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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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