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HOW DOES THE COMPOSITION OF DISABILITY INSURANCE APPLICANTS CHANGE ACROSS BUSINESS CYCLES?

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Abstract

Much as in previous recessions, the number of applications to public disability insurance programs increased sharply during the Great Recession. We find that the composition of applicants also changes across business cycles. For example, applicants during economic downturns, and especially during the Great Recession, are younger, better educated, higher income, and more likely to have recent work experience. However, we find only mixed evidence supporting the theory that the increase in applications in downturns is caused by healthier applicants who apply to disability programs only because they are unemployed.

We formally decompose how the differences among the applicants across the business cycle – both from peak to trough and from trough to trough – contribute to the increased probability of applying for, and being awarded, benefits. We find that changing demographics and unemployment rates explain less than half of the increase in the application rate and only one quarter of the increase in the awards to applicants (the allowance rate) between the 2004-2006 expansion and the Great Recession. Further, these same factors predict a fall in the award rate (among eligible individuals), in contrast to the increase observed in the data. Together with the fact that there have been no programmatic changes in the disability programs in the 2000s, these results suggest there have been fundamental changes over the last decade in the way that people apply to disability and in the way these applications are evaluated that cannot be explained by observable differences.

Introduction

The Great Recession has led to the loss of more than 7.5 million jobs since it began in December 2007, affecting Americans of all ages and education levels. At the same time, applications to two public disability programs, Social Security Disability Insurance (SSDI) and its means-tested counterpart, Supplemental Security Income (SSI), have risen to unprecedented levels. More than 3 million new SSDI applications were filed in 2010, an increase of almost 35 percent in just three years (SSA 2011). SSDI applications normally rise during economic downturns – there were 13 percent year-over-year increases in the first year of both of the last two recessions (1990 to 1991 and 2000 to 2001) – but the current rate of increase in disability claims dwarfs previous upticks. In addition, while applications normally fall during periods of economic growth, SSDI claims increased for all but one year of the 2000s, so the current spike adds to an already-high level of SSDI activity. Similar patterns, albeit smaller in magnitude, are evident in the SSI disabled rolls.

This relationship between the business cycle and the number of public disability program applications has been well-documented (e.g., Autor and Duggan 2006). We expand on this work by exploring the relationship between the individual characteristics of applicants and awardees to SSDI and SSI during the Great Recession to those of applicants and awardees immediately before the downturn.

There are a variety of ways in which the incentives to apply for disability benefits may change for working-age adults with persistent health problems during a recession. Laid-off workers may find that, even though the public disability program's application process does not change, the opportunity costs associated with the 5-month unemployment requirement do. Losing one's job might also make it easier to meet the means test for SSI eligibility.[1] Further, there may be interactions between the macroeconomy and the trade-offs between applying and remaining in the labor market. For example, in a recession individuals may think they are more likely to be awarded public disability benefits than to find a new job when so many other unemployed workers are looking. Workers who retain their job may fear another round of layoffs, experience a real or nominal wage cut, or grow unhappy putting in longer or more stressful hours to make up for their shrinking number of coworkers. Also, the stress caused by a poor economic climate could worsen both physical and mental health to the point of disability,

[1] SSI only looks back one month in determining whether someone qualifies the income-test.

especially with anxiety and depression increasingly becoming the diagnosis for public disability claims (Gallo et al. 2009).

Using the 2000-2010 waves of the *Health and Retirement Survey* (HRS), as well as the 2001 and 2004 panels of the *Survey of Program Participation* (SIPP) linked to Social Security benefits records through 2010, we compare applicants to the public disability programs across the business cycle in three distinct time periods: the 2001-2003 downturn; the 2004-2006 boom; and the 2008-2010 Great Recession. Several characteristics of the Great Recession could explain why the composition of disability applicants differs over time. Job losses during this recession were more widespread than in the past (Farber 2011), resulting in larger increases in the unemployment rates of well-educated workers, a group that is generally less likely to apply. In addition, long-term joblessness has become much more common during the current downturn, which makes SSDI application more attractive (and more likely to be successful, as employability is a factor in judging applications), though extensions in unemployment insurance benefits have likely delayed the decision to apply for SSDI (Lindner 2011, Rutledge 2011). Finally, because of the high disability application and allowance rates over the last decade, the most vulnerable – the infirmed near-elderly and those individuals who have clear-cut physical and mental defects – may already be receiving benefits and have left the labor market before the onset of this recession.

We compare applicants across the business cycle based on three characteristics of the applicants: demographics (race, education, gender, marital status, health), income, and job characteristics at the last job worked prior to application (hours worked, industry, occupation). Interestingly, we find inconsistent evidence that the health composition of applicants is sensitive to the business cycle. Great Recession applicants are significantly less likely to have had work limitations, but in all other measures are not observably healthier than applicants during economic booms. But applicants during the recessions, especially the Great Recession, are younger, better educated, higher income, and more likely to have held a full-time job when first observed in the data than those who apply during expansions. As a result of differences in these non-health characteristics, the predicted application, award, and allowance rates are much lower than those observed during the Great Recession.

The paper continues as follows. Section 1 discusses the literature on disability insurance decisions and the macroeconomy. Section 2 discusses the application decision. Section 3

discusses the data, and Section 4 presents the empirical models. Section 5 presents the results. Section 6 concludes that while some of the increases in application and allowance rates can be explained by observable characteristics and the macroeconomy, much of it cannot. The incentives to apply, and the prospects for successful application, differ substantially in a severe downturn like the Great Recession. Together with the fact that there have been no programmatic changes in the disability programs in the 2000s, these results suggest there have been fundamental changes over the last decade in the way that people apply to disability and in the way these applications are evaluated.

Disability Programs and the Macroeconomy

Both SSDI and SSI are disability programs administered by the Social Security Administration (SSA) and using the same 5-step disability determination process, but they are designed to serve different populations.[2]

Social Security Disability Insurance. SSDI is a public disability program that provides insurance to current and recent workers who face a work-limiting disability expected to last at least 12 months. Individuals are eligible for SSDI benefits if they are not currently earning more than the Substantial Gainful Activity level due to a disability and will be unable to do so for at least a year. Applicants must have worked long enough and recently enough to be SSDI-insured; that is, one must have worked a total of (age 22) quarters and have worked 20 quarters in the last 10 years.[3,4] Individuals have a 5-month waiting period between disability onset and the potential start of benefits. Beneficiaries are eligible for Medicare 29 months after disability onset. SSDI benefits are a function of an individual's earnings history, using the same formula as Social Security retirement benefits, without an actuarial adjustment for early receipt of benefits;

[2] See Maestas, Mullen, and Strand (2012) for details on the 5-step disability determination process.
[3] The Substantial Gainful Activity (SGA) level is set at $1,010 ($1,690) a month for non-blind (blind) disability recipients in 2012. In order to be covered by SSDI, one must have worked a specified number of quarters overall and have worked a specific number of quarters in recent years. The number of quarters and the number of recent years is a function on individual age at disability onset.
[4] While the rules always refer to "covered quarters," it has been a misnomer since 1978. Covered quarters are calculated by the amount one makes in a calendar year, not the amount of time one was employed. In 2012, earnings of $1,130 are required to earn one quarter of coverage.

disabled individuals get their full Social Security retirement benefit in perpetuity, as if they had retired at their Full Retirement Age.[5]

Numerous studies have established that disability applications increase during periods of rising unemployment.[6] Work by SSA (1988) finds that economic differences play a significant role in explaining the differences in SSDI application rates among the states. Rupp and Stapleton (1995) find that a 1 percentage point increase in the unemployment rate leads to 2-7 percent more disability applications, albeit fewer awards. Autor and Duggan (2003) find an even larger response to the unemployment rate after the disability liberalization of 1984. Duggan and Imberman (2009) explore the relationship between applications and the unemployment rate and also find a strong positive relationship, but they do not control for other potentially confounding factors such as age or whether the potential applicant is SSDI-insured. Cutler, Meara, and Richards-Shubik (2012) find that while the increase in the disability application rate during the Great Recession is in line with expectations given the depth of the downturn, the increase is inconsistent with either an increase in health shocks or a decrease in the opportunity cost of application.

