earnings test on labor market behavior in the United States. Gelber, Jones, and Sacks (2014) find that the earnings test not only creates bunching around the earnings limits defined by the formula but also leads some individuals to forgo work altogether. Gelber and others (2017) reinforce those conclusions, finding that the employment rate of workers subject to the earnings test decreases significantly relative to that of other workers. For people aged 63–64, for example, the earnings test reduces the employment rate by at least 3.7 percentage points. Gelber, Jones, and Sacks (2019) present evidence of earnings-test frictions, wherein some individuals continue to behave as if they are constrained by the earnings test even when they are no longer affected. Specifically, during the period from 1990 to 1999, when the earnings test was imposed at ages 62–69 but not at ages 70 or above, there was still a modest bunching of earnings at ages 70 and 71, as if the earnings limit still applied. Even though the reductions in short-term Social Security benefits caused by the earnings are largely or completely offset by increases in Social Security benefits later, these results imply that eliminating the earnings test could increase work among older people.

Some state pension systems impose another form of earnings test, limiting the number of hours beneficiaries can work and still receive a state pension. Fitzpatrick (2019) finds that raising the maximum number of work-hours allowed increases part-time work among retirees without reducing retirement benefits collected. As such, these policies appear to be binding on the

employment decisions of some state pension beneficiaries, just as the earnings test affects some Social Security beneficiaries.

The studies described so far emphasize how Social Security policy affects work, retirement, and benefit claiming. Of course, other influences affect behavior too. For example, ease of access to health insurance before Medicare eligibility at age 65 may influence early-retirement decisions. Coe and Goda (2014) analyze how state-level reforms that prohibit insurers from rejecting applicants (guaranteed-issue requirements) or charging different rates based on health (community-rating regulations) affect early retirement. They find that these regulations, when applied in the individual (nongroup) market, substantially increase labor force withdrawal. At age 63, the monthly probability of retirement increases by 2.2 percentage points, or nearly double the rate that would occur without the reforms. For workers in fair or poor health, who are most likely gain access to the individual market through these regulatory changes, the effects are even greater. Among individuals predicted to be more sensitive to health policy regulations, access to health insurance accelerates retirement by 1–2 years.

Banks and Coe (2017) look at how the regulatory reforms and subsidies in the Patient Protection and Affordable Care Act (ACA) affected retirement expectations. Using survey data, they find that 15 percent of respondents indicated that they would be more likely to retire early. Heim, Lurie, and Simon (2016) compare retirement behavior in states that expanded Medicaid eligibility after enactment of the ACA with states that did not expand eligibility. Although they find no effect of Medicaid expansion on retirement behavior for the population generally, they detect small effects among women and single individuals who had access to employer-provided health insurance while working.

The causal link between health insurance and Social Security can work in the reverse direction as well. Fitzpatrick and Moore (2016) examine whether the increase in the Social Security FRA from 65 (for workers born in 1937 or earlier) to 66 (for workers born 1943–1954) delayed people's Medicare enrollment. The authors find that at age 65, the rate of Medicare participation is 2.5 percentage points lower for cohorts with an FRA of 66 than it is for cohorts with an FRA of 65. By age 66, there is again no difference in Medicare enrollment rates. This suggests that some people affected by the older Social Security FRA delay Medicare enrollment from age 65 to 66, but not beyond age 66.

Several RRC studies look at the psychology of Social Security claiming, and how framing the claiming options influences behavior. All of these studies are based on experimental surveys and interventions that alter and compare the framing, presentation, informational content, or messaging about Social Security claiming options. Greenberg and others (2017) find that Social Security claiming plans are sensitive to one's longevity expectations and how a person is asked to think about them. For example, if respondents were asked to think about someone they knew who had lived long into retirement, they indicated an intended Social Security claiming age that was 9 months older, on average, than the average age reported by respondents who were not. Similarly, respondents who were asked to focus on dying early in retirement indicated claiming intentions that were 9 months younger than the average age indicated by respondents with no such prompt. In follow-up work, Greenberg and others (2018) look at the effect of messages designed to promote self-reflection and to help people make reasoned judgments about Social Security claiming age. They test numerous messages, most of which significantly delay claiming intentions toward older average claiming ages, ranging between 5 months and 10 months later than the ages reported by respondents who do not receive such messages.

Two studies look at what happens to claiming expectations when respondents are given additional information on the cumulative payouts that would be made from Social Security under alternative scenarios. The findings differ. Shu, Payne, and Sagara (2014) compare the effects of two different tabulations of Social Security benefits, one showing monthly benefit amounts and the other showing cumulative lifetime payouts under various claiming-age and lifespan assumptions. They find that the lifetime-payout presentation leads respondents to favor earlier claiming, on average, over later claiming. Modrek, Reed, and Carstensen (2016) also test the effect of providing a table that compares lifetime benefits by claiming age and longevity, along with a modified SSA message highlighting the possible advantages of delaying claiming. They find that women seeing this table delay their expected Social Security claiming age by 1.3 years on average. The findings from this work highlight the very significant effect that even subtle variations in the framing of claiming options can have on planned retirement and claiming behavior.

Shu and Payne (2013) find a relationship between claiming-age expectations and longevity expectations.

For example, respondents expecting to claim Social Security at or before age 65 express an average probability of living to age 85 of 41 percent, compared with 50 percent for those expecting to claim at age 67 or later. Colby, Shu, and Payne (2017) likewise find that individuals who believe they will live longer choose to claim Social Security later. The authors also test whether people's claiming expectations differ if they are presented with a list of prudent financial planning goals (such as acquiring wealth and paying off debts) or, alternatively, a list of enjoyable retirement activities (such as travel or hobbies). They find little effect of these messages on claiming expectations.

Payne and others (2015) find that loss aversion, which varies widely across individuals, is highly predictive of financial preferences, including Social Security claiming age. The authors measure loss aversion by asking participants to choose among a series of gambling choices and find that individuals with high loss-aversion scores indicate an average expected claiming age that is about 6 months younger than that of individuals with low loss-aversion scores. In other words, those with greater loss aversion appear, when considering delayed claiming, to weigh the loss of early benefit payments more heavily than the gain they could achieve from higher monthly benefit levels.

Continuing to work at retirement-eligible ages can contribute to the well-being of individuals and families, the financial health of the Social Security system, and the economy more generally. In addition, delayed claiming—by raising the annuitized payment stream from Social Security—can further improve household financial well-being as age advances. Given these potential advantages, an important goal of the RRC is to understand the decisions people make about work and claiming, and how they are affected by Social Security policy and other factors. Recent RRC research reveals how significantly the structure of Social Security policy, and the presentation of claiming options, can affect what people do.

Health and Financial Well-Being

A second area addressed by RRC research is the finances and the health of the aged. Although changes to Social Security policy have been relatively modest, the economic and demographic environment surrounding Social Security has changed considerably in ways that influence people's broader financial well-being. The growth of defined contribution 401(k)-type savings plans, and the associated decline in traditional defined benefit pension income, is one important

trend. Another is the rise in labor force participation by women, such that retiring couples today are more likely to have substantial dual-income histories.

The lifetime courses of a worker's income, assets, and health are inextricably related. The strength and persistence of that interrelationship weaves through many RRC studies. For example, Chetty and others (2016) document the wide variation in life expectancy by income and geography. They find that the gap in life expectancy between the richest 1 percent and the poorest 1 percent of individuals is 14.6 years for men and 10.1 years for women. The gap is also widening. Between 2001 and 2014, life expectancy increased by 2.5 years for those with higher incomes but remained stagnant for those with the lowest incomes. Life expectancy among lower-income households also varies significantly across geographic regions. Abraham and others (2014) find that spatial variation in mortality is three times greater for those with annual incomes between \$10,000 and \$25,000 than for those with annual incomes of \$75,000 or higher. As an illustration, mortality rates for low-income individuals vary from 4,800 deaths per 100,000 in Yuma, Arizona to 15,000 deaths per 100,000 in Vincennes, Indiana. Low-income mortality and the slope of the mortality-income gradient are strongly correlated with local health risk behaviors (smoking and obesity) and racial composition but are only weakly correlated with measures of health care access.

Poterba, Venti, and Wise (2013) find a very strong relationship between education and financial well-being. Having a high school diploma increases the expected balance in a retirement plan by more than \$50,000 relative to not having a diploma, and having a college or postcollege degree increases expected account accumulations by almost \$250,000. Follow-up work in Poterba, Venti, and Wise (2018) finds that people with less education and lower lifetime earnings are more likely to have low wealth at retirement. Using a threshold of \$100,000 in total assets to define low wealth, the authors find that 45 percent of couples in the lowest quintile of lifetime earnings have low wealth at retirement, while only 7 percent of couples in the highest lifetime-earnings quintile have low wealth. Similarly, 51 percent of couples without a high school diploma have low wealth at retirement, while only 6 percent of those with a college degree do.

Venti and Wise (2014) find that enrollment in Social Security Disability Insurance is more than six times higher for people with less than a high school diploma than it is for people with a college degree or more.

People in the latter group are more than 25 percentage points less likely to claim OASI benefits early than are people with less than a high school diploma. Education is associated with better health and higher employment, earnings, and savings.

Poterba, Venti, and Wise (2017) analyze data from the University of Michigan's Health and Retirement Study and find that median assets do not change significantly as people age. For example, 70 percent of respondents born during 1931–1941 who held less than \$50,000 in total assets when last surveyed before death also had held less than \$50,000 in assets when first surveyed. Among respondents born in 1923 or earlier who held less than \$50,000 in assets when last surveyed before death, 52 percent also had held less than \$50,000 in assets when first surveyed. Although the typical asset trajectory is relatively flat over time, people do exhibit asset declines in connection with important medical events or disruptions in family composition. Poterba and Venti (2017) find that although some diagnoses do not substantially affect people's assets, strokes are associated with average declines in net worth of \$4,682 for low-wealth individuals and of \$59,290 for wealthier individuals. New diagnoses of lung disease are associated with declines in net worth of \$9,986 and \$84,959 for low- and high-wealth individuals, respectively.

Several RRC projects focus on the financial circumstances of lower-income households. For example, Baugh and Wang (2018) analyze how the once-a-month timing of Social Security income affects household finances between payments. They find that during months with a 35-day pay cycle (those having a fifth Wednesday) rather than the more common 28-day pay cycle, beneficiary households experience 9 percent more overdrafts, 6 percent more bounced checks, and 12 percent more online payday loans per day. Also, a mismatch of 1 additional week between the benefit payment and the due date for major bills results in 13 percent more overdrafts, 42 percent more bounced checks, and 37 percent more online payday loans. However, Giambra, Hastings, and Shah (2017) find no effect of the once-a-month timing of benefit payments on health outcomes.

Meyer and others (2018) find that many household surveys inadequately account for in-kind transfers and contain errors in earnings reports, transfer reports, and assets. When corrected, the number of households in extreme poverty is much lower than the raw data suggest.

Xu and others (2015) examine how the Big Five personality traits—conscientiousness, emotional

stability/neuroticism, extraversion, agreeableness, and openness to experience—relate to financial distress. They find that conscientiousness reduces the likelihood of missing utility bills, losing phone service, missing rent or mortgage payments, being insolvent, worrying about no food, and being on welfare. Neuroticism raises the likelihood of these distress indicators. Xu, Brown, and Roberts (2016) find that the personality traits of conscientiousness and openness to experience are positively associated, and agreeableness is negatively associated, with nonpension wealth at older ages.

RRC research also considers the well-being of other groups such as widowed individuals, whose Social Security benefits are affected by special policy rules, and immigrants, whose employment histories differ from native-born beneficiaries. Fadlon, Ramnath, and Tong (2017; 2018) analyze how the death of a spouse affects household income, comparing the effects on widows just below and just above the age-60 eligibility threshold for Social Security survivors' benefits. They find that eligibility for survivors' benefits increases the widow's net annual income by nearly \$5,000, or more than 11 percent. Benefit eligibility also enables widows to meaningfully decrease their labor supply.

Two projects compare the labor market experience and earnings histories of native, legal immigrant, and undocumented immigrant workers. Borjas (2017b) finds that the employment rate of undocumented men rose dramatically from 1994 to 2014. The probability of employment is far higher for undocumented immigrant men than for legal immigrant men, which in turn is higher than for native men. The probability that undocumented immigrant women work is lower than the probability that legal immigrant women work, which in turn is lower than the probability that native women work. Borjas (2017a) finds that the age-earnings profiles of undocumented workers lie far below those of legal immigrants and native workers. However, about half of the gap disappears after adjusting for other socioeconomic characteristics. The wage gap between observationally equivalent undocumented and legal immigrants fell from 10 percent to 4 percent between 2005 and 2014.