While changes over time in SSDI applications have been the focus of frequent analyses, few studies examine how the *composition* of applicants changes due to macroeconomic conditions. Stapleton and Dietrich (1995) find that the initial allowance rate – the proportion of applications that were successful without appeals – fell during the years immediately following an unemployment rate increase; this finding is consistent with the hypothesis that healthier individuals are induced to apply during periods of high joblessness. Martin and Davies (2004) examine how the composition of disability applicants and beneficiaries had changed between 1984 and 1999, compared to the overall population changes, similar to our descriptive analysis. However, the focus of their work was comparing these two points in time – not the role of the macroeconomy. Lahiri, Song, and Wixon (2008) find heterogeneous effects of the unemployment rate on disability application by gender – in particular, low-wage men are more responsive to downturns than women.

[5] Individuals may be terminated from the disability program due to medical recovery or by earnings that exceed the SGA under certain conditions. "Medical recovery" is determined through continuing disability reviews (CDRs), whose use has varied widely over time. Stapleton et al. (2010) find that only 4 percent of 1996 SSDI awardees had their benefits terminated for work in the first ten years in the program. Coe and Rupp (2012) find that approximately 1 percent of SSDI beneficiaries leave the rolls per year either due to work effort or medical recovery.

[6] See Rupp and Stapleton (1995) for a survey of earlier studies estimating the effect of changes in the unemployment rate on the SSDI application rate.

Supplemental Security Income. SSI is a means-tested disability program for which individuals with low income and assets, and a work-limiting disability are eligible. The disability criteria are the same as the SSDI program. The SSI benefit depends on the household's or individual's income but generally can be thought of as raising the beneficiary to the poverty line – the benefits are typically higher than the benefits available through Temporary Assistance to Needy Families (TANF) but lower than the full retirement benefits available through SSDI.[7] SSI recipients also receive Medicaid coverage immediately upon first benefit receipt. Recent work suggests some substitutability, especially among children, for SSI enrollment and TANF participation.[8]

In contrast to the SSDI program, there has been relatively little research examining how the SSI program is related to the business cycle. The existing research that does exist supports the hypothesis that SSI applications are less responsive to the business cycle. A series of papers suggest that SSI applications were more responsive to the business cycle before welfare reform of 1996, and that applications are more responsive than receipts.[9] Recent evidence of a link between SSI and the macroeconomy is mixed. Autor and Duggan (2003) note that the state-level changes in SSI participation, unlike SSDI, are unrelated to changes in labor force participation among high school dropouts. Black et al. (2002) find that SSI participation is positively related to earning shocks, though much less so than SSDI participation. Garrett and Glied (2000) and Schmidt and Sevak (2004) find a negative relationship between unemployment rates and SSI caseloads, though Schmidt (2012) finds that this correlation is less negative – and not significantly different from zero – after welfare reform.

This paper is among the first analyses of disability activity during the Great Recession. In addition, it considers not just the overall response of disability applications to macroeconomic conditions but also how the composition of applicants and their ultimate success change at different points in the business cycle.

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[7] Individuals can apply to both the SSI and SSDI programs at the same time (concurrent applications) if their SSDI benefits would not bring them above the maximum SSI benefit. Approximately 40-50 percent of SSDI applicants concurrently apply to SSI. (Authors' calculations of Title 2 (SSDI) only, Title 16 (SSI) only, concurrent Title 2 and Title 16 receipts by state for FY2001-FY2010 from SSA's Payment Management System (PMS). We are grateful to Paul Davies for providing this data.)

[8] See Duggan and Kearney (2007), Schmidt and Sevak (2004), Pavetti and Kauff (2006), Kubik (1999), Coe and Rutledge (2012).

[9] See Rupp and Stapleton (1995), Stapleton et al. (1998), Stapleton et al. (1999).

Public Disability Program Application Decisions and the Business Cycle

In theory, an individual's decision to apply for disability is a simple matter of weighing the costs and benefits of application: one applies if the expected benefit would increase the expected present value of lifetime utility.[10] Workers who apply must weigh their current earnings and future labor market opportunities against the future stream of disability benefits (plus health insurance coverage), times the probability of being accepted to the program, minus any costs of application.[11] The value of the decision can be expressed as $V_t = V_t(E_t)$ where E_t, employment status at time *t*, equals zero if the decision in the current period is to work, one if the individual applies for disability, two if he decides not to work or apply. The value of working will equal this period's utility, which is derived from labor market earnings, W_t; leisure time when working, L_t^0; and the effort of work which is a function of health, *e(h)*, plus the discounted value of facing employment and application decisions next period, where β is the discount factor.

$$V_t(0) = U\left(L_t^0, W_t, e(h)\right) + \beta V_{t+1}(E_{t+1}) \quad (1)$$

If the individual applies for disability, he faces a probability $\pi(h)$ that his claim will be accepted, which is a function of his underlying health. The value of applying for disability is the weighted sum of the underlying utilities based on the outcome of the application, minus the application costs, *c*.[12] If the claim is accepted, the individual receives current utility from leisure when not working, $L_t^1 > L_t^0$, and the disability cash benefit received, plus the discounted value of future disability benefit (and Medicare) receipt. If the claim is denied, the individual receives current utility from leisure when not working and non-wage, non-disability benefit income, I_t, when the individual is not in receipt of benefits, plus the discounted value of facing the

[10] This model refers to the decision to apply for either of the public disability programs. The decision process is virtually identical for the two programs; only the income/asset eligibility criteria and the level of benefits vary.

[11] For simplicity, we assume in the model that disability recipients do not participate in the labor market again once being accepted onto the program. This is relatively reasonable assumption for SSDI participants –only 4 percent of 1996 SSDI awardees had their benefits terminated for work in the first ten years in the program (Stapleton et al. 2010) – but less so for SSI-recipients. Rupp and Riley (2011) find that only 2.8 percent of awardees first entitled to disability benefits in 2000 were alive and off the rolls 5 years after first-ever disability entry. The corresponding percent is 9.8 percent for entrants first entitled to SSI benefits.

[12] Application costs could be a function of health as well. A priori the sign of the derivative is unclear. Healthier individuals may find application more costly to build a convincing case to the SSA, but more disabled individuals may find the process more difficult. We abstract from this possibility in the theoretical model, since the focus of this paper is on the relationship with the business cycle.

employment decision next period when he must decide whether to appeal, work, or remain unemployed.

$$V_t(1) = \pi(h)[U(L_t^1, DI_t) + \beta V_{t+1}(1)] + (1 - \pi(h))[U(L_t^1, I_t) + \beta V_{t+1}(E_{t+1})] - c \quad (2)$$

Finally, the utility from non-work is simply the current utility from leisure while not working and non-wage, non-disability benefit income, I_t, when the individual is not in receipt of benefits, plus the discounted value of facing the employment decision next period when he must decide whether to apply, work, or remain unemployed.

$$V_t(2) = U(L_t^1, I_t) + \beta V_{t+1}(E_{t+1})) \quad (3)$$

The individual's decision will be affected by health status, which influences the probability of acceptance to disability and the costs of working. Age is also a factor because it influences the probability of acceptance,[13] potential wages, and possibly the disutility of work. The type of job could also influence the disability decision by affecting the disutility of work.

Business Cycle. The business cycle enters into the decision to apply for disability benefits in numerous ways. First and foremost, it impacts the value of the outside option of potential employment. In recessions, a worker may lose his job, may perceive his job to be more unstable and a replacement job harder to find when there are many other displaced workers unemployed and searching. This would make individuals more likely to apply, whether they have lost their jobs or not, since their income stream from work may have decreased and uncertainty has increased.

A second way that the business cycle may directly impact the application decision is through the inability to work while the application is pending. During economic booms, when work is relatively easy to come by, pulling out of the labor market and waiting anywhere from a few months to over 4 years for the application to be processed could mean a lot of foregone

[13] Age is specifically an input in the disability insurance determination process because the assessment of the ability to be retrained changes if an applicant is between age 50-54 (Approaching Advanced Age), age 55-59 (Advanced Age); or age 60-64 (Retirement Age).

income.[14] However, if one is already out of the labor market and not earning income, being forbidden to work while waiting for a decision may not represent a substantial change to the income stream.

The business cycle also can influence the disability application rate through the unemployment insurance (UI) program. UI, a federal-state partnership program based on federal law, is administered at the state level. The duration of the benefits is typically 26 weeks but that has been extended during past recessions to as much as 59 weeks, and, during the Great Recession, to as much as 99 weeks in the hardest-hit states. Recent work by Rutledge (2011) finds that SSDI applications increase in the month of UI benefits are exhausted. This unprecedented extension has a dampening effect on the cyclicality of disability applications for two reasons. First, longer UI benefit durations reduce job search effort. Second, longer UI extensions may lead to a higher-quality match in the ensuing job (Caliendo, Tatsiramos, and Uhlendorff 2009).

Since SSI is a means-tested program, there is likely a mechanical relationship between SSI eligibility and the macroeconomy. As incomes decline, more individuals will fall below the program's income limits. The longer the downturn lasts, the more people will also likely qualify under the asset limit.

Finally, health or disability status itself may be impacted by the macroeconomy. Though the literature often finds a positive relationship between health and the unemployment rate (Ruhm 2000), others contend that health improvements in a recession are mostly tied to short-run mortality, and that recessions worsen health over the long run (Sullivan and von Wachter 2009, Gallo et al. 2009, Stevens et al. 2011, Coile et al. 2012). If health declines, then one would expect higher probabilities of application and allowance.

Data

[14] The length of time for a final disability determination depends on how many appeals one makes. An audit study performed by the Office of the Inspector General (2008) found that in 2006 the average processing time for cases in the initial determination phase was 131 days. A denied individual has the right to appeal at this point, which can add considerable time to the final determination. For cases reaching the appeals phases, the audit study reports that the average time was 279 days for reconsideration, 811 days for cases going to the Administrative Law Judge, 1,053 days for cases going to the SSA Appeals Council and 1,720 days for Federal Court cases. Maestas, Mullen and Strand (2012) use administrative data and find that roughly one-third of applications are allowed at the initial determination phase, and 38 percent of the rejections do not appeal the decision. For the remaining cases, just under a third made it to the Administrative Law Judge level, less than 5% of cases progressed to the Appeals Council level and less than 1% of cases progressed to Federal Court.

We use the *Health and Retirement Study* (HRS) and the *Survey of Program Participation* (SIPP) data, both matched to administrative records.

Health and Retirement Study. We use the *Health and Retirement Study* (HRS) conducted by the University of Michigan and prepared by RAND. Our sample includes three cohorts: the original HRS (birth years 1931-1941), War Babies (1942-1947), and Early Baby Boomers (1948-1953). We examine disability insurance applications every two years starting with the 2000 wave, though we also use the 1996 and 1998 waves to gather information on some respondents prior to their benefit application. The sample is comprised of respondents between age 50 and their Full Retirement Age (FRA) of 65 or 66 during the 2000-2010 waves.

Applications to and benefit receipts from disability insurance programs are based on self-reported information from HRS respondents. Due to changes in the wording of questions and confusion on the part of the respondents, it can be difficult to disentangle whether the respondents are applying for SSDI, SSI, or both programs at the same time. To determine this, we match the survey data to the restricted Summary Earnings File, made available by the SSA. The earnings file includes all Social Security-covered earnings between 1951 and the last time the respondent gave SSA permission to match to the restricted data.[15] The administrative data allow us to determine whether applicants are insured for SSDI benefits at any point in time. If the respondent was uncertain whether he had applied for SSDI or SSI, or the RAND files indicate a probable incorrect response, we assume that individuals who are eligible for SSDI applied for SSDI, because the financial benefit is significantly higher than SSI and the disability determination criteria are identical.

We also use self-reported income information to identify who has a successful application. This is right-censored for some applicants, since their cases were still pending at the last interview, though only 38 of the 528 applications between 2001 and 2010 (excluding 2007) were pending.

Table 1 presents the sample restrictions and resulting sample sizes. Out of 10,743 (2,942) person-period observations who are eligible for SSDI (SSI) at some point, 443 (222) apply during the period.

[15] Approximately 70 percent of the respondents have given permission. Previous work has concluded that using the matched sample does not introduce bias (Kapteyn et al. 2006).

Survey of Income and Program Participation Gold Standard File. The *Survey of Income and Program Participation* (SIPP) is a nationally representative, longitudinal survey of households conducted by the U.S. Census Bureau. Every four months over a two- to four-year period, respondents are asked a battery of questions on their labor market participation, sources of income, employment relationships, demographics and family structure, health insurance status, wealth, and public program participation during each month between interviews. New panels began annually between 1990 and 1993, plus 1996, 2001, 2004, and 2008. The SIPP sample is more age-representative than HRS and offers a larger sample size (80,500 applicants between 2001 and 2010), but health measures are not as detailed as HRS.

Another benefit of using the SIPP is that we do not have to rely on self-reported information about disability application. The SIPP Gold Standard File is matched to the SSA's *831 Disability File*, which includes administrative data on the date of application, application outcome, and the benefit amount received. The survey is also matched to earnings data from both the SSA's Summary Earnings Record and the IRS' Detailed Earnings Record. Approximately 88 percent of SIPP respondents over age 15 provided valid Social Security numbers and were successfully matched, with little evidence of sample selection bias (Abowd, Stinson, and Benedetto 2006).

The *831 File* includes the date of application, the filing type (SSDI, SSI, or concurrent applications), and the initial determinations for up to four disability applications for each individual through the end of calendar year 2010. SSDI eligibility and the level of monthly benefits (the primary insurance amount, or PIA) are calculated using the individual's earnings history from the Summary Earnings Record. We also control for the potential SSI benefit, which depends on self-reported non-labor income, calendar year, and the state of residence (SSA2002-2011). The benefits levels and the earnings variables are adjusted for inflation using the Consumer Price Index from the U.S. Bureau of Labor Statistics.

Table 2 presents the sample selection criteria for the SIPP panels. We include individuals from the 2001 and 2004 panels who are age 25 to 61 at the start of the panel, and are part of the survey in January 2001 (2001-2003 period), January 2004 (2004-2006 period), or January 2006

(2008-2010 period).[16] After excluding person-periods with invalid matches to the SSA data and with previous disability applications, 88,697 person-period observations remain in the sample, among whom 2,431 applied to SSDI and 1,317 applied to SSI.

Methodology

We compare SSDI and SSI applicants and recipients in the Great Recession to those in the prior recession and the intervening expansion using two different methods.

First, using both the HRS and the SIPP Gold Standard File, we estimate a probit regression using one observation per person and per time period:

$$DI_{ip} = \Phi\left[\alpha_0 + \alpha_1 P1_p + \alpha_3 P3_p + \gamma X_{ip} + \theta_1 P1_p X_{ip} + \theta_3 P3_p X_{ip} + \varepsilon_{ip}\right] \qquad (4)$$

The dependent variable, DI_{ip}, is one of a series of indicators of disability insurance activity for person i in period p. For each program – SSDI and SSI – we estimate three models: application conditional on eligibility, award conditional on eligibility, and award conditional on application. We also estimate another set of these three regressions for applying or being awarded any disability benefits, regardless of which program received the application.