Several recent RRC studies look at wealth dynamics among retirees in other countries. Ljunge, Lockwood, and Manoli (2013; 2014) analyze how a person's financial circumstances change following divorce or widowhood in Sweden. They find that wealth is not drawn rapidly down during years with no major change in household composition. In fact, wealth increases during many such periods, especially

during the early years of retirement, up to ages in the early 70s. Both divorce and spousal death, however, lead to large declines in household assets, even if assets are measured on a per-person basis. Böheim and Leoni (2016) find that aged people face greater income-poverty risks in the United States than in the majority of European countries, particularly among advanced-age women. The gender gap in poverty rates, which exists with different sizes in virtually all Organisation for Economic Co-Operation and Development countries, is particularly pronounced in the United States. Milligan and Wise (2014) find that the expansion of Canada's public pension system over the last 50 years has coincided with large improvements in elderly living standards, as measured by either income or consumption. For people in their 70s, the authors estimate that the 2010 system reduces income poverty by 88 percent relative to the 1960 system.

Social Security, combined with Supplemental Security Income for very low-income households, provides a solid base of annuitized income and financial security through later life. For a sizable share of households, it is their only resource. Evident throughout RRC research is the strength of the relationship between education, income, wealth, health, functional ability, Disability Insurance enrollment, and mortality; and how individuals struggling in any one of these domains are more likely to be struggling in others as well.

Retirement Saving

Accumulated savings in 401(k) plans and similar retirement accounts are an additional resource supporting the postretirement financial needs of many households. Individuals manage and largely fund such plans themselves. Some planholders may get matching contributions and guidance from employers, but in general, people make their own decisions about how much to save and how to invest their savings. Thus, a third major area of RRC research focuses on the determinants of retirement saving.

Behavioral tendencies and biases clearly influence how much people save. For example, Brown and Previtro (2014) look at procrastination, which is a manifestation of a behavioral phenomenon called present bias. The authors identify individuals as procrastinators if they wait until the last day of their health-insurance open enrollment period to choose their plan. When offered a supplementary retirement savings plan, procrastinators were 2.4 percentage points less likely to participate than nonprocrastinators, and they took 44–85 days longer to sign up,

contributed less, and were less likely to annuitize their plan distributions.

Goda and others (2015) estimate the effects of present bias and exponential-growth bias (the tendency to underestimate the compounding of investment earnings over time) on retirement saving decisions. People with stronger exponential-growth bias, as estimated from survey responses, tend to save less. Present bias is the tendency for people to value benefits in the present over the future in a dynamically inconsistent way (that is, they act impatiently in the present but want their future selves to act more patiently). People with a stronger present bias also save less. The authors estimate that retirement wealth could increase by as much as 70 percent if present bias and exponential-growth bias were eliminated. In a follow-up study, Goda and others (2017) find that a one-standard-deviation increase in present bias corresponds to a one-third lower likelihood of making an active saving choice and a one-quarter lower likelihood of maximizing plan contributions. They also look at the effects of financial literacy on saving, as measured by a series of questions that test people's understanding of inflation, diversification, compound interest, mortgage payments, and bond prices. They find that a one-standard-deviation increase in financial literacy corresponds to an 18 percent increase in the likelihood of maximizing plan contributions.

One approach to overcoming procrastination and other adverse behavioral influences is through automatic plan enrollment with defaults for the contribution rate, investment allocation, and other features, from which a participant may actively opt out. These features have been shown to substantially increase participation, contributions, and asset accumulations. Beshears and others (2015) confirm that automatic enrollment leads to markedly higher plan participation rates. For employees who accrue 5 years with their employer, average plan balances as a fraction of starting salary are 10 percentage points higher under automatic enrollment than they are without automatic enrollment. The study also finds that employees subject to automatic enrollment have higher rollovers and cash withdrawals, but these differences only slightly counteract their greater 401(k) accumulations. Beshears and others (2016) examine whether the increased saving induced by automatic enrollment is offset by borrowing outside the plan. They find that 4½ years after hire, the effect of automatic enrollment on cumulative contributions as a percentage of first-year salary is 6 percent at the mean, 17 percent at the 25th percentile,

and 32 percent at the 10th percentile. They find that higher debt partially offsets the savings increase, but automatic enrollment still increases net wealth.

Goda and others (2018) examine the effect of a change in the default investment fund of the Thrift Savings Plan (TSP), the federal employees' defined contribution plan, on saving behavior. In September 2015, the TSP default for new hires switched from a low-risk, low-return government securities fund to a lifecycle fund that automatically adjusts its ratio of stock and bond investments based on the proximity of the employee's projected retirement date. The authors find that employees with the lifecycle-fund default are more likely to passively accept both that fund and the default contribution rate than were those with the old default. Interestingly, the default contribution rate that more employees passively accept under the new policy is lower, on average, than the contributions that employees formerly made with an active choice. So although the change resulted in more people defaulting into the lifecycle fund, it also reduced the amount being contributed to the plan by some employees.

Brown, Farrell, and Weisbenner (2016) look at employees who are offered a defined benefit plan as a default, but may choose a defined contribution plan instead. The authors find that individuals with higher income and higher net worth were substantially less likely to choose the default, as were women, those with higher self-assessed investment skills, and those with greater knowledge of the retirement system. When asked if they could go back in time and remake their original pension choice, individuals who were defaulted into the defined benefit plan are about 20 percentage points more likely to regret the choice. Regret is even higher for those prone to procrastination. The findings from this study and Goda and others (2018) point to the need to select default parameters carefully.

To help people who are already enrolled in retirement savings plans to overcome potentially adverse behavioral influences, Beshears and others (2014b) explore whether individuals might increase their retirement saving if they have the option to defer the increase to a later date. The authors find that employees given a delay option exhibit lower savings rates over the ensuing months. However, when framing the delay as being linked to a psychologically meaningful moment, such as the employee's next birthday, the negative effect of offering the delay option is undone. Chalmers and others (2017) examine the effects of message framing and delivery on people's decisions about retirement savings. They find that potential savers are more responsive to

messages about retirement saving delivered by members of the same sex, and that descriptive messages ("what others do") are more effective than injunctive messages ("what one should do").

Chetty and others (2014) analyze how tax subsidies, employer-provided pensions, and saving mandates affect different types of savers in Denmark. The Danish retirement system is broadly similar to that of the United States, consisting of individual accounts, employer-provided pensions, and a government social security program. The authors estimate that 85 percent of the individuals studied are passive savers, for whom tax subsidies do little to increase saving because action is required to take advantage of them. Automatic contributions, however, are effective, because no action is necessary, yet savings still increase. Active savers are more likely to offset either policy through transfers of assets across accounts, but without increasing net saving. The authors estimate that each \$1 of tax expenditure on subsidies increases total saving by 1 cent. By contrast, policies that raise retirement contributions automatically, even if individuals take no action, increase wealth accumulation substantially.

Beshears and others (2014a; 2017) examine illiquidity—that is, restriction on the ability to spend down balances—in a retirement saving system. Because human behavior is subject to the temptation to overspend in the moment, a "socially optimal" retirement system balances illiquidity (to protect assets for the future) against flexibility (for unexpected financial needs now). The authors find that an optimal retirement-saving system is well approximated by just two accounts, one being liquid before retirement and the other being illiquid before retirement.

Beshears and others (2018) analyze what federal employees do with their accumulated TSP savings when they leave their jobs. The authors estimate that more than one-third of those people roll their TSP balances over into individual retirement accounts (IRAs), which very likely have higher fees than the TSP. People with more education are slightly more likely to roll their savings over to an IRA but are also slightly more likely to choose lower-fee IRAs when they do. Goda, Jones, and Ramnath (2016) examine how people respond when they reach age 59½ and thereby become exempt from the 10-percent withdrawal penalty on IRAs. The authors find that crossing that age threshold leads to a \$1,500 increase in average annual IRA distributions.

Continuing a stream of past research on the behavioral determinants of saving, this collection of studies highlights the significant effect of "paths of least

resistance” on financial decision-making, whether in terms of automatic enrollment, default contribution rates, default portfolio allocations, or other plan provisions. As with choosing when to claim Social Security benefits, the framing of information about saving options and implications influences behavior.

Discussion

Social Security was enacted in 1935 and has served since then as the foundation of retirement income in the United States. The financial challenges facing the program in the coming years are substantial. The youngest cohorts of the baby boom generation will soon transition into OASI eligibility, driving a sizable share of OASI’s current and near-term enrollment growth. The Census Bureau (2017, Table 5) projects that the U.S. population aged 62 or older will rise by nearly 25 percent in the next 10 years while the adult population younger than 62 will rise by only 3 percent. Further, the Social Security trust funds’ costs are projected to exceed income for the first time in 2020 (Board of Trustees 2019). Under the trustees’ intermediate assumptions, OASI trust fund reserves will decline thereafter and, unless Congress enacts reforms, the reserves will be depleted in 2034. Both the importance of the program to people’s well-being and the financial challenges it faces going forward motivate the research activities of the NBER RRC and its continuing participation in the Retirement and Disability Research Consortium.

The research of the NBER RRC from 2013 to 2018 offers several overarching takeaways. First, Social Security policy and the way it is communicated to covered workers strongly influences work, retirement, and claiming behavior. Second, the relationships between socioeconomic status, health, and financial well-being in retirement are strong and persistent, making them important considerations in informing Social Security policy. And third, the extent to which people prepare for their financial needs in later life, beyond Social Security, is strongly influenced by the psychological paths of least resistance that powerfully influence saving and other decisions over the life course.

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RESEARCH TO INFORM POLICY: CONTRIBUTIONS OF THE MATHEMATICA CENTER FOR STUDYING DISABILITY POLICY

by Gina A. Livermore, Jody Schimmel Hyde, Yonatan Ben-Shalom, Todd Honeycutt, and David C. Stapleton*

Introduction

The Social Security Disability Insurance (DI) and Supplemental Security Income (SSI) programs provide vital income support to some of our country's most vulnerable populations. The programs help alleviate poverty and facilitate access to low-cost health insurance for working-age people with disabilities and their dependents, as well as for low-income families of children with significant disabilities. DI was established in 1956, and SSI followed in 1974. Much has changed since then, and the programs must evolve to continue to meet the needs of the public, particularly nonelderly Americans with disabilities. To make reasoned decisions, administrators and policymakers must have information about program participants and about the external and operational factors that affect the programs and the populations they support. The Social Security Administration (SSA) established the Disability Research Consortium (DRC) in 2012 to provide high-quality objective information to help guide policy decisions. In the DRC's first 6 years, its researchers developed substantial new information that has provided insights toward improving the circumstances of people with disabilities and the design and administration of the programs that serve them.

This article summarizes selected findings from DRC work conducted by researchers at the Mathematica Center for Studying Disability Policy (CSDP), often in collaboration with other institutions, most notably SSA, the University of Illinois at Chicago, the University of Massachusetts Medical School, and Virginia Commonwealth University. (Formerly known as

Mathematica Policy Research, the organization shortened its name to "Mathematica" in 2019.) The research addresses five broad topic areas: DI applicants and their ability to remain in the labor force; factors affecting participation in the federal disability programs; the characteristics, well-being, and employment of disability program participants; special populations of people with disabilities; and access to health insurance for people with disabilities.

DI Applicants and Their Ability to Stay in the Labor Force

The number of DI beneficiaries has nearly tripled over the last 30 years (SSA 2017a). Changes in labor force demographics account for some of that increase, but the growth has exceeded what would be expected based on demographics alone and has resulted in fiscal pressure on the DI trust fund. In 2015, the Old-Age, Survivors, and Disability Insurance (OASDI) trustees projected DI trust fund depletion in 2016 (SSA 2015b). In response, Congress enacted a temporary payroll tax reallocation from the Old-Age and Survivors Insurance (OASI)

Selected Abbreviations

ACA	Patient Protection and Affordable Care Act
CSDP	Center for Studying Disability Policy
DI	Disability Insurance
DRC	Disability Research Consortium
OASI	Old-Age and Survivors Insurance
SSA	Social Security Administration

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Selected Abbreviations—Continued

SSI	Supplemental Security Income
VR	vocational rehabilitation
WC	workers' compensation

Trust Fund to the DI trust fund under the Bipartisan Budget Act of 2015; as a result, the projected date of DI trust fund depletion was deferred to 2022 (SSA 2015a). Since then, however, DI awards have declined steeply and unexpectedly; the OASDI trustees now project DI trust fund depletion in 2052 (SSA 2019).

The immediacy of the DI program's financial troubles in 2015 focused policymaker and researcher attention on the factors contributing to DI enrollment growth and on possible approaches to limiting that growth by helping DI applicants and potential applicants stay in the labor force. A growing body of research suggests that a well-targeted intervention, if occurring in the first few weeks after a medical condition threatens an employee's ability to work, can substantially improve the odds of job retention (Ben-Shalom, Christian, and Stapleton 2018). Too often, however, workers with medical problems do not receive prompt support that would help them to avoid suboptimal medical outcomes and preventable labor force withdrawals.

Under the DRC, CSDP researchers and their collaborators have added to the available evidence in two ways. First, they have generated new information on the characteristics and outcomes of DI applicants. Second, they have examined options for identifying workers at risk of preventable disability as early as possible, when a well-designed intervention is most likely to succeed.

Characteristics of DI Applicants and Their Application Outcomes

Three CSDP studies sought to help policymakers and program administrators anticipate changes in application volume and implement policies for documenting the characteristics and outcomes of DI applicants, all with the goal of helping workers with medical problems stay in the labor force. A fourth study assessed the use of private organizations that provide nonattorney representation services to DI applicants in early-intervention efforts.

Thompkins and others (2014) examined the demographic, employment, and program-participation characteristics of DI applicants and individuals at risk

of applying for DI. The authors found that individuals' employment and earnings declined before they applied for DI, with the biggest changes occurring in the 6 months before application. Four at-risk groups had relatively high rates of DI application (13 percent to 22 percent) although they represented small proportions of all DI applicants (2 percent to 5 percent): new private disability insurance beneficiaries, new workers' compensation (WC) recipients, new unemployment insurance beneficiaries with disabilities, and workers with disabilities at risk of unemployment benefit receipt.

Contreary and others (2017) determined that certain DI applicants are more likely than others to receive a DI allowance based on their preapplication work history. In their analysis of medical disability determinations, the authors found that DI allowance rates were higher for applicants who worked consistently either until application or until shortly before application. These applicants had relatively well-paying jobs, often with benefits such as private health insurance. Applicants who either had been out of the workforce for a relatively long period before application or had an intermittent work history were less likely to receive a DI allowance, and they tended to rely more on means-tested and social insurance programs—such as unemployment insurance benefits and WC—for support.

The two studies point to aspects of early intervention that are both promising and challenging. The four at-risk groups identified in Thompkins and others (2014) could benefit from early intervention to help them maintain employment, but each represents only a small portion of all DI applicants, thus limiting the scope of such an intervention. The findings of Contreary and others (2017) imply that different policy approaches might work for different target populations. Interventions that target workers still connected to an employer could serve some of the roughly half of DI applicants with recent attachments to the labor force and help that population remain employed. Applicants with less stable work histories and no recent connection to an employer might require a different, more comprehensive array of supports to regain employment.

Schimmel Hyde, Wu, and Gill (2018) focused on a specific group of applicants: older workers (aged 51 to 66) who were initially denied DI benefits based on residual ability to work in a current, former, or other occupation. The authors found that few older DI applicants who were denied benefits for this reason worked at a substantial level following denial. More

commonly, they continued to pursue benefit award, often successfully; nearly two-thirds were ultimately allowed DI benefits after appealing the initial decision or reapplying, and many of the rest claimed OASI benefits before full retirement age. The findings suggest that returning to work after exiting the labor force and seeking benefits is difficult. This may be because of health limitations, but may also reflect difficulties in finding work at older ages. To forestall labor market exits and Social Security benefit claims among older workers who experience new disabilities, employers could provide workplace accommodations or retraining to allow them to remain working.

Intermediary organizations that provide nonattorney representation services to people applying for DI or SSI are a prominent but understudied part of the disability-service landscape, primarily because client-level data are not available. Luca and Ben-Shalom (forthcoming) used operational data from one such organization to describe how it screens potential clients and supports current clients throughout the DI application process. The authors found that the intermediary's screening process turns away a substantial proportion of prospective clients whom they assess to have a low likelihood of allowance. This results in a DI allowance rate for the intermediary's clients that is substantially higher than that of all DI applicants. However, the authors were not able to track outcomes for the many individuals who were screened out by the intermediary or who were screened in but ultimately did not use its services. It is also impossible to know what the outcomes for those who were screened in would have been if they applied for DI on their own. Information about these three groups could provide a more complete picture of the intermediary's role in DI applications, including the potential incorporation of similar screening tools in the DI and SSI disability determination process.

Workers at Risk of DI Application and Their Employers

A critical component of effective early intervention is the timely identification of the particular workers who are most likely to benefit from intervention services and supports. This means identifying workers soon after they have developed medical conditions that interfere with their ability to work and distinguishing between those who would and would not benefit from expanded services (Stapleton and others 2015). Early identification and engagement of workers at risk of job loss and DI entry is relatively straightforward—though

not easy—in WC systems and private and public short-term disability insurance programs, in which workers are required to file claims to obtain benefits (Ben-Shalom 2016). Two CSDP studies examined options for using information in WC and short-term public and private disability insurance claims to identify workers who develop medical conditions that put them at risk of a prolonged work disability and DI entry.

Neuhauser, Ben-Shalom, and Stapleton (2018) analyzed California's statewide data on State Disability Insurance (SDI) and WC claimants. The authors found that 13 percent of SDI claims and 19 percent of WC claims that lasted for at least 8 days ultimately lasted for 12 months or longer. The long-term SDI and WC claimants were similar in demographic and diagnostic characteristics to DI awardees nationwide, except that they were somewhat younger. For early-intervention purposes, the SDI and WC data suggest that information available in initial short-term disability claims—such as the claimant's age, sex, medical diagnosis, and wage—can help target workers whose claims are likely to last for 12 months or longer and who are therefore at risk of DI entry. However, it is also important to collect more information at the time of filing to distinguish between those whose odds of return to work would benefit from earlier assistance and those whose would not.

Along similar lines, Contreary, Ben-Shalom, and Gifford (2018) used data on private short-term disability insurance claims from a large database of employer-based benefit programs to document that age, primary diagnosis, and industry are predictive of exhaustion of short-term disability benefits and transition to long-term disability insurance and risk of DI application. The authors also found that rapid attrition of short-duration claims from the sample indicates that waiting even a few weeks can substantially increase the efficiency of targeting efforts. The authors acknowledged the importance of considering the potential trade-offs involved in delaying the start of any intervention, as well as options for initial screening that could improve earlier targeting.

A less direct approach to early intervention involves encouraging employers to help workers remain employed after illness or injury. This can be accomplished by holding firms partially responsible for the DI benefits paid to their recent employees, whether through a mandatory short-term disability program (Autor and Duggan 2010) or by applying an experience rating to the DI portion of the Federal Insurance Contributions Act premium (Burkhauser and Daly 2011).

Another approach would require employer-provided group long-term disability insurance policies to pay 100 percent of benefits over an initial period (Stapleton and others 2017). In analyzing the implications of such proposals, Stapleton and others found that mandatory short-term disability benefits and DI experience-rating would place a relatively large cost burden on firms employing low-wage workers, particularly for those with fewer than 500 workers. The authors concluded that firms with high potential liabilities might seek to accommodate and retain workers with challenging medical conditions, but they might also be less likely to hire or retain workers at high risk of medical problems, which would disproportionately include low-wage workers. Because employers providing long-term disability insurance group coverage tend to be large and pay relatively high wages, requiring that the policies pay 100 percent of benefits for an initial period would be less problematic for low-wage workers, but it would increase long-term disability insurance premiums and, in the absence of countervailing policy measures, would likely reduce coverage.

Factors Affecting DI and SSI Eligibility and Participation

Numerous medical and nonmedical factors affect eligibility for DI and SSI benefits—not only in an initial award decision but also in deciding whether to continue benefits once awarded. Understanding these factors and their effect on program participation is important for assessing current policies, considering new ones, and forecasting future participation and costs. Four CSDP studies under the DRC focused on the eligibility determination process and trends in the medical characteristics of applicants. Three others considered the role that regional health-condition and disability-status characteristics play in determining geographic variation in program participation, and another study took a closer look at paths to termination of DI or SSI benefits after program entry.

Obesity, Other Physiological Measures, and Vocational Factors

Obesity prevalence in the United States has increased rapidly in recent decades. Because obesity raises the risk of many significant medical conditions, the increased prevalence has important implications for disability prevalence and disability program participation. Schimmel Hyde and others (2016) examined trends in obesity among disability program applicants from 2007 through 2013 using SSA data

collected electronically at the time of application. They found that applicants were much more likely than the full working-age population to be obese (40 percent versus 29 percent in 2013). They likewise found that obesity prevalence rose faster among disability program applicants (an increase of 2.8 percentage points, or 7.5 percent) than among the overall working-age population (1.8 percentage points, or 6.7 percent) over the study period. Although the findings do not establish a causal relationship between obesity prevalence and application filings, they suggest that such a connection is important.

SSA removed obesity from its medical Listing of Impairments for adults in 1999, which meant that the disability determination process could no longer find new DI and SSI applicants to be medically eligible based on obesity alone (although it could be considered a contributing factor). Stahl, Schimmel Hyde, and Singh (2016) found that the change led to a decline of about 60 percent in the number of applications in which SSA adjudicators cited obesity in the primary impairment field between 1999 and 2000. After 1999, the share of applications with obesity in the secondary impairment field steadily increased, so that by 2012, the share of applications citing obesity reached pre-1999 levels. Further, initial allowances declined for applicants with obesity cited as a primary or secondary impairment, as one might expect after delisting. The share of applicants who received an initial allowance based solely on meeting the criteria contained in SSA's medical listings fell precipitously after the policy change, from about 62 percent in 1990–1999 to about 10 percent in 2000–2012. Conversely, the share of applications citing obesity that were allowed at the initial level based on medical *and* vocational factors (that is, accounting for age, education, and work experience as well as the medical factors) increased after 1999, placing additional administrative burdens on the disability determination process and presumably delaying allowances for many applicants.

Obesity is just one example of numerous physiological markers that might predict disability. Blue and others (2017) assessed the extent to which 19 distinct and objective physiological measures can predict DI and SSI benefit receipt among adults aged 51 to 65. The authors found that, after controlling for age, sex, and other predictors of disability program participation, the physiological measures added substantially to their ability to predict SSI and DI participation. The findings indicate that SSA could use physiological measures in forecasting program enrollment and

conducting disability determinations, but the authors note that much more work is required before implementing policies suggested by this line of research.

Another DRC study examined the evidence base for SSA's medical-vocational guidelines. Adjudicators use these guidelines to assess whether a DI or SSI applicant with a significant medical condition is able to return to a past occupation or, if not, may adapt to new work. Mann, Stapleton, and de Richemond (2014) conducted an exhaustive literature review to identify evidence that supports the way that SSA incorporates the vocational factors—age, education, and work experience—into its determinations of whether an applicant can perform work that he or she has not performed in the past. The authors concluded that no rigorous evidence directly supports the way the determination process currently uses vocational factors, nor is evidence available that would enable SSA to make better use of vocational factors in determining the applicant's ability to work at a substantial level. Filling this evidence gap could improve the disability determination process. For example, it would be useful to identify causal links between particular vocational factors and return to work following either a permanent layoff or the onset of a significant medical condition. Information gathered on injured worker experiences for the Retaining Employment and Talent After Injury/Illness (RETAIN) demonstration might suggest avenues for further research in this area.

Determinants of Geographic Variation in Program Participation

Geographically, DI and SSI participation among the working-age population and SSI participation among children varies widely. Three CSDP studies examined the nature and causes of that variability.

Gettens, Lei, and Henry (2018) sought to explain geographic variations in DI and SSI participation among working-age adults. The authors found that county-level variation in disability prevalence (based on self-reported activity limitations recorded in the American Community Survey) and socioeconomic characteristics explained most of the variation and that inconsistent disability program administration was not a significant contributor to geographic variation in program participation.