$P1_p$ and $P3_p$ are time period dummies, equal to one if the period of observation is from the early 2000's recession (2001-2003) or the Great Recession (2008-2010), with the omitted condition being the intervening expansion (2004-2006).[17] We interact these time period indicators with X_{ip}, a comprehensive set of demographics, job characteristics, and measures of income, wealth, and health.[18] We then evaluate the interaction effect for each variable with each time period, taking into account the nonlinearity in the probit model (Ai and Norton 2003); a

[16] Some individuals from the 2004 SIPP panel will appear in both the 2004-2006 and 2008-2010 periods, if they are in the SIPP sample in both January 2004 and January 2006. January 2006 is chosen as the base period for the 2008-2010 period to ensure that the characteristics are from before the disability application; the 2008 panel did not begin until June 2008, which would eliminate anyone who applied for disability benefits in the first half of 2008.

[17] To keep the time periods of the same length, we omit disability activity from 2007. The NBER recession dating committee marks the start of the recession as December 2007, though the national unemployment rate remained fairly flat until summer 2008.

[18] In the SIPP regressions, we use the first value from each time period for time-varying characteristics, including age, marital status, job characteristics, and family income as a percent of the federal poverty line. For the HRS regressions, the value used for each time-varying characteristic depends on the timing of the HRS interview relative to the application date. Where possible, we use the 2000 interview for the 2000's recession, the 2004 interview for the expansion, and the 2008 interview for the Great Recession. If, however, the individual applied for disability in 2004 or 2008 before the HRS interview, we use the prior interview wave (2002 or 2006, respectively).

statistically significant interaction effect indicates that applicants or recipients in the 2000s recession or the Great Recession were observationally different from applicants or recipients in the mid-2000's expansion.[19]

Using the SIPP sample only, we decompose the change in the probability of applying for, or being awarded, disability benefits between two periods, using an adaptation of the Blinder-Oaxaca decomposition technique for nonlinear models (Fairlie 2005). The linear Blinder-Oaxaca decomposition (Blinder 1973, Oaxaca 1973) begins from the observation that the difference in the average value of an outcome variable between two groups – using an example from this project, SSDI application in the mid-2000's expansion (period 2) versus the Great Recession (period 3). It can be written as:

$$\overline{DI}_i^3 - \overline{DI}_i^2 = \beta^3 \bar{Z}_i^3 - \beta^2 \bar{Z}_i^2 \quad (5)$$

can be rewritten as:

$$\overline{DI}_i^3 - \overline{DI}_i^2 = (\bar{Z}_i^3 - \bar{Z}_i^2)\beta^p + \bar{Z}_i^3(\beta^3 - \beta^p) + \bar{Z}_i^2(\beta^p - \beta^2) \quad (6)$$

by adding and subtracting both $\beta^p \bar{Z}_i^1$ and $\beta^p \bar{Z}_i^0$ to the right-hand side. In these equations, $\bar{Z}_i^w$ is a matrix of mean values for all explanatory variables for individuals in period $w \in \{2, 3\}$, β^w is the coefficient from an OLS regression of DI on Z for individuals in period w only, and β^p is the coefficient from a pooled regression of DI on Z for individuals in either period (Neumark 1988).[20] The first term on the right-hand side of equation (1) is the explained portion of the gap between $\overline{DI}_i^3$ and $\overline{DI}_i^2$; that is, how much the observable differences between individuals in the two time periods contribute to the difference in disability application probabilities. The latter two terms together represent the unexplained portion, or the contribution of the difference in the *responses* to individual characteristics between the two periods.

Since our outcome variables are dichotomous, we adopt Fairlie's (2005) extension of the Blinder-Oaxaca decomposition for nonlinear models. Where $Y = F(Z\beta)$, in a non-linear equation, $\bar{Y}$ does not simply equal $\bar{Z}\beta$. Instead, $\bar{Y} = \frac{1}{N}\sum_{i=1}^{N} F(Z\beta)$. Therefore, the nonlinear analogue to equation (1) is:

[19] For each individual, we calculate the derivative of the dependent variable with respect to each variable; the results tables report the mean of these derivatives. We calculate the standard error for the marginal effects and interaction effects using the Delta method.

[20] Elder, Goddeeris, and Haider (2010) find that using the pooled decomposition technique (Neumark 1988) can overstate the explained portion of the decomposition if the pooled regression does not include an indicator for the group variable (in this case, period 3). We thus include this indicator in our decomposition.

$$\overline{DI}_i^3 - \overline{DI}_i^2 = \left[\sum_{i=1}^{N^3} \frac{F(Z^3\beta^p)}{N^3} - \sum_{i=1}^{N^2} \frac{F(Z^2\beta^p)}{N^2}\right] + \left[\sum_{i=1}^{N^3} \frac{F(Z^3\beta^3)}{N^3} - \sum_{i=1}^{N^2} \frac{F(Z^3\beta^p)}{N^3}\right] + \left[\sum_{i=1}^{N^3} \frac{F(Z^2\beta^p)}{N^2} - \sum_{i=1}^{N^2} \frac{F(Z^2\beta^2)}{N^2}\right]. \quad (7)$$

As before, the first term is the explained portion, and the combination of the latter two terms is the unexplained portion.

For each variable in Z, we calculate the contribution to the explained portion of the change in the disability application or allowance rate; we also calculate the total unexplained change in the outcome variable. To calculate each separate variable's contribution to the explained portion, we find the difference in the average predicted probability of application (or award) when replacing the distribution of each variable in period 2 with that variable's period 3 distribution, holding all other variables constant. Standard errors are calculated using the Delta Method.[21]

Results

Health and Retirement Study. Table 3 presents the mean characteristics of individuals who apply for disability benefits by the point in the business cycle in which they apply. Despite the limited age range of the HRS sample –50-66 – we see differences in the average age of applicants. Individuals who apply during either recession are approximately one year older, with an average age of 58.6, than those who applied during the intervening boom. Individuals who apply during recessions are also more likely to be college educated. Interestingly, we find a declining trend over time in the percent of applicants of Hispanic origin.

We also compare disability applicants' incomes relative to the federal poverty threshold, and categorize applicants by wealth based on the cut-off points among the wealth quintiles in

[21] We use the STATA command FAIRLIE, created by Jann (2006), to estimate the probit decomposition. The decomposition is repeated 100 times with the order that the variables are replaced randomized, as Fairlie (2005) points out that the order will matter.

2000. While there is little apparent difference in the distribution of household incomes before applying to a disability program, those who apply during recessions are more likely to fall higher in the net-worth distribution. During the 2004-2006 boom, over 40 percent of applicants are from the lowest quintile of wealth, and another 25 percent come from the second-lowest quintile; the next three quintiles only had 10 percent of the applicants each. During the recessions, applicants are more likely to come from the third wealth quintile, at 20 and 25 percent of the applicants during the Great Recession and the 2001 recession, respectively.

We also compare the characteristics of the jobs that individuals reported having within the last two years before applying to a disability program. Approximately 60 percent of the sample of applicants was not working for pay prior to application – except during the Great Recession, when less than half of the applicants were not employed in the previous wave We also observe differences in the types of employment among those who have jobs. Individuals applying for disability benefits during recessions are less likely to have been working in a part-time job and are more likely to be working in a full-time job before applying for disability benefits.

Finally, we examine whether individuals report having limitations with any activities of daily living or instrumental activities of daily living, and any reported psychological problems. We also assess any differences in the mobility index, the CESD-8 index, and a count of large muscle impairment.[22] There are noticeable increases over time and across booms and busts in the percent of applicants reporting mobility problems, large-muscle problems, and psychological problems. Life expectancy, as measured by the ratio of the self-reported probability of living until age 75 to the statistical probability of living that long, is relatively stable. Interestingly, the average self-reported life expectancy is quite low, with individuals reporting probabilities of living until age 75 – that life expectancy is 65-70 percent lower than the life-table would predict.

[22] The ADL activities include bathing, dressing, eating, getting in/out of bed and walking across a room. The IADL activities include using a telephone, taking medications, handling money, shopping and preparing meals. The psychological problem indicator reports whether the respondent was ever diagnosed with an emotional, nervous or psychiatric problems. The mobility index includes four tasks: walking several blocks, walking one block, climbing several flights of stairs and walking one flight of stairs. The large muscle impairment index also includes four tasks: sitting for two hours, getting up from a chair, stopping/kneeling/crouching and pushing/pulling a large object. The CESD-8 index is the sum of six "negative" and two "positive" indicators of experiencing a sentiment all or most of the time. The sentiments are: felt depressed, everything is an effort, restless sleep, felt alone, felt sad, could not get going, felt happy and enjoyed life.

Table 4 presents the marginal effects from three fully interacted probit models. The first set of columns models the decision to apply to either disability program, among the population potentially eligible ("application rate"). The second set of columns models the awardees among the eligible population ("award rate"), and the third set models the awardees among the subset of individuals who decided to apply ("allowance rate"). These three specifications allow us to examine how characteristics among applicants and awardees have changed with the business cycle, and to decompose any observed differences to see if it is happening at the application or the award stage of the process.

The first column, not surprisingly, shows that health conditions are positively related to applying, since they influence the probability of acceptance onto a disability program. Individuals working at the beginning of each three-year period are less likely to apply, and men are more likely to apply. While a larger SSI benefit increases the probability of applying to a disability program, a larger SSDI benefit actually decreases the probability of applying; this variable is likely picking up the effect of lifetime income that is not already controlled for in the wealth and current income variables.

Interestingly, we do not find evidence of large increases in overall disability program applications during recessions once we control for observable characteristics, as evidenced by the insignificant marginal effects on the time period indicator variables, nor has the composition changed consistently across business cycles. We do, however, find some evidence that the pool of applicants has changed over time, independent of macroeconomic conditions. Higher income individuals, those with higher SSI benefits, and those age 62 and over are more likely to apply for benefits during the 2001-2003 recession than during the expansion. But for each variable the opposite is true for the Great Recession, when applicants also are more likely to have recently worked full time. In addition, a higher SSDI benefit is associated with the increased prevalence of applications during the Great Recession, either because applicants have increased sensitivity to financial incentives or more applicants have higher lifetime income. But there is no statistically significant evidence that healthier individuals are more likely to apply during either recession.

When we examine who is accepted onto the disability rolls, we find a very similar story. As expected, having a mobility problem is positively associated with being awarded disability benefits. Recent work experience is negatively correlated with disability awards, as is higher net

worth. The results for awards across business cycles are similar to those from the application regressions: Great Recession awardees are younger and are more likely to have worked full-time in the previous wave. And awardees from the earlier recession are older, higher income, lower wealth, and less likely to have worked in the previous wave.

The third set of columns, estimating the probability of being awarded benefits among those who have applied reveals interesting results. Overall, applicants who previously held full-time jobs are more likely to be awarded benefits – except during the 2001-2003 recession. This suggests that selection effects occur at both the application and the award phases of the disability insurance process. Individuals with longer self-reported life expectancies who applied during the minor recession in 2001-2003 are actually less likely to be awarded benefits, while married individuals from this period are more likely. Applicants awarded benefits during the Great Recession are compositionally similar to awarded applicants from the expansion, except that applicants from manufacturing are more likely to be awarded benefits compared to those in wholesale or retail trade.[23]

Survey of Income and Program Participation Results. Table 5 reports summary statistics for disability applicants in the SIPP sample by period. Compared to the 2004-2006 expansion, applicants during the 2001-2003 recession are less likely to be childless, more likely to be working prior to application, and more likely to work in wholesale or retail trade. Their educational attainment is comparatively bimodal: they are more likely to either be high school dropouts or more likely to have a college degree. Applicants during the Great Recession are more likely to be male, have children, have at least some college education, be wealthier and have larger incomes and potential SSDI benefits, and they are more likely to have health insurance coverage at the beginning of the three-year period than those who applied in the 2004-2006 expansion.

In contrast to the HRS results, there is some evidence in the SIPP results that healthier people are more likely to apply for disability during the recent recession than during the

[23] Results are similar when examining SSDI and SSI separately. SSDI applicants during the Great Recession are more likely to be male and have worked recently, and SSDI awardees are more likely than other applicants to be men, Hispanics, and white-collar workers in the most recent period. Older individuals are more likely to apply to SSI during the Great Recession, and individuals with longer work histories or more recent full-time work experience were less likely to be awarded SSI benefits given that they applied during the Great Recession. These results are available from the authors upon request.

expansion. Applicants during the Great Recession are less likely to report a work-limiting disability before the recession than those who applied in the 2004-2006 expansion. The statistical significance of this finding is not explained entirely by the much larger sample size in the SIPP; the magnitude of the interaction effect is more than an order of magnitude larger using the SIPP. Still, the work limitation variable (the only health variable available in the Gold Standard File) is a much weaker proxy for health than are the more comprehensive HRS measures.

The main difference between applicants in the two recessions is in educational attainment. Applicants in recent years appear to be better educated than during 2001-2003; the proportion with less than a high school degree was cut almost in half, and the proportion with some college experience grew significantly, but the distribution of applicants by education remained relatively constant between the expansion and the Great Recession. Accordingly, applicants during the Great Recession have higher incomes and career earnings, and they are more likely to have been working prior to the recession than those who applied between 2001 and 2003.

Table 6, the SIPP analog to Table 4, presents the marginal effects of three probit regressions estimating the application decision (SSDI and SSI combined) among all potentially eligible individuals, the award rate among all potentially eligible individuals, and finally the award rate among all applicants.

SIPP's wider age range enables us to analyze a more complete age distribution of applicants and awardees over time. Overall, disability applications increase monotonically with age. Application prevalence across the age distribution is relatively fixed across business cycles, with one exception. Individuals under age 30 in the Great Recession are significantly more likely to apply than during the expansion. However, awards at younger ages are significantly more likely in both recessions.

Not surprisingly, wealth and income are highly negatively correlated with applications. Unlike the 2001-2003 recession, the Great Recession experiences a statistically significant increase in applications by those in higher income quintiles and in the third and fourth quintiles of the wealth distribution. Awards as a proportion of the eligible population are more likely at higher net worth levels in each recession, but awards conditional on application are significantly less likely at higher income quintiles during the Great Recession.

The estimates for other characteristics confirm patterns that were observed in the descriptive data for the Great Recession. Applicants during this period are more likely to be male and are a statistically significant 5.1 percent less likely to report a work limitation the first time they are observed, compared to applicants during the expansion. Fewer awardees also report work limitations, though this appears to be due to increased applications and not an increase in allowance conditional on application. Awardees are also less likely to be black, and more likely to be college educated and have smaller families during the Great Recession.[24]

Table 7 reports the non-linear Blinder-Oaxaca decompositions for both programs combined.[25] The first two lines report the unconditional probability of applying, being awarded benefits, or being awarded benefits conditional on applying, in the base year – 2001 – and in 2004). The third line is the growth in this probability (2004 minus 2001), and the fourth line gives the total amount of this unconditional growth that can be explained by differences between the two periods in the independent variables. Subsequent entries in the table detail how each category of controls contributes to the explained portion. The last line gives the unexplained portion of the unconditional difference in probabilities between the periods.

The application rate falls between the 2001-03 recession and the subsequent expansion by just under one half of a percentage point, of which just less than 0.2 percentage points can be explained by variables in the regression analysis. The increases in income, wealth, and educational attainment each contribute between 0.06 and 0.07 percentage points, while the change in the age distribution actually suggests that the application rate should have risen. The portion of the decrease in awards that can be explained by the included variable is negligible, with the contribution of increasing wealth and education canceled out by the effect of the aging population. Although the allowance rate falls in this period by more than 2 percentage points, the explanatory variables collectively suggest that it should have *risen* by about 1.5 percentage points – primarily because of aging and increasing income – so the unexplained portion is 3.6 percentage points.