Two studies considered geographic variation in child SSI caseloads and outcomes. Schmidt and Sevak (2017) examined county-level variation in child SSI caseload growth. They found that, nationally, county-level variation in observed factors such as poverty

and unemployment rates, disability and health conditions, and the share of children in special education explains only 30 percent to 40 percent of the growth in child SSI caseloads from 2003 to 2008, and about 25 percent of the growth observed from 2008 to 2011. Although the importance of these factors in explaining caseload growth varied substantially by region and across states, observable factors could not explain most of the variation. Hemmeter, Mann, and Wittenburg (2017) examined the age-18 redetermination outcomes of former child SSI recipients and found substantial variation; cessation rates by state ranged from 20 percent to 47 percent. Southern states had higher cessation rates relative to other regions even after accounting for differences in the characteristics of the state caseloads. Both studies point to the importance of a variety of geographic factors—both measurable and unobserved—that affect SSA program caseloads, including state and local service environments and the health, culture, and expectations of regional populations.

Beneficiary Experience After Program Entry

Better knowledge of the long-term experiences and characteristics of DI and SSI awardees could help policymakers develop programs tailored to the needs and circumstances of various subgroups. Anand and Ben-Shalom (2018) examined the various work- and program-related milestones achieved and the pathways followed by new DI and SSI awardees. Examples of work-related milestones include completion of a trial work period (TWP) and suspension of benefits because of work earnings. Examples of program-related milestones include attainment of the OASI full retirement age and, for those who were initially awarded either DI or SSI benefits, a subsequent award for the other program as well. The authors found that most DI and SSI awardees achieved few (if any) work- or program-related milestones in the 10 years after their initial award. Furthermore, many of the awardees who achieved initial work- or program-related milestones did not make additional progress toward exiting the program. For example, 4.9 percent of DI-first awardees completed a TWP, but only 2.9 percent subsequently had their DI benefits suspended because of earnings. Similarly, 6.2 percent of SSI-first awardees achieved positive countable earnings, but only 1.9 percent subsequently had their SSI payments suspended because of earnings. Interventions that identify awardees who achieve initial work milestones and support their continued efforts toward self-sufficiency might improve return-to-work outcomes and reduce reliance on benefits.

Beneficiary Characteristics, Financial Well-Being, and Work

DI and SSI are important parts of the social safety net for youths and working-age adults with disabilities, providing many with income support and access to health insurance. Understanding the characteristics and circumstances of SSI and DI program participants, the adequacy of the benefits they receive, and their work activity is fundamental to determining how well the SSI and DI programs fulfill their missions—and to considering how they might be improved. Beneficiary employment is particularly salient because earnings can supplement SSI and DI income and some beneficiaries may become self-sufficient and exit the disability programs. SSA devotes substantial effort to encouraging and supporting beneficiary employment through a variety of SSI and DI work-incentive provisions and through programs such as Ticket to Work and Work Incentives Planning and Assistance.

CSDP researchers and their collaborators have conducted numerous DRC-sponsored studies of beneficiary characteristics, well-being, and employment. We summarize selected findings from these studies below.

Beneficiary Characteristics

To make information about beneficiaries more readily available, CSDP developed a series of papers and data briefs based on the rich information collected through the National Beneficiary Survey (NBS), a nationally representative survey of working-age disability beneficiaries sponsored by SSA. By pooling NBS data from multiple years, researchers were able to study relatively small and nationally representative subgroups of SSI and DI participants—groups about which little information was previously available. For example, DRC studies profiled working-age SSI and DI beneficiaries with intellectual disabilities (Livermore, Bardos, and Katz 2017), those who were parents of minor children (Livermore and Bardos 2016), and those who were high earners (Livermore and Bardos 2015a). Others, described in later sections of this article, profiled young adults (Bardos and Livermore 2016) and beneficiaries with psychiatric disabilities (Livermore and Bardos 2017). The findings of these profiles demonstrate the many ways in which particular beneficiary subgroups differ from the “average” beneficiary and the importance of considering the heterogeneity of the DI and SSI beneficiary populations in the face of programmatic changes and reforms.

The NBS also supports analyses of how beneficiary characteristics and experiences have changed over

time. Livermore, Sevak, and Shenk (2019) found a large increase in the share of DI-only beneficiaries who had work goals or work expectations, from 34 percent in 2005 to 43 percent in 2015. The estimated difference between the 2005 and 2015 outcomes remained large and statistically significant after accounting for changes in beneficiary characteristics over the period. The study also found that beneficiaries reporting work goals or expectations in 2015 were significantly older than the work-oriented group in 2005. The findings suggest that demand for return-to-work support among beneficiaries may have increased over time, and that such supports should address the needs of an older target group to be effective.

Financial Well-Being of Beneficiaries

Although many beneficiaries rely on the cash benefits DI and SSI provide, the benefit amounts are modest. The average monthly DI disabled-worker benefit marginally exceeds the poverty threshold for a single individual, and the average SSI payment is well below that threshold. CSDP studies have confirmed high poverty rates among beneficiaries, with 12 percent to 20 percent of working-age DI-only beneficiaries in poverty and 31 percent to 48 percent of working-age SSI recipients in poverty based on data from national surveys (Schimmel Hyde and others 2018). Moreover, the higher risk of poverty among DI beneficiaries persists after DI benefits convert to OASI benefits (Wu and Schimmel Hyde 2019). Four years after full retirement age, the number of former DI beneficiaries who began to receive DI benefits before age 62 and were in poverty was triple the share of those who began to receive OASI benefits after the full retirement age. Of course, beneficiaries may have had lower incomes and higher poverty rates before they began to receive benefits; neither study accounted for income or earnings before program participation.

Poverty is not distributed evenly across all beneficiaries, and certain characteristics are associated with increased financial vulnerability. Compared with other DI-only beneficiaries, those in poverty were significantly less likely to have completed high school or to be married, and were more likely to have children younger than 18 (Livermore and Bardos 2014). They also reported more activity limitations and poorer general health than those with higher incomes. Working beneficiaries were significantly less likely than nonworking beneficiaries to be in poverty, holding other observable characteristics constant. However, beneficiaries in poverty were as likely to be working

as were those in higher-income households. Among working beneficiaries, earnings and hours worked did not differ significantly based on poverty status. However, poor beneficiaries were significantly more likely to be working in sheltered or supported work settings, which typically offer low wages.

The high rates of beneficiary poverty raise the question of whether and how beneficiaries are able to meet their financial obligations—especially given that their medical conditions or impairments may expose them to significant costs. To find out, Gettens and Henry (2019) interviewed a small sample of disability program beneficiaries in a single metropolitan area. The authors found that beneficiaries generally constrain their spending to align with their modest income. Many beneficiaries reported having very low housing expenses, restraining their food consumption, curtailing discretionary spending, or occasionally going without one or more basic needs. Comparing data from multiple surveys for 2009, Schimmel Hyde and others (2018) found that the shares of beneficiaries who also received housing, energy, or food assistance from public programs varied widely among the survey sources, but were not trivial in any instances. Those benefits may effectively increase the resources available to the family but are not included in standard measures of income. A minority of beneficiaries in 2009 supplemented their benefits with earnings. Depending on the survey source, earnings amounts varied, but generally represented less than 10 percent of individual income. As a percentage of beneficiaries' family income, however, earnings ranged from about 25 percent to 30 percent, reflecting the inclusion of spousal earnings for married beneficiaries. Yet, that share is substantially lower than that of nonbeneficiaries, for whom earnings represented about 85 percent of family income.

The Great Recession and Beneficiaries' Well-Being and Work

Early evidence suggested that the 2007–2009 recession affected workers with disabilities more than other workers (Kaye 2010), and that many left the labor force to seek disability benefits (Maestas, Mullen, and Strand 2015). Evidence gathered more recently suggests that the employment rate of workers with disabilities took many years to return to pre-recession levels (Kessler Foundation 2018). However, the recession's effects on the employment and income of SSI and DI beneficiaries were not immediately known. Two CSDP studies examined how beneficiary employment, reliance on SSA program benefits,

and poverty changed before, during, and after the Great Recession.

Levere and others (2018) found that beneficiaries were less likely to have their cash benefits suspended or terminated for work (STW) during and after the recession. The number of DI and SSI beneficiaries with at least 1 month of STW status in 2011 was about 25 percent lower than it had been in 2008. However, those achieving the STW milestone in postrecession years retained that status for as many months as their counterparts before and during the recession. The effects of the recession on achieving STW status were more pronounced for SSI recipients than for DI beneficiaries. Following cohorts of beneficiaries based on their initial eligibility year, the study found steeper declines in the likelihood of STW status for SSI recipients (including those concurrently receiving DI) during the recession than for DI-only beneficiaries. This likely reflects a combination of differences between beneficiaries of the two programs: first, in the strength of previous connections to the labor force; and second, in how earnings affect benefits.

Livermore and Bardos (2015b) found that, in absolute terms, the labor force participation rates of disability program beneficiaries and nonbeneficiaries had similar declines from 2006 through 2010, but the proportional change was significantly larger for beneficiaries. Declines in income resulting from the recession translated into absolute increases in poverty rates that were similar for beneficiaries and nonbeneficiaries. Proportionally, the increase in the poverty rate was larger for nonbeneficiaries than for beneficiaries because a smaller share of the former was in poverty before the recession. The findings suggest that steady income from DI, SSI, and other safety-net programs contributed to the relative stability of beneficiary income, weakening the negative effects of the recession on their financial status.

Other Factors Affecting Beneficiary Work Activity

The desire of many beneficiaries to work, coupled with the possibilities of reduced dependence on benefits, increased beneficiary income, and reduced federal outlays, has focused policymakers' attention on options for increasing beneficiary employment. In recent years, SSA has modified administrative review of beneficiary work efforts to adjust benefits more accurately and timely and to reimburse vocational rehabilitation (VR) agencies for the role they play in helping beneficiaries work.

Schimmel Hyde and O’Leary (2018) examined SSA reimbursements to VR agencies that served beneficiaries who wished to work. For beneficiaries who received VR services and subsequently maintained substantial employment, the estimated value of benefits forgone for work was about 10 times greater than that of SSA reimbursements to VR agencies. Notably, only 4 percent of beneficiaries served by VR agencies generated an SSA reimbursement. The authors concluded that because benefits forgone for work are so much greater than payments, VR agencies may have been eligible for SSA reimbursement for other beneficiaries, had they sought payment and completed the requisite paperwork. The funds provided by unclaimed SSA reimbursements could free up scarce VR agency resources to serve more of the approximately 40 percent of beneficiaries who applied for VR but were not served when they initially applied.

Delays in reporting and processing beneficiary earnings information can lead to benefit payments that should not be made, sometimes for several months or years. Avoidance of work-related overpayments is often cited as a reason why some beneficiaries do not work, or choose to keep earnings below the threshold that results in benefit suspension. Hoffman and others (2019) documented that 71 percent of DI beneficiaries with earnings sufficient to put them at risk of a work-related overpayment during 2010–2012 were overpaid in at least 1 month. The median overpayment amount was \$9,282, approximately equivalent to 9 months of the average monthly DI benefit amount at the time. Reflecting the fact that a very small share of beneficiaries had sufficient earnings to be at risk of overpayment during the period, those receiving work-related overpayments represented 1.9 percent of all DI beneficiaries.

Kregel (2018) interviewed 84 DI beneficiaries who had received a notice of overpayment to learn about their experiences. Of those interviewed, 51 percent immediately stopped working upon receiving the overpayment notice. Those who quit working said they did so because they feared they would receive another overpayment, or were frustrated by the overpayment. Although some of these beneficiaries may have used overpayment fears and frustrations as justification for not working, Hoffman and others (forthcoming) found evidence suggesting that overpayment notices may trigger a reduction in the share of beneficiaries with substantial earnings.

Special Populations

Several DRC studies conducted by CSDP have focused on youths with disabilities or people with mental health conditions. Both groups are among the disability program beneficiaries who receive SSI or DI benefits for the longest periods (Riley and Rupp 2015). Hence, they both represent important target populations for services designed to avoid a lifetime of poverty and, ultimately, to reduce long-term federal expenditures for their support.