[24] Separate analysis for SSDI and SSI reveals that the change in the age distribution of applicants is from SSDI, but changed for both SSDI and SSI among awardees. Similarly, both SSDI and SSI applications increased in the Great Recession among higher income or wealthier individuals; the increase in SSI application is indicative of steep declines in financial well-being from the peak to the trough of the business cycle. These results are available from the authors upon request.

[25] Patterns for SSDI and SSI separately are very similar. These decompositions are available from the authors upon request.

In the expansion bookmarked by the recessions of 2001-03 and 2008-10, the application rate rises slightly. About 70 percent of the increase in the application rate during the expansion is explained by differences in the characteristics of potential applicants, primarily the aging of the population, since increases in education and wealth and a decrease in work limitations all suggest that the application rate should have been lower in 2008-2010 than in the previous recession. The award rate also increased during the expansion, but the increases are much larger than those in the application rate. The explained portion of this increase is actually negative, as aging is swamped by other personal characteristics. About half of the allowance rate can be explained—and about half of that comes from the aging population.

The application rate rises from 2.9 to 3.6 percent on average in the period between the expansion of 2004-06 and the Great Recession. Just over 40 percent of this increase can be explained by differences in explanatory variables between the beginnings of each period, due almost entirely to changes in the age and wealth distributions. The award rate rises from 1.2 to 1.8 percent; here, the increase suggested by the age distribution is overwhelmed by the decrease suggested by the high unemployment rates, so the unexplained portion is higher than the actual rise. Finally, the allowance rate rises from 40.5 to 49.6 percent, with just less than a quarter of that rise explained by individual characteristics; the age and income distributions, along with job characteristics, together account for most of this portion.

Conclusions

Not only does the number of disability applicants increase during a recession, but the composition of these applicants also changes with the macroeconomy. Interestingly, we find some support for the idea that an economic downturn induced healthier individuals to apply to disability programs: although the health characteristics of applicants to be independent of the business cycle in the HRS, applicants in the SIPP were significantly less likely to have work limitations before the downturn. A more unequivocal change between expansions and contractions is the recent attachment to the labor force. Individuals who apply during recessions are more likely to have a recent work history and to have worked full-time than those who apply during booms. Applicants during the Great Recession also had higher incomes and wealth and more educational attainment when first observed than those who applied during the expansion.

When we decompose the increase in application rate, award rate, and allowance rate experienced during the Great Recession, we find that a substantial portion of the increase in disability activity remains unexplained by the demographic composition and economic circumstances faced by potential applicants and awardees. The characteristics of the population – specifically, the graying of the baby boom generation and declining wealth – account for less than half of the increase in the application rate in the Great Recession, and only one quarter of the increase in the allowance rate. In contrast to the substantial increase in the award rate since 2006, our estimates suggest that, given the severity of the recent recession and declining reports of work limitations, the award rate should have actually decreased.

The severity of the Great Recession resulted in a very different marginal disability applicant than during the expansion or even the previous downturn. Better educated and better paid workers who normally avoid the disability program because of the high opportunity cost of leaving the workforce to apply were induced by high unemployment to apply between 2008 and 2010. This shift would suggest a decline in the award and allowance rates, but in actuality more of these applications have been successful. While this low explanatory power could be due to model misspecification, it is difficult to imagine what factors are omitted that could explain such substantial changes over time in the application rate, allowance rate and award rate. Together with the fact that there have been no substantial programmatic changes to the disability programs, we interpret our findings as evidence of a substantive shift over the last decade in how the disability application decision and the disability awards have been made, which cannot be explained by observable characteristics of the applicants.

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Table 1. *HRS Sample Selection Criteria*

	Individuals	Person-period observations
Whole sample	31,169	
Provided interview and birth year	30,699	
Respondents matched with SSA Earnings records	21,633	
Under 65 in 2000 or when applied	10,306	
SSDI-sample	6,671	
Period-individual observations		11,748
Missing variables of interest		1,005
Final sample		10,743
Number who applied		443
Outcome observed		353
SSI-sample	2,492	
Period-individual observations		3,425
Missing variables of interest		483
Final sample		2,942
Number who applied		222
Outcome observed		169

Source: Health and Retirement Study, 1996-2010

Table 2. *SIPP Sample Selection Criteria*

	Individuals	Person-period observations
Whole sample	776,613	
In 2001 or 2004 panels	235,602	
Age 25 to 61 at start of panel	110,908	
Present in Jan 2001, Jan 2004, or Jan 2006	102,332	
Age 25 to 61 at start of period		142,261
Matched to SSA data		104,456
Eligible for either SSDI or SSI		91,240
Have not previously received SSDI or SSI		88,697
Applied to SSDI		2,431
Applied to SSI		1,317

Source: Survey of Income and Program Participation Gold Standard File, 2001-2019

Table 3. *Characteristics of All Disability Benefit Applicants, by Year of Application - HRS Sample*

	Mean (standard error)			P-value		
Demographics	2001-2003	2004-2006	2008-2010	2001 vs. 2004	2001 vs. 2008	2004 vs. 2008
Age 55 to 61	0.731	0.629	0.808	0.070	0.169	0.003
	(0.445)	(0.484)	(0.396)			
Age 62 or more	0.191	0.146	0.149	0.272	0.378	0.948
	(0.394)	(0.354)	(0.358)			
Male	0.452	0.460	0.523	0.898	0.333	0.378
	(0.499)	(0.500)	(0.502)			
Married	0.669	0.575	0.592	0.116	0.279	0.810
	(0.472)	(0.496)	(0.494)			
One child	0.089	0.082	0.087	0.843	0.974	0.898
	(0.285)	(0.275)	(0.284)			
Two children	0.222	0.259	0.230	0.485	0.899	0.634
	(0.417)	(0.440)	(0.423)			
Three or more children	0.619	0.553	0.528	0.287	0.218	0.727
	(0.487)	(0.499)	(0.502)			
Black	0.158	0.199	0.126	0.357	0.477	0.109
	(0.366)	(0.400)	(0.334)			
Hispanic	0.155	0.081	0.037	0.043	0.002	0.063
	(0.363)	(0.274)	(0.189)			
Foreign born	0.110	0.075	0.047	0.338	0.108	0.385
	(0.314)	(0.265)	(0.213)			
High school degree	0.507	0.666	0.596	0.010	0.227	0.324
	(0.501)	(0.473)	(0.493)			
College degree	0.173	0.085	0.177	0.052	0.953	0.095
	(0.380)	(0.280)	(0.384)			
Postsecondary degree	0.023	0.048	0.056	0.339	0.248	0.810
	(0.151)	(0.214)	(0.232)			
Income/poverty						
0 - 100 percent	0.183	0.165	0.167	0.685	0.761	0.972
	(0.388)	(0.372)	(0.375)			
100 - 200 percent	0.132	0.189	0.159	0.229	0.623	0.587
	(0.340)	(0.392)	(0.367)			
200 - 300 percent	0.182	0.202	0.132	0.696	0.322	0.180
	(0.387)	(0.403)	(0.341)			
300 - 400 percent	0.106	0.123	0.164	0.697	0.262	0.441
	(0.309)	(0.329)	(0.372)			
400 percent or more	0.394	0.322	0.378	0.245	0.831	0.427
	(0.490)	(0.469)	(0.487)			

Table 3. *Characteristics of All Disability Benefit Applicants, by Year of Application - HRS Sample* (continued)

	Mean (standard error)			P-value		
Demographics	2001-2003	2004-2006	2008-2010	2001 vs. 2004	2001 vs. 2008	2004 vs. 2008
2000 wealth quintiles						
1st	0.288	0.433	0.423	0.012	0.053	0.887
	(0.454)	(0.497)	(0.497)			
2nd	0.277	0.251	0.143	0.653	0.017	0.040
	(0.449)	(0.435)	(0.352)			
3rd	0.247	0.101	0.199	0.001	0.447	0.071
	(0.432)	(0.302)	(0.402)			
4th	0.097	0.100	0.115	0.922	0.681	0.741
	(0.296)	(0.301)	(0.321)			
5th	0.092	0.114	0.120	0.540	0.544	0.909
	(0.289)	(0.319)	(0.327)			
Characteristics of last job						
Full time work	0.359	0.271	0.489	0.139	0.074	0.001
	(0.481)	(0.446)	(0.502)			
Part time work	0.045	0.125	0.064	0.018	0.566	0.130
	(0.207)	(0.332)	(0.245)			
Not working	0.597	0.604	0.448	0.910	0.041	0.027
	(0.492)	(0.491)	(0.500)			
Industry						
Manufacturing	0.224	0.212	0.145	0.823	0.153	0.187
	(0.418)	(0.410)	(0.354)			
Wholesale and retail trade	0.112	0.098	0.122	0.674	0.818	0.551
	(0.317)	(0.298)	(0.329)			
Services, FIRE, and public admin	0.453	0.447	0.402	0.926	0.473	0.511
	(0.499)	(0.499)	(0.493)			
Mining, construction, and utilities	0.150	0.164	0.183	0.776	0.566	0.743
	(0.358)	(0.371)	(0.388)			
N/A	0.060	0.079	0.149	0.530	0.081	0.174
	(0.239)	(0.271)	(0.358)			
Occupation						
Managerial and professional	0.235	0.221	0.194	0.806	0.509	0.646
	(0.425)	(0.416)	(0.397)			
Technical/sales/admin	0.514	0.485	0.390	0.646	0.085	0.173
	(0.501)	(0.501)	(0.490)			
Other	0.195	0.214	0.253	0.694	0.327	0.505
	(0.397)	(0.412)	(0.437)			

Table 3. *Characteristics of All Disability Benefit Applicants, by Year of Application - HRS Sample* (continued)

	Mean (standard error)			P-value		
Health characteristics	2001-2003	2004-2006	2008-2010	2001 vs. 2004	2001 vs. 2008	2004 vs. 2008
No health insurance	0.210	0.384	0.295	0.002	0.186	0.191
	(0.408)	(0.488)	(0.458)			
Any ADL	0.314	0.354	0.324	0.511	0.889	0.664
	(0.465)	(0.480)	(0.470)			
Any IADL	0.214	0.260	0.229	0.383	0.804	0.616
	(0.412)	(0.440)	(0.423)			
Mobility limitations	1.655	1.750	1.890	0.604	0.229	0.481
	(1.426)	(1.480)	(1.382)			
Large muscle mobility	2.022	2.157	2.463	0.461	0.016	0.092
	(1.414)	(1.450)	(1.206)			
Psychiatric problems	0.203	0.329	0.349	0.022	0.027	0.764
	(0.403)	(0.471)	(0.479)			
CESD	2.619	2.996	2.859	0.255	0.532	0.728
	(2.416)	(2.607)	(2.630)			
Probability of living to age 75	0.698	0.705	0.641	0.901	0.422	0.349
	(0.453)	(0.441)	(0.469)			
SSDI benefit	0.879	0.826	0.859	0.429	0.836	0.725
	(0.558)	(0.552)	(0.712)			
SSI benefit	0.160	0.244	0.237	0.020	0.075	0.868
	(0.274)	(0.303)	(0.308)			
Sample size	182	163	97			

Source: Health and Retirement Study, 1996-2010

Table 4. Fully-Interacted Probit Regression Results using HRS - SSDI and SSI Combined

	All Applied/Eligible			All Allowed/Eligible			All Allowed/Applied		
		Period1 interaction	Period3 interaction		Period1 interaction	Period3 interaction		Period1 interaction	Period3 interaction
2001-2003	0.055	-	-	0.039	-	-	-0.042	-	-
	(0.038)			(0.035)			(0.289)		
2008-2010	-0.016	-	-	-0.013	-	-	0.021	-	-
	(0.027)			(0.022)			(0.240)		
Age 55-61	0.009	0.018	-0.018	0.012 *	0.025	-0.021 *	0.174 **	0.128	-0.099
	(0.008)	(0.015)	(0.012)	(0.007)	(0.015)	(0.011)	(0.067)	(0.124)	(0.130)
Age 62+	-0.006	0.037 **	-0.021 *	0.003	0.045 **	-0.020 *	0.074	0.207	-0.083
	(0.008)	(0.016)	(0.012)	(0.008)	(0.018)	(0.012)	(0.085)	(0.148)	(0.164)
Male	0.023 ***	0.019	-0.007	0.012 *	0.021	-0.001	-0.027	-0.118	0.162
	(0.009)	(0.016)	(0.014)	(0.007)	(0.014)	(0.011)	(0.074)	(0.126)	(0.129)
Married	-0.004	0.002	0.005	-0.003	0.012	0.000	0.001	0.249 **	-0.087
	(0.006)	(0.012)	(0.010)	(0.005)	(0.011)	(0.008)	(0.072)	(0.122)	(0.135)
1 child	-0.004	0.010	-0.008	-0.006	-0.010	0.016	-0.237 *	-0.220	0.364
	(0.012)	(0.024)	(0.018)	(0.008)	(0.018)	(0.015)	(0.144)	(0.221)	(0.222)
2 children	0.004	0.012	-0.023	0.002	-0.006	0.001	-0.067	-0.315	0.227
	(0.011)	(0.022)	(0.017)	(0.009)	(0.018)	(0.014)	(0.119)	(0.203)	(0.218)
3+ children	0.004	0.017	-0.018	0.000	-0.003	0.003	-0.127	-0.228	0.161
	(0.010)	(0.020)	(0.015)	(0.008)	(0.016)	(0.012)	(0.103)	(0.175)	(0.180)
Black	0.004	-0.006	-0.002	0.000	-0.009	0.003	-0.083	-0.177	0.050
	(0.008)	(0.015)	(0.013)	(0.006)	(0.013)	(0.010)	(0.085)	(0.145)	(0.148)
Hispanic	-0.001	0.018	-0.010	-0.006	0.004	-0.003	-0.012	-0.169	0.168
	(0.011)	(0.021)	(0.017)	(0.008)	(0.018)	(0.012)	(0.098)	(0.173)	(0.175)
Foreign born	-0.014 *	-0.016	-0.004	-0.007	-0.032 **	-0.001	0.040	-0.252	0.031
	(0.008)	(0.017)	(0.014)	(0.007)	(0.015)	(0.012)	(0.105)	(0.197)	(0.208)
High school degree	0.008	-0.010	0.014	0.004	-0.014	0.017	-0.011	-0.110	0.197
	(0.009)	(0.017)	(0.017)	(0.008)	(0.015)	(0.016)	(0.081)	(0.140)	(0.157)
Some college	0.003	0.023	0.008	0.002	0.005	0.016	0.078	-0.248	0.173
	(0.012)	(0.021)	(0.020)	(0.010)	(0.019)	(0.021)	(0.115)	(0.205)	(0.201)
College degree +	-0.005	-0.022	0.041	-0.007	-0.019	0.028	-0.042	-0.165	0.183
	(0.013)	(0.025)	(0.028)	(0.010)	(0.020)	(0.023)	(0.168)	(0.280)	(0.269)
Inc/Pov 100-200%	0.016	0.029	-0.018	0.012	0.036	-0.022	-0.014	0.022	-0.018
	(0.015)	(0.028)	(0.023)	(0.013)	(0.028)	(0.019)	(0.009)	(0.016)	(0.050)
Inc/Pov 200-300%	0.030	0.090 **	-0.055 **	0.017	0.051	-0.030			
	(0.019)	(0.039)	(0.027)	(0.015)	(0.034)	(0.022)			
Inc/Pov 300-400%	0.027	0.053	-0.028	0.019	0.047	-0.029			
	(0.020)	(0.037)	(0.029)	(0.017)	(0.037)	(0.025)			
Inc/Pov 400% +	0.028	0.067 **	-0.036	0.021	0.073 **	-0.035			
	(0.018)	(0.032)	(0.025)	(0.015)	(0.032)	(0.022)			
2nd wealth quintile	-0.006	0.002	-0.005	-0.007	-0.007	0.001	-0.111	-0.012	0.080
	(0.007)	(0.014)	(0.011)	(0.005)	(0.011)	(0.008)	(0.093)	(0.158)	(0.178)
3rd wealth quintile	-0.003	0.022	-0.008	-0.005	0.006	-0.006	-0.227 **	0.024	-0.184
	(0.008)	(0.016)	(0.013)	(0.006)	(0.014)	(0.010)	(0.111)	(0.160)	(0.160)
4th wealth quintile	-0.008	-0.013	0.006	-0.010 *	-0.022 *	0.009	-0.186	-0.360 *	0.162
	(0.009)	(0.017)	(0.015)	(0.006)	(0.012)	(0.010)	(0.116)	(0.185)	(0.204)
5th wealth quintile	-0.002	-0.004	0.001	-0.002	-0.012	0.005	0.016	-0.058	-0.039
	(0.010)	(0.020)	(0.017)	(0.008)	(0.016)	(0.014)	(0.133)	(0.236)	(0.246)
Full time work	-0.027 ***	-0.019 *	0.028 ***	-0.011 **	-0.023 **	0.018 **	0.139 **	-0.257 **	0.001
	(0.005)	(0.010)	(0.009)	(0.005)	(0.010)	(0.009)	(0.067)	(0.115)	(0.117)
Part time work	-0.022 ***	-0.036 ***	0.008	-0.012 **	-0.021 *	0.008	0.157 **	0.165	0.188
	(0.005)	(0.012)	(0.009)	(0.005)	(0.011)	(0.009)	(0.074)	(0.139)	(0.151)
Trade	-0.008	-0.008	0.008	-0.004	-0.003	0.006	0.084	0.105	-0.411 **
	(0.008)	(0.016)	(0.015)	(0.007)	(0.014)	(0.012)	(0.087)	(0.152)	(0.165)
Services	-0.007	-0.003	0.015	-0.006	-0.002	0.013	-0.011	0.088	-0.006
	(0.007)	(0.014)	(0.014)	(0.006)	(0.013)	(0.011)	(0.090)	(0.154)	(0.159)