Youths with Disabilities

Youths with significant disabilities encounter various barriers in their transition to adulthood, including health-related challenges, a lack of appropriate work supports, less developed social networks, and limited awareness of their rights to disability-related workplace accommodations (Rangarajan and others 2009; Shandra and Hogan 2008). Youths and young adults receiving SSI face additional barriers and incentives because of their households’ limited resources and poverty. Such factors contribute to youths with disabilities experiencing poorer educational and employment outcomes as adults than their nondisabled peers (Mann and Honeycutt 2014; Newman and others 2011).

Bardos and Livermore (2016) profiled young adults (aged 18 to 29) participating in the SSI and DI programs. The authors found that a large majority of young adult beneficiaries were interested in employment, and their employment rates were more than twice those of older beneficiaries. Yet most young adults who worked did so part-time in low-paying jobs. Further, relative to older beneficiaries, young adult beneficiaries received less public and other income support and experienced higher rates of poverty. The study also found that, despite their strong interest in work, young beneficiaries faced numerous significant barriers to employment and economic independence. A large share had no experience in the labor market, and many had less than a high school education or its equivalent. Additional training, and the availability of other supports and opportunities that address these barriers, might improve outcomes for this group and help some to achieve greater economic well-being. The Promoting Readiness of Minors on SSI (PROMISE) demonstration, now in the evaluation phase, tests whether providing such supports will help SSI youths achieve greater self-sufficiency as young adults.

State VR agencies are an important resource for youths with disabilities who want to work and become

independent as they transition to adulthood. Before the passage of the 2014 Workforce Innovation and Opportunity Act (WIOA), VR agencies served few applicants younger than 16. Honeycutt and others (2015) found that 8 percent of youths aged 16 to 24 with disabilities applied for state VR services from 2004 through 2006. Of those who applied, 56 percent eventually received services, and of those who received services, 56 percent were employed for at least 3 months at case closure. The findings suggest that more youths with disabilities might benefit from using state VR services. WIOA provisions require VR agencies to use 15 percent of their federal funding on preemployment transition services and to provide those supports to students before they apply for VR services. Those provisions, and others, have likely increased the number and percentage of youths with disabilities receiving VR services relative to the pre-WIOA period analyzed in this study. In another study of the 16–24 age group, Honeycutt and others (2017) examined a specific type of service provided by state VR agencies that is believed to be particularly effective in improving adult outcomes: postsecondary education supports. The authors found a positive association between the delivery of those services and employment at case closure. Although the findings of both studies suggest positive effects of state VR services on employment, the supporting statistics are descriptive and therefore do not provide evidence of causation.

Honeycutt and others (2017) also found that many youths who participated in the federal disability programs and received state VR services had positive employment outcomes and subsequently reduced their dependence on SSA program benefits. Nearly 30,000 of those youths and young adults applied for state VR services in each year from 2004 to 2006, accounting for 4 percent of SSA program participants aged 16 to 24. Those VR customers were less likely to be employed at case closure than were their same-age nonbeneficiary counterparts. Nonetheless, 48 months after application for VR services, 14 percent of youths receiving SSI or DI benefits had at least 1 month of benefit suspension because of earnings. These statistics point to both the connections between young federal disability program participants and state VR agencies and the program savings that can result from those connections.

Hoffman, Hemmeter, and Stegman Bailey (2018) examined the long-term outcomes of child SSI recipients whose eligibility was terminated in their age-18 redeterminations and how those outcomes were

associated with their receipt of state VR services as youths. The authors tracked the outcomes for these former child SSI recipients at ages 27 to 30, and differentiated them by whether they reported using VR services or vocational training before age 18. The study found that more than half (58 percent) had no earnings during the year studied, and few of those with earnings had accrued amounts that met the level defined by SSA as substantial gainful activity. Holding observable characteristics constant, those who had received VR services or other vocational training before age 18 were more likely to earn above the substantial gainful activity level and less likely to be receiving federal disability program benefits. Although the findings do not provide causal evidence of the effects of the VR services, they suggest that services provided by state VR agencies could help SSI youths to avoid returning to the federal disability programs as adults.

People with Mental Health Conditions

About one-quarter of working-age DI and SSI beneficiaries have a mental health condition recorded as their primary impairment (SSA 2017a, 2017b). Mental health conditions can affect educational attainment, obtaining a job, productivity, and labor supply. CSDP studies have examined the characteristics of beneficiaries with mental health conditions, their barriers to work, and the long-term effects of interventions designed to improve their employment outcomes and reduce their reliance on public programs.

Livermore and Bardos (2017) estimated that 46 percent of all SSI and DI adult beneficiaries had at least one mental health condition. Although the SSA estimate of about one-quarter considered only the primary impairment that qualified an applicant for benefits, Livermore and Bardos also considered secondary impairments that SSA noted as contributing to medical eligibility and survey respondents' self-reported reasons for their activity limitations. The authors also found that about one-third of the beneficiaries that SSA found eligible for disability benefits on the basis of a mental impairment did not attribute their activity limitations to a mental health condition in their survey responses. Relative to other beneficiaries, those with mental health conditions were more likely to report a desire to work but were no more likely to be employed, perhaps because they were also more likely than other beneficiaries to report a variety of employment barriers. Of those barriers, the most frequently cited—after poor health—was discouragement over previous work attempts. This finding suggests that

employment interventions aimed at preventing failed work attempts, if implemented timely and effectively, might improve employment outcomes.

Cook, Burke-Miller, and Bohman (2017) studied one such intervention: the Texas site of the Demonstration to Maintain Independence and Employment (DMIE), funded by the Centers for Medicare and Medicaid Services. The Texas DMIE provided case management, enhanced access to health care, and referrals for employment supports to employed adults with mental health conditions, with the goal of postponing or preventing application for federal disability benefits. In the original DMIE evaluation, Gimm, Hoffman, and Ireys (2014) found that DI and SSI receipt were reduced by 27 percent for intervention participants 1 year after enrollment, relative to the control group's rate. Cook, Burke-Miller, and Bohman followed the Texas DMIE participants for 5 years to assess the longer-term effects of the early intervention on employment. For participants overall, the study found no effects on employment or reliance on Medicaid as a source of health insurance. Yet among the participants identified as having a serious mental illness, the regression-adjusted estimates suggest that treatment-group participants were almost five times more likely than control-group participants to be employed during the follow-up period. The study provides some evidence of the long-term effect of earlier intervention for workers with mental health conditions, particularly when targeted to those with the more severe conditions.

Two other CSDP studies examined the long-term outcomes of SSI and DI beneficiaries with mental health conditions who received supported employment interventions. Cook, Burke-Miller, and Roessel (2016) conducted a 13-year follow-up study of beneficiary participants in the Employment Intervention Demonstration Project (EIDP), sponsored by the Substance Abuse and Mental Health Services Administration. The EIDP was an experimental study of supported employment programs targeting people with mental health conditions. Participants assigned to the treatment group received supported employment services that included personalized job-search assistance and ongoing vocational supports provided by multidisciplinary teams that coordinated employment and clinical services. The authors found that, relative to the control group, treatment-group members were almost three times more likely to be employed during the 13-year follow-up period. The treatment group also had higher average earnings, though the difference

was small (about \$24 per month), and were about 13 times more likely to attain STW status during the study period. The effects of the interventions on all three outcomes declined with time and eventually disappeared; most had ended by about 8 years into the follow-up period.

Baller and others (2017) studied the outcomes of participants in SSA's Mental Health Treatment Study (MHTS) in the 5 years after the demonstration ended. The MHTS targeted DI beneficiaries with schizophrenia and affective disorders. Treatment-group members were offered individual placement and support services, clinical case management, supplemental health insurance, and other medical supports (Frey and others 2011). Baller and others found that treatment-group members were more likely to be employed than were control-group members (45 percent versus 37 percent) and had higher earnings (roughly \$14,000 versus \$9,000), but were no less likely to have their DI benefits suspended or terminated because of earnings. The findings of both Cook, Burke-Miller, and Roessel (2016) and Baller and others (2017) suggest that supported employment might help beneficiaries work and improve their economic well-being, but they do not provide evidence that the interventions lead to long-term reductions in disability benefits under current program rules. This may in part be due to the limited (2-year) duration of the interventions and the chronic nature of mental health conditions; beneficiaries with these conditions might require ongoing medical and vocational supports to maintain long-term employment.

Health Insurance and Access to Health Care

Before the Patient Protection and Affordable Care Act (ACA) was enacted in 2010, many adults with disabilities who were not receiving either DI or SSI had limited options for obtaining health insurance. The availability of employer-sponsored plans was declining (Long and others 2016), particularly for those working in low-wage or part-time jobs (Claxton and others 2018), and nongroup coverage was often unavailable or prohibitively costly (Sommers 2006; Pizer, Frakt, and Iezzoni 2009). Many of the ACA provisions were significant for individuals with disabling conditions—in particular, the expansion of health insurance coverage, which is implemented at the state level. The ACA's Medicaid expansion option allowed coverage for adults with household incomes below 138 percent of the federal poverty level, thus decoupling Medicaid coverage from SSI receipt. Not all states exercised the

option to expand Medicaid eligibility. Immediately after the policy change took effect in 2014, about half of the states opted to expand Medicaid. About a dozen others have expanded their programs since then (Kaiser Family Foundation 2019).

Because SSI and DI both confer public health insurance coverage, the programs provide more value to people with disabilities than cash payments alone. Kennedy and Blodgett (2012) speculated that the health insurance benefits that accompany federal disability benefits may motivate individuals to apply for SSI and DI even when they are indifferent to the income support the programs provide. DI beneficiaries are automatically enrolled in Medicare 24 months after entitlement for DI benefits. Almost all SSI recipients are eligible for Medicaid at the time of award, although in many states enrollment is not automatic, and a few states have Medicaid means tests that are more stringent than the SSI means test (Rupp and Riley 2016).

The ACA provisions were implemented in the early years of the DRC, providing opportunities for CSDP researchers to assess how the availability of health insurance coverage for people with disabilities affects disability program participation and service receipt. The next subsection summarizes some of those studies.

Health Insurance Coverage Expansions and the Disability Programs

The effect of the ACA provisions on DI and SSI application and award volume is particularly relevant to SSA. Application might have decreased if obtaining health insurance was an important motivation for enrolling in DI or SSI before the ACA, or it might have increased if the expanded coverage options enabled workers to free themselves of the “job lock” effect (maintaining employment to keep health insurance coverage). Application might also have increased if marketplace efforts to enroll adults in Medicaid or federally subsidized private plans increased awareness of potential SSI or DI receipt among those with disabilities—a phenomenon called the “welcome mat” effect.

In studying this issue, Anand and others (2019) found that ACA Medicaid expansions led to slower decreases in SSI application from 2014 through 2016—SSI application declined nationally during that period, but the rate of decline was slower in states that expanded Medicaid. The authors noted that this trend might be short-term—the study period immediately followed the Medicaid expansions—and does not necessarily mean that awards will follow a similar trend, especially if disproportionate shares of new

applicants have less severe health conditions. The authors also found that the estimated effect of the ACA on SSI application varied substantially from state to state, highlighting the importance of local factors in influencing the outcomes of federal policies for people with disabilities and in considering the effects of national policies at the state level.

Levere and others (2019) also considered interactions between health insurance and SSI, focusing on historical instances of Medicaid and Children’s Health Insurance Program (CHIP) expansions. They found that those health insurance expansions led to a decrease in both applications and awards for child SSI payments in the states where SSI awardees are not automatically eligible for Medicaid, but not in other states where SSI and Medicaid may require separate applications, even though Medicaid is often granted automatically to SSI recipients. Those findings suggest that making Medicaid available to low-income children with disabilities reduces SSI participation, but only if the transaction costs of Medicaid enrollment are substantial. In other words, Medicaid expansions in states that require separate applications for Medicaid and SSI do not affect SSI participation as much as they do in the states that formally link eligibilities. As with Anand and others (2019), this study found varied effects based on state-level policies, even under national policy reforms.

Levere, Hock, and Early (2019) analyzed the effect on SSI application of another type of ACA coverage expansion—namely, the provision that extended to age 26 the coverage of dependents on their parents’ or guardians’ health insurance. Before the ACA, dependents typically lost that coverage at age 19 or upon college graduation (Goldman 2013). Levere, Hock, and Early found a spike in SSI application around age 26 after ACA implementation. They estimated that the prospective loss of coverage resulted in about 3.8 percent more applications at age 26 in the 5 years following policy implementation than would have been filed at that age in the absence of the policy change. The spike might simply reflect delayed applications that would have occurred at earlier ages without the ACA provision. If so, public savings resulting from that provision are limited to reduced SSI and Medicaid expenditures for those years. The authors also speculate that the extension of private coverage to age 26 might have facilitated improved education and employment outcomes for some young adults with disabilities, ultimately enabling their self-sufficiency and thereby reducing public-health and income-support expenditures for many years.

Employment-Related Health Care Needs

Health insurance market reforms in the ACA (and in earlier state initiatives) generated interest in understanding whether newly available coverage would provide the necessary services and supports for individuals with disabilities who were interested in working. Historically, private insurance plans usually did not cover these types of supports—including personal assistance services, home- and community-based care, and durable medical equipment—but Medicaid did, to some degree. Broader availability of Medicaid coverage might have been particularly salient to workers with disabilities who wanted to remain attached to the labor force but required these types of supports to do so.

Two CSDP studies addressed this issue by drawing on the experience of Massachusetts, which implemented reforms in 2006 that later informed some of the ACA deliberations. One feature of the Massachusetts plan was a Medicaid buy-in, under which workers with disabilities could pay an income-based premium to maintain Medicaid coverage when their earnings would otherwise suspend their eligibility. Although the Massachusetts reforms made relatively low-cost coverage more widely available, people with disabilities who had health insurance reported that they continued to have unmet health care needs and high out-of-pocket costs (Gettens and Henry 2014). About 70 percent of workers and 67 percent of potential workers with disabilities used employment-related health care services, but 7 percent and 33 percent of those groups, respectively, had unmet needs for those services (Gettens, Henry, and Lei 2016).

Gettens, Hoffman, and Henry (2016) found that Medicaid—both as a sole source of coverage and as a “wraparound” to supplement other coverage—was particularly important in providing long-term supports to people with disabilities. Working-age people with disabilities in Massachusetts who were working, were enrolled in the Medicaid buy-in program, and also had Medicare or private coverage accrued an average of \$427 per member per month in wraparound costs (in 2012 dollars). Community-based services and supports represented nearly two-thirds of that total, and personal-assistant services represented 60 percent of the community-based service costs. Thus, although the ACA’s Medicaid coverage expansion may be especially helpful in covering these supports for workers with disabilities, not all states expanded Medicaid through the ACA, nor do all states have Medicaid buy-in programs.

Conclusion

In October 2018, SSA merged the DRC and the Retirement Research Consortium to form the Retirement and Disability Research Consortium (RDRC). Projects completed by CSDP researchers under the DRC and summarized above have already contributed to the knowledge base and helped lay the groundwork for potential RDRC research. Combining retirement and disability research under a single umbrella will be especially helpful for examining important topics that encompass the intersection of DI and OASI.

One of the goals of the DRC has been to make better use of rich data from administrative sources for which access is often difficult to obtain. Using these data helps to illustrate their value for researchers and paves the way for easier access and greater use in the future. Many CSDP studies used such data. Most were made possible by the collaboration of SSA researchers, who have comparatively easy access to the data, with CSDP researchers and their partners at other institutions. For example, several projects used SSA’s Disability Analysis File, a restricted-access data file that combines data on 100 percent of working-age SSI and DI beneficiaries to enable researchers to conduct projects that would not have been feasible in the past. Others took advantage of administrative data linked to results of nationally representative surveys and other administrative sources. Several studies used administrative data to estimate long-term effects of earlier randomized controlled trials on employment and program outcomes. Two studies made innovative use of SSA’s Structured Data Repository, which contains electronic information on every disability program application and disability determination from 2007 forward. Demand for access to these rich sources has only increased over time, and in response, SSA is vigorously addressing privacy and security concerns to make these and other data available to academic researchers and staff at other federal agencies.

Over its 6-year history, the DRC supported a broad range of rigorous disability research relevant to the federal disability programs, as intended. The studies have made important contributions to the body of research and have led to new investigations on existing and emerging issues of policy significance.

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DISABILITY POLICY, PROGRAM ENROLLMENT, WORK, AND WELL-BEING AMONG PEOPLE WITH DISABILITIES

by David Autor, Nicole Maestas, and Richard Woodbury*

Introduction

A severe work-limiting disability is a financially consequential event that any American worker might encounter. Social Security Disability Insurance (DI) offers some protection from this risk, paying benefits to workers with qualifying work histories (and their dependents) should they develop a severe disability. These protections are buttressed by Supplemental Security Income (SSI), which provides payments to lower-income adults and children with disabilities regardless of work history, as well as to lower-income people aged 65 or older. People who qualify for DI or SSI are also eligible for health insurance through Medicare (for DI beneficiaries, after 24 months) or Medicaid (for SSI recipients). The DI program currently supports nearly 10 million workers with disabilities, their dependent spouses, and their children. The SSI program supplements the income of 2.7 million Old-Age and Survivors Insurance and DI beneficiaries and provides stand-alone payments to another 5.4 million recipients, including children with disabilities and people with limited income and resources at older ages (Social Security Administration 2019, Tables 1 and 2). DI and SSI are central components of the U.S. social safety net.

The DI and SSI programs operate in an environment of continually changing health trends, demographics, labor markets, economic conditions, government finances, household finances, and related public and private programs. The dynamic evolution of these influences makes the ongoing monitoring and evaluation of DI and SSI policy, and the well-being of people insured by these programs, important subjects of research

attention and the explicit focus of a Disability Research Center (DRC) at the National Bureau of Economic Research (NBER). The NBER DRC was active from 2012 to 2018 through a cooperative agreement with the Social Security Administration. This article highlights key findings from the Center's research. Each section addresses a primary theme of that research. Findings from the NBER's companion Retirement Research Center are described in a separate article in this issue of the *Social Security Bulletin*. In late 2018, the two NBER centers merged into a single entity known as the NBER Retirement and Disability Research Center.

Enrollment Trends and Determinants

When the NBER developed its initial research plan for the DRC, DI program enrollment had been rising for several decades, the nation was starting to recover from the Great Recession, and the depletion of DI trust fund reserves was imminent. In a concurrent trend, growing numbers of DI beneficiaries had qualified for benefits based on mental health and musculoskeletal conditions. Other trends and concerns have emerged since then, including the opioid epidemic and a rise in midlife morbidity among some populations. Contrary to what might be expected, however,

Selected Abbreviations

DI	Disability Insurance
DRC	Disability Research Center
NBER	National Bureau of Economic Research
SSI	Supplemental Security Income

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DI enrollment has declined since 2014, reversing the long-term trend. These developments highlight the need for ongoing analytic work on enrollment patterns and their underlying causes.

An early DRC project considers the historical growth in DI enrollment (Liebman 2013). It finds that the rise in the beneficiary-to-population ratio among men in the late 1980s was attributable to the combination of a more aged population, declining mortality, and increased disability incidence. From 1991 to 2007, however, disability incidence among men flattened, while rising median population age and declining mortality continued to affect enrollment. Rising enrollment among women resulted from an increase in disability incidence (toward the rates experienced by men) combined with a larger share of women whose work histories qualified them for DI. Follow-up research by Manoli and Ramnath (2015) finds that at ages younger than 50, DI enrollment rates of men and women are similar. After age 50, participation rates are notably higher for men than for women. Less surprisingly, given program eligibility rules that prioritize less-educated workers, the study also finds that individuals with lower income are much more likely to enter the DI rolls than higher-income individuals are, and their entry rises markedly with age. By age 55, for example, more than 3 percent of those in the lowest income group enter the DI rolls each year, while less than 0.2 percent of those in the highest income group do.

Other DRC studies focus on the strong inverse relationship between education and DI enrollment, and on how the relationship interacts with health condition and wealth. For example, Poterba, Venti, and Wise (2015) estimate a DI participation rate for 1992–2012 of 12.3 percent for women aged 50–61 with less than a high school diploma, but only 2.4 percent for women with a college degree. For men, the enrollment-rate differential is even larger: 16.9 percent in the lower education group and 2.6 percent in the higher education group. The authors further estimate that for women, roughly three-quarters of the DI enrollment gap by education results from health-condition differences; that is, women with lower levels of education are in poorer health, which in turn leads to higher DI claim rates. The other one-quarter of the enrollment-by-education gap for women is explained by wealth differences across education levels. Among men, 38 percent of the enrollment-by-education gap is explained by health differences across education levels, 16 percent by wealth differences across education levels, and 43 percent by more direct effects of education on enrollment.

Rutledge and others (2014) also decouple interactions between education, health condition, and DI enrollment. They find that over the period from 1989 to 2013, unadjusted measures of health condition and functional ability worsened for DI applicants of all ages and across multiple dimensions of health. When controlling for changes in education and other applicant characteristics, however, health had not worsened; rather, the demographic composition of the applicant pool had changed. Interestingly, an increase in college-educated applicants, who are likely to apply only when health problems are especially severe, was largely responsible for the observed decline in applicant health.

Looking forward, Bhattacharya and others (2013) model how health trends are likely to affect future Social Security enrollment. The challenge is in disentangling positive trends such as reduced smoking from negative trends such as rising obesity and associated chronic conditions. Using an application of the University of Southern California’s Future Elderly Model, the authors project that the age distribution of the population aged 51 or older will shift dramatically toward older ages, with the size of the population aged 85 or older growing most sharply. The model also projects that diabetes, hypertension, stroke, heart disease, and cancer prevalence will increase in the older population throughout the coming decades. Based on health trends alone, the authors project mortality rates in the population aged 51 or older to decline until about 2025, and then to rise sharply until about 2050. Interestingly, and foreshadowing actual trends in DI participation since the study’s completion, their model projects lower DI enrollment rates among the population aged 51 or older through 2030.

Two recent studies consider the increasing prevalence of pain, musculoskeletal diagnoses, and opioid use, and their effects on DI enrollment. Cutler, Meara, and Stewart (2016) find that roughly the same proportions of people diagnosed with back pain enroll in DI from year to year, despite the rising use of opioids. In other words, if prescribing opioids made back pain less debilitating, their increasing use did not translate into changes in DI participation rates. Indeed, Cutler, Meara, and Stewart (2017) find that states with greater use of opioid prescriptions have larger, not smaller, shares of people enrolled in DI. A 30 percent rise in opioid shipments, for example, is associated with a 5 percent increase in DI applications. The percentage of DI beneficiaries receiving high-dosage opioid drugs varies dramatically across states, from 1.6 percent to 11.5 percent.

Other DRC studies have looked at geographic variations in DI enrollment to better understand what leads people to apply. For example, a three-phase project finds that adult children from lower-income families have sharply varying probabilities of DI enrollment depending on the place where they grew up, while adult children from richer families show little geographic variation (Friedman and others 2016; Friedman, Lurie, and Mogstad 2017; Friedman and others 2018). Interestingly, the places where poor children grow up to have the highest DI enrollment rates tend to be “good” areas based on many standard metrics, including lower inequality and segregation, better schools, and higher social capital. States with more generous earned income tax credits, lower tax rates, and less progressive tax structures also tend to have higher DI uptake. Additionally, a substantial fraction of the geographic variation in DI rates can be explained by local labor market conditions, meaning that more people apply for DI when the job prospects in their geographic region are worse.

Other studies have considered the effect of both local and national economic and labor market conditions on DI enrollment. For example, Foote, Grosz, and Stevens (2015) find that mass layoffs lead to out-migration and labor force departure, including through DI enrollment. This effect more than doubled during the Great Recession. Cutler and others (2015) find that the recession essentially accelerated DI application among people who might otherwise have applied later, as well as leading more people to apply for DI benefits within 4 years of reporting functional limitations. Maestas, Mullen, and Strand (2018) reach the same conclusion. They find that the Great Recession led 1.4 million former workers to apply for DI benefits during 2008–2012; nearly 1 million (72 percent) were induced in the sense that they otherwise would not have applied, while the rest (28 percent) would have applied anyway, and the timing of their application was accelerated. These induced enrollments amount to over 400,000 incremental beneficiaries with estimated DI benefit obligations of \$55 billion in present value, or nearly \$100 billion including both DI and Medicare.

Several studies consider how labor market trends, and the increasing use of alternative work arrangements such as independent contracting and hiring through temporary help agencies, may affect DI enrollment. For example, Broten, Dworsky, and Powell (2018) find that temporary workers discontinue employment after a workplace injury about 26 percent more frequently than observationally similar direct-hire employees do. Citing previous research that

found temporary and contract workers to have higher workplace injury rates than direct-hires in the same industries, the authors observe that those higher injury rates and the larger reductions in employment conditional on injury place temporary and contract workers at elevated risk of transitioning to DI. On the other hand, Rutledge, Zulkarnain, and King (2018) find that DI application rates are about one-quarter lower for older contingent workers than for traditional workers of the same ages. Contingent workers are also about one-third less likely to be awarded disability benefits. The authors therefore suggest that contingent workers might benefit from a greater availability of information and assistance in navigating the DI application process.

Aizer, Gordon, and Kearney (2013) analyze the rapid rise in children’s SSI enrollment from just over 900,000 in 2002 to nearly 1.3 million in 2012. They find that national trends in childhood enrollment were driven by awards based on mental health conditions, which more than doubled over the study period, although rates varied widely by state. Campbell and Hastings (2017) also explore the predictors of SSI enrollment among children, comparing those enrolled before reaching age 1 with those enrolled later in childhood. They find that the factors driving enrollment at birth largely relate to birthweight, while other factors predict enrollment later in childhood. The strongest predictors of enrollment after age 1 are various complications of delivery, each of which raise the odds of enrollment several-fold. Moderately preterm African-American children are almost seven times more likely to enroll in SSI. Anemia and birth to a teen mother each increase the odds of childhood SSI enrollment more than tenfold. Mothers who smoke increase the odds of SSI enrollment for their children, particularly so if they smoked during pregnancy. Finally, very preterm children born to mothers with a household member who is or has been incarcerated are twelve times more likely to be enrolled in SSI.

Among the major insights arising from this set of studies are the continuing relevance of musculoskeletal conditions, pain and opioid treatment, and mental health as key determinants of DI enrollment. The wide variations in enrollment by education are another key insight, especially when combined with economic conditions and their implicit effect on job opportunities, in particular for lower-skilled workers. The wide geographic variations in enrollment provide a continuing programmatic opportunity, if researchers can identify the factors that lead to better outcomes in certain places.

Well-Being of DI and SSI Beneficiaries

As one might expect, financial circumstances generally decline for people who develop work-limiting disabilities, even with DI and SSI enrollment. Meyer and Mok (2014) find that among women 10 years after the onset of a disability, average individual earnings decline by 25 percent, but standards of living are cushioned by social insurance benefits and by the income of other family members. For example, after-tax household income (including transfers) falls by just 6 percent, and food and housing consumption drop by just 4 percent. The declines are much larger for women with a chronic and severe disability: On average, they experience reductions of 82 percent in individual earnings, 20 percent in after-tax household income from all sources, and 10 percent in food and housing consumption. Meyer and Mok (2016) find that disability reduces an individual's economic well-being not only in the short term but also over an extended period of later life. Among retirees without disabilities, average family income drops by almost 50 percent between ages 50–54 and ages 75 and older. For retirees with a disability, however, family income drops by an additional 10 percent at ages 58 to 61, 14 percent at ages 62 to 64, and 10–12 percent thereafter.

Parallel work by Moore and Ziebarth (2014) finds that from 1986 to 2012, the average post-tax income disparity between working and beneficiary households doubled. The average post-tax income of households with SSI recipients rose from an estimated \$17,000 to \$24,000, or about 40 percent. The average post-tax income of households with DI beneficiaries rose from an estimated \$24,000 to \$43,000, or about 80 percent. The average post-tax income of working households rose from an estimated \$33,000 to \$73,000, or about 120 percent. Disparities in expenditures between working and beneficiary households were smaller, particularly for food and housing.

Khan, Rutledge, and Sanzenbacher (2016) find that the average income replacement rate of DI beneficiaries is higher than that for retirees because DI beneficiaries' career earnings are lower and the Social Security benefit formula is progressive. Further, they do not face an actuarial reduction from early claiming, as many retired workers do. Social Security retirement benefits are estimated to replace a median of 40 percent of a beneficiary's average career earnings, while DI benefits replace a median of 50 percent. When one includes income from sources other than Social Security benefits, however, the total-income replacement rate for Social Security retirees rises to

about 75 percent, while the replacement rate for DI beneficiaries rises only to 59 percent.

Rennane (2018) looks at not only formal sources of income support but also the value of informal care within families. She finds that household income declines by 20 percent to 40 percent following disability onset, but intrafamily and other income transfers increase. DI enrollment is associated with an increase in family assistance: The probability of a family transfer rises by 7 percent and the amount of assistance provided nearly doubles. Family support is especially important for lower-income SSI recipients, who may use SSI payments to partially offset the costs of informal care provided by family members.

Several DRC studies look at the effect of DI benefits on people's health. Heiss, Venti, and Wise (2015) compare the health trajectories of DI applicants whose claims were accepted with those whose claims were rejected. The authors find that in the 12 years after application, the health status of applicants whose claims were approved remains essentially flat, while that of applicants whose claims were denied improves in each subsequent year. By contrast, Gelber, Moore, and Strand (2015) find that the DI payment amount has a positive effect in reducing mortality, particularly for the lowest-income beneficiaries. An increase of \$1,000 in annual DI payments decreases mortality over the next 4 years by an estimated 0.47 percentage points. Börsch-Supan, Bucher-Koenen, and Hanemann (2017) explore the health effects of DI by studying variations between the U.S. program and similar ones across Europe. They find stronger health-stabilizing effects of disability insurance programs in countries with more generous benefits than in countries with less generous systems.

DRC projects have also analyzed the well-being of families who receive SSI payments for children with disabilities. For example, Deshpande (2016) finds a significant effect of children's SSI payments on the labor force behavior of their parents. A loss of \$1,000 in a child's SSI payment is estimated to increase parental earnings by at least \$600. In related work, Deshpande, Gross, and Wang (2017) find, somewhat surprisingly, that the removal of an 18-year-old from SSI reduces the likelihood that parents file for bankruptcy by nearly 70 percent relative to families whose children remain on SSI. One explanation is that SSI removal reduces access to credit, which may mechanically reduce bankruptcy rates.

The research on well-being consistently highlights the comparatively lower income of most DI beneficiaries relative to workers without disabilities, as well

as the critical role played by DI and SSI in preventing more catastrophic financial challenges. Household earned income is dramatically lower for individuals with disabilities, but the disparity is less stark when comparing after-tax income including transfers or expenditures for basic needs.

DI Application and Screening

There are large and complex interactions between disabling conditions, disability policy, labor force withdrawal, and application for DI benefits. Depending on the nature and severity of the disabling condition, limitations in functional ability can make continued employment somewhat more, much more, or prohibitively difficult. Indeed, the purpose of DI is to insure against severe work-limiting health circumstances. However, the full effect of a disability on labor market behavior and DI application is complicated, in large part because of the incentives of Social Security policy itself. For example, to qualify for DI benefits, a claimant must not be engaged in substantial gainful activity or capable of such employment. Although this rule is intended to prevent work-capable individuals from obtaining DI benefits, it also discourages labor force participation among applicants, a consequence that is exacerbated by the lengthy process of application, denial, and appeal that many beneficiaries experience.

DRC research has examined the health declines that precede labor force exit and DI application, the characteristics of the DI application and screening processes, and their interactive effect on prospective applicants. Cutler, Meara, and Powell (2014) highlight the wide variability in health trajectories following adverse life events, noting that some people recover from or cope well with such events, while others spiral downward. The authors find that low socioeconomic status is associated with more persistent long-term health consequences, including a greater likelihood of subsequent and continuing health events and impairments. Focusing on occupational injuries, Broten, Dworsky, and Powell (2017) report the same basic result. They find that lower-wage workers experience larger reductions in employment following injury than higher-wage workers do.

Three recent DRC studies look at absenteeism (and presenteeism, or working while sick) as early indicators of labor force withdrawal and DI application. A literature review by Mullen and Rennane (2017b) identifies mental health conditions as particularly predictive of absenteeism. Other conditions associated with absenteeism or presenteeism include allergies,

arthritis, hypertension, migraines, cancer, respiratory disorders, chronic obstructive pulmonary disease (COPD), heart disease, gastrointestinal issues, obesity, and diabetes. Using data from a large manufacturing firm, Modrek, Coey, and Cullen (2017) report similar relationships between health and absenteeism. They find a marked rise in absenteeism before and after a diagnosis of depression, for example. For asthma/COPD, absences increase in the month before a diagnosis, remain elevated in the month of the diagnosis, and then return to previous levels. For arthritis, absenteeism increases in the month of diagnosis and the first month after; and for ischemic heart disease, absenteeism spikes in the month of diagnosis and the 2 months thereafter before returning to previous levels. Maestas, Mullen, and Rennane (2018) find that the effects of absenteeism on subsequent labor force withdrawal are concentrated almost entirely among workers with the highest 5 percent of absences, who are significantly less likely to be working 3 years later.

By law, the DI program awards benefits only to people who are “unable to engage in substantial gainful activity,” thus requiring DI applicants to withdraw from the labor market. The evaluation period can be very long: It averages 4 months for applications approved on initial review, but can last several years for appealed claims. In that time, the employment potential of applicants who might be capable of work may diminish. Autor and others (2017) find that extended application processing times reduce the employment of DI applicants by an estimated 4.2 percentage points (19 percent) 3 years after initial determination and by 1.6 percentage points (9.5 percent) 6 years after initial determination.

Deshpande and Li (2019) analyze what happens when a Social Security field office closes, thereby raising the effective cost of applying for DI. They find that closing a field office reduces DI allowances by 13 percent in the immediate community and by 10 percent in the surrounding communities where service congestion increases. Walk-in wait times increase by 32 percent, the time required by field officers to process applications increases by 10 percent, the time required to drive to an open field office increases by 42 percent, and public transit time to the nearest field office increases by 40 percent.

Attorneys and nonattorney representatives are increasingly involved in assisting DI applicants to develop their cases and in representing them in disability hearings. Hoynes, Maestas, and Strand (2016) document a 40 percent rise in representation of

initial-level applicants between 2010 and 2014. They find that claimants' representatives are more likely to be involved in cases with older and English-speaking claimants who have impairments in less easy-to-document diagnosis groups, notably psychiatric disorders and back pain. Surprisingly, representation at the initial level is associated with adverse case outcomes, such as denial for insufficient evidence.

The wide variation in disability program enrollment across countries indicates the influence of differences in program policy, benefit generosity, and screening intensity. For example, Börsch-Supan, Bucher-Koenen, and Hanemann (2018) document the wide range of unadjusted enrollment rates among the population between age 50 and the age when disability benefits convert to retirement benefits. Disability program participation rates at these preretirement ages range from 3–4 percent in Italy, France, and Switzerland to 20 percent in Sweden and the Czech Republic. Importantly, very little of this variation in enrollment is explained by health variations across countries; instead, most of it is explained by differences in disability program policy and administration. A central aspect of the study is a series of counterfactual simulations that estimate program participation across countries if each had the same demographic, health condition, and policy parameters. The authors find that the pattern of disability program uptake changes strikingly when equalizing the policy variables; and that in most countries, the simulations lead to enrollment rates that approach the overall average rate.

Croda, Skinner, and Yasaitis (2018) analyze how effectively countries target disability program benefits to those in the poorest health, based on a health index created with survey data from the U.S. Health and Retirement Study and the Survey of Health, Ageing and Retirement in Europe. They find that disability program participation among people aged 50 to 64 who are in the bottom decile of their country's health-condition distribution ranges from 12 percent in France to 51 percent in the United States, 52 percent in Denmark, and 63 percent in Sweden. These wide variations in benefit targeting are only partly equalized when accounting for other categories of social insurance.

Böheim and Leoni (2015b) explore the characteristics and scope of disability policy reforms across Organisation of Economic Co-operation and Development (OECD) countries since 1990. Among their findings is that numerous countries introduced new provisions or stronger incentives for workers with health impairments to remain employed. Many

countries tried to reduce the inflow of new disability program beneficiaries by implementing stricter gatekeeping at the application stage and by continually monitoring beneficiary health. A companion study (Böheim and Leoni 2015a) finds that the time required for such policies to take effect varies by approach. Reforms of eligibility criteria, screening, program scope, and benefit levels require less time than do those aimed at preventing workplace sickness or disability or leaving the labor force.

Autor, Kostøl, and Mogstad (2014) and Autor and others (2019) analyze how tightening the disability screening process might affect applicants, drawing from experience in Norway. Because some appeals judges are systematically more lenient than others, one can compare economic outcomes among equivalent disability benefit applicant groups that have greater or lesser probability of being accepted into the program. The authors find that denying disability benefits to marginal applicants increases their average earned income by about \$6,600, which is about 40 percent of the benefit amount denied. However, the effect of benefit denials on single versus married applicants differ starkly. For single applicants, each public dollar saved through benefit denial reduces household income by nearly 90 cents; but for married applicants, denials do not decrease household income or consumption at all. In their households, joint labor supply and benefit substitution entirely offset the absence of a benefit payment.

Haller, Staubli, and Zweimueller (2016) look at an interesting policy in Austria that imposes more stringent health screening for younger disability program applicants than for older ones. The study focuses specifically on a policy reform that raised the age of eligibility for the relaxed screening standard from 55 to 58. The authors find that tightening benefit eligibility standards at certain ages reduces awards at those ages by 2.7 percentage points for men and by 1.5 percentage points for women, or roughly by half. However, awards increase at later ages, when the eligibility standards for the same individuals relax again, suggesting that many people simply postpone program enrollment.

A subtler aspect of disability screening in the United States is explored in Rutledge, Zulkarnain, and King (2019). Determining DI eligibility is a multistep process. Applicants are generally approved if they are not working because of a disability, their condition is determined to be "severe," and their disability is explicitly listed as a qualifying medical condition. If

the condition is not explicitly listed, however, other criteria are considered, including occupational factors. Specifically, the medical impairment must be determined to prevent the applicant from performing any of his or her past work or any other work that matches her or his vocational background (that is, skills gained through education or work experience). The authors devise a “Health Mismatch Index” that identifies the share of workers in a given occupation citing health-related difficulties that would prevent them from performing at least one task marked as essential for that occupation. The study finds that health mismatches declined from 1997 to 2010, even as DI enrollment rose. The estimated percentage of workers who had difficulty with at least one job requirement declined from 7.4 percent to 6.1 percent over that period.

The DRC devotes considerable attention to the DI application and screening process. Policy and administrative aspects of the process include categorical inability-to-work requirements and the agency’s use of the medical-vocational guidelines to classify a worker’s potential capacity to retain employment or to identify alternative occupations. These combine with practical matters such as ease of access to field offices and other resources for applicants—and application processing times themselves—to affect how the program operates in practice, who applies, and the resulting inflow of new enrollees.

Work by People with Disabilities

The integral relationship between labor force exit and DI enrollment weaves through all DRC projects. The relationship matters because continuation or resumption of employment, when possible, can contribute to the well-being of individuals and families, the financial health of the Social Security system, and the economy more generally. Ability to work depends on functional capability, and many people with disabilities have the capability to continue working or to return to work in some capacity. It is important to ask how we can structure our policies, reimbursement systems, and workplace accommodations to facilitate work by people with disabilities. Some of these considerations apply to people with disabilities broadly, and some to DI beneficiaries specifically.

The extent to which employers accommodate workers with disabilities likely affects labor market behavior as much as the structure of disability policy. Workplace accommodations may involve flexible work arrangements, fewer hours, less physical job demands, assistive technologies, or other adaptations.

The degree to which employers proactively make such workplace accommodations is evolving rapidly in response to an aging workforce, antidiscrimination policies, and other factors. In general, employer incentives under DI policy do little to encourage workplace accommodation because DI contributions—made through payroll taxes—are not experience-rated. It is therefore likely that some individuals who could continue working with accommodations instead exit the labor force.

Maestas, Mullen, and Rennane (2019) use survey data to estimate both the size of the population with health conditions that affect their work and the degree to which employers accommodate health-related needs. The authors estimate that the rate of accommodation availability among individuals who are employed and for whom accommodation does or would increase the ability to work is 56 percent to 65 percent—rates that are two to three times higher than those estimated in the existing literature. Still, an estimated 47 percent to 58 percent of accommodation-sensitive individuals (both employed and not employed) would benefit from additional employer accommodation to either sustain or commence work. Although this estimated unmet need for accommodation is lower than previous estimates, it is still economically large.

The degree to which employers accommodate workers with disabilities is influenced in part by disability discrimination laws. Button, Armour, and Hollands (2016) analyze the effect of historical changes in federal antidiscrimination statutes, and of variations in laws across states, on labor market behavior. They find that laws prohibiting disability discrimination are generally associated with modest to large improvements in hiring rates, but the findings vary by policy and by the measure of disability used. The effects are larger, for example, when disability is defined as encompassing less severe functional impairments. Böheim and Leoni (2015b) find that policies to induce employers to retain workers with disabilities may at times have the reverse effect by inducing firms to screen job applicants rigorously for health problems before hiring.

Several other DRC projects have looked at efforts in other countries to promote return-to-work opportunities for disability program beneficiaries. Kostøl and Mogstad (2014) analyze the effect of a program introduced in Norway in 2005 that allows enrollees to retain some of their benefits if they return to work. The policy reduces benefits by \$0.60 for every \$1.00 earned above an exempt threshold. Three years after implementation, the return-to-work program increased the labor force

participation of beneficiaries aged 18 to 49 by 8.5 percentage points, roughly doubled the income of program participants, and reduced program costs. Analyzing a similar benefit phase-out provision in the disability program in Austria, Ruh and Staubli (2015) find substantial bunching of beneficiary earnings just below the exempt threshold where the phase-out begins. The authors estimate that average earnings would increase significantly if the threshold were raised or eliminated. Gelber, Moore, and Strand (2017) find a modest effect of the benefit amount on the earnings of DI beneficiaries in the United States. Their estimates imply that as DI benefits rise by one dollar, earnings fall by three cents.

Two DRC studies explore whether medical interventions could improve health and functional ability and allow DI enrollees to return to work. Nicholas and others (2018) find that bariatric surgery for obesity has little effect on the likelihood of subsequent work. Basu, Coe, and Park (2014) find that cochlear implants for hearing loss reduce average Medicaid spending in the next 3 years by almost \$3,000. Although the authors do not look at effects on labor market behavior, the broad reduction in Medicaid costs suggests that the implants improve not just functional ability but health status more generally.

Two other DRC studies look at work by veterans with disabilities. Rutledge, Sanzenbacher, and Crawford (2016) analyze a decline in work among veterans with disabilities from 62 percent in 1995 to 49 percent in 2014. They attribute the decline entirely to a broader trend of veterans becoming relatively older and more severely disabled. Coile, Duggan, and Guo (2016) look at how Disability Compensation (DC) benefits from the Department of Veterans Affairs affects veteran work behavior. DC benefits are paid regardless of other earnings. Focusing on a reform that raised DC benefits for some veterans and not others, the authors find that veterans who were eligible for higher DC benefits reduced their labor force participation, hours of work, and earned income relative to those who were not. Interestingly, however, self-employment among those with a benefit increase rose 4.1 percentage points relative to those without an increase, which offset a decline of 6.5 percentage points in work for an employer. Mullen and Rennane (2017a) find similar effects of noncontingent income in reducing work. Based on a study of workers' compensation benefits for permanent partial disability in Oregon, they find that providing noncontingent cash benefits to workers with disabilities reduces labor force participation, hours, and earnings, even though the benefits are

unconditional—meaning they are paid regardless of how much the individual decides to work.

As the nation struggles with the projected depletion of the combined Old-Age, Survivors, and Disability Insurance Trust Fund reserves in 2035, policymakers will continue to focus on ways to encourage and enable workers with disabilities to continue or return to work. DRC studies improve understanding of the opportunities in workplace accommodations, the incentive effects of policies that promote—or discourage—work among those who are able, and the functional capabilities of people who develop health impairments.

Related Programs and Program Interactions

DI and SSI are two of many public and private benefit programs, some of which provide similar or substitutable benefits, and some of which serve complementary purposes. The DRC seeks to draw lessons from related programs that can inform Social Security policy and to analyze the existing interactions between Social Security and the related programs. How those programs determine eligibility, fund benefits, treat earnings, and affect beneficiaries are rich areas of inquiry.

In addition to DI, state-sponsored programs, employer-provided benefits, and private insurance products may assist workers with disabilities. Short-term disability insurance, and even shorter-term sick leave, may provide a bridge to recovery for some individuals, thereby avoiding long-term DI enrollment. Alternatively, these benefits may provide a pathway out of the labor force that ultimately encourages DI claiming. By analyzing cross-state and cross-sector short-term disability coverage, Autor and others (2013) find that policy-induced increases in short-term benefits decrease DI inflows. Brown, Goda, and McGarry (2016) explore why so few people purchase private insurance for disability and long-term care expenses. One reason, they find, is that people tend to place less value on consumption when envisioning themselves in an unhealthy condition than they do when envisioning themselves in a healthy condition, though this result varies between people with mental and physical impairments. Drawing on experience in Austria, Böheim and Leoni (2013) explore the possibility that firms take advantage of publicly paid sick-leave benefits, allowing more absences at firms whose workers are publicly insured with no deductible, compared with firms that pay a deductible first. The

authors find no difference in firm behavior, whether fully or partially covered by the public program.

Two DRC studies consider interactions between unemployment insurance and DI. Focusing on the enlarged role of unemployment insurance during the Great Recession, Mueller, Rothstein, and von Wachter (2016) explore whether people are more likely to apply for DI benefits once their eligibility for unemployment benefits is exhausted. The authors find no indication that the expiration of unemployment benefits causes DI applications to rise. Inderbitzin, Staubli, and Zweimüller (2016) consider the interactions from a different angle, based on a program reform in Austria that extended unemployment benefits to as long as 4 years for older workers. Among people losing jobs at ages 50 to 54, the authors find that the lengthened eligibility for unemployment insurance increased labor force exit by 16 percentage points and increased subsequent disability program enrollment by 12 percentage points.

Another area of policy interaction is between health insurance and DI. The interaction stems partly from the potential loss of employer-provided benefits while applying for DI, partly from the Medicare coverage that accompanies DI after 24 months of enrollment, and partly from the potential effects of health insurance on health and functional ability. Heim and others (2018) present suggestive evidence that the Patient Protection and Affordable Care Act (ACA), by subsidizing private health insurance purchases for people with incomes between 138 percent and 400 percent of the poverty line, induced more people to forgo employer-sponsored health insurance and to apply for DI. Byker and Goodman-Bacon (2018) find that Medicaid coverage for children decreases the likelihood of their applying for DI benefits as adults.

Analyzing the effects of health insurance on health, Armour and O’Hanlon (2019) look at private insurance coverage known as “Medigap” plans, and specifically at the variation across states in Medigap eligibility, regulations, and program generosity for DI beneficiaries. They find substantial improvements in self-reported health in states requiring insurers to offer Medigap plans to DI beneficiaries. Chandra, Fu, and Seabury (2017) find that after the introduction of Medicare Part D, average annual spending on prescription drugs by DI beneficiaries increased by \$910 more than the change in spending by privately insured individuals, and by \$524 more than the change in spending by Medicare beneficiaries aged 65 or older.

Despite the greater spending, however, the number of prescriptions filled did not increase, suggesting that

some beneficiaries may have switched medications to costlier alternatives. Simon and others (2016) find that the ACA’s Medicaid expansion for low-income childless adults increased Medicaid enrollment and access to care—and improved self-assessed health as well. The ACA also increased coverage among young adults, most of whom were newly eligible through their parents’ plans; but the study finds no change in disability prevalence, mental health condition, or health care access or utilization from this coverage.

Goodman-Bacon and Schmidt (2018) look at how the introduction of SSI in 1974 interacted with the patchwork of state-administered welfare programs that preceded it. The authors find that of every four new SSI recipients, three came from previously existing state-administered welfare programs that generally provided lower benefits than SSI. Each dollar of per-capita income transferred through SSI increased total per-capita transfer income by just over 50 cents.

The DRC has also studied relationships between DI and certain tax and wage policies but has not identified any significant interactive effects to date. Rutledge (2014) finds that increasing the earned income tax credit would have little effect on the labor force participation of people with disabilities. Manoli (2016) finds that minimum wage increases also have little effect on DI enrollment. Gruber (2013) analyzes the relationship between workers’ compensation benefits and DI; results are inconclusive. Finally, Campbell, Chyn, and Hastings (2016) find that temporary disability insurance in Rhode Island had little effect on earnings, employment, enrollment in other safety-net programs, or health outcomes.

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