Table 4. Fully-Interacted Probit Regression Results using HRS - SSDI and SSI Combined (continued)

	All Applied/Eligible			All Allowed/Eligible			All Allowed/Applied		
		Period1 interaction	Period3 interaction		Period1 interaction	Period3 interaction		Period1 interaction	Period3 interaction
Mining, etc.	-0.009	-0.009	0.012	-0.007	-0.010	0.022 *	-0.050	0.012	0.248
	(0.008)	(0.015)	(0.014)	(0.006)	(0.013)	(0.013)	(0.108)	(0.180)	(0.193)
N/A industry	-0.004	-0.018	0.058 **	-0.003	-0.003	0.025	-0.040	0.443 **	-0.409 **
	(0.012)	(0.025)	(0.027)	(0.010)	(0.022)	(0.020)	(0.133)	(0.193)	(0.199)
Tech/sales/admin	0.000	0.010	0.011	0.000	0.007	0.006	-0.028	0.099	-0.179
	(0.007)	(0.014)	(0.013)	(0.006)	(0.012)	(0.010)	(0.093)	(0.152)	(0.165)
Other occupation	0.004	-0.002	0.022	0.003	0.006	0.004	-0.025	0.118	-0.133
	(0.009)	(0.018)	(0.017)	(0.008)	(0.016)	(0.013)	(0.099)	(0.163)	(0.186)
No health insurance	0.003	-0.013	0.003	-0.001	-0.016	0.004	-0.061	-0.115	-0.035
	(0.007)	(0.013)	(0.012)	(0.005)	(0.011)	(0.009)	(0.077)	(0.134)	(0.140)
Any ADL	0.003	0.019	-0.008	-0.001	0.020	-0.008	-0.191 *	0.183	-0.114
	(0.009)	(0.017)	(0.015)	(0.007)	(0.015)	(0.012)	(0.100)	(0.156)	(0.161)
Any IADL	0.002	0.005	0.002	0.010	-0.012	-0.004	0.076	-0.199	-0.234
	(0.010)	(0.018)	(0.016)	(0.010)	(0.019)	(0.017)	(0.071)	(0.140)	(0.144)
Any psych problem	0.009	-0.007	-0.002	0.006	-0.006	0.002	-0.018	-0.059	0.087
	(0.008)	(0.016)	(0.013)	(0.007)	(0.014)	(0.011)	(0.067)	(0.116)	(0.111)
Mobility index	0.010 ***	0.003	0.002	0.007 ***	0.002	0.002	0.024	-0.048	0.072
	(0.003)	(0.008)	(0.010)	(0.002)	(0.007)	(0.010)	(0.030)	(0.052)	(0.141)
Large muscle index	0.006 **	0.002	0.003	0.003	0.007	-0.001	-0.016	0.106 *	-0.081
	(0.002)	(0.006)	(0.008)	(0.002)	(0.007)	(0.005)	(0.027)	(0.059)	(0.139)
CESD score	0.002	0.001	0.000	0.001	0.001	0.000	0.002	-0.040	0.061
	(0.001)	(0.003)	(0.003)	(0.001)	(0.003)	(0.002)	(0.013)	(0.027)	(0.082)
P(living to age 75)	-0.011 *	-0.020	-0.002	-0.005	-0.029	0.009	0.014	-0.319 *	0.326
	(0.007)	(0.020)	(0.017)	(0.006)	(0.021)	(0.010)	(0.070)	(0.169)	(0.444)
SSDI benefit	-0.012 **	-0.036	0.024 ***	-0.008 **	-0.032	0.020 **	0.146 **	-0.090	0.124
	(0.005)	(0.023)	(0.008)	(0.004)	(0.022)	(0.008)	(0.073)	(0.158)	(0.414)
SSI benefit	0.090 ***	0.271 *	-0.108 ***	0.060 ***	0.191	-0.073 ***	0.021	-0.186	0.075
	(0.014)	(0.145)	(0.028)	(0.011)	(0.123)	(0.027)	(0.120)	(0.215)	(0.256)
N	11,508			11,452			436		

Note: * significant at 10%, ** significant at 5%, *** significant at 1%.

Source: Health and Retirement Study, 1996-2010

Table 5. *Characteristics of All Disability Benefit Applicants, by Year of Application - SIPP Sample*

	Mean (standard error)			P-value		
Demographics	2001-2003	2004-2006	2008-2010	2001 vs. 2004	2001 vs. 2008	2004 vs. 2008
Age 25 to 29	0.064	0.045	0.053			
	(0.245)	(0.207)	(0.225)			
Age 30 to 34	0.093	0.087	0.068	0.494	0.774	0.161
	(0.290)	(0.281)	(0.252)			
Age 35 to 39	0.132	0.101	0.116	0.815	0.890	0.893
	(0.338)	(0.301)	(0.321)			
Age 40 to 44	0.171	0.148	0.133	0.596	0.866	0.290
	(0.376)	(0.355)	(0.339)			
Age 45 to 49	0.138	0.169	0.198	0.169	0.201	0.938
	(0.345)	(0.375)	(0.399)			
Age 50 to 54	0.196	0.204	0.196	0.327	0.670	0.408
	(0.397)	(0.403)	(0.397)			
Age 55 to 61	0.206	0.247	0.235	0.181	0.458	0.384
	(0.405)	(0.431)	(0.424)			
Male	0.459	0.436	0.518	0.421	0.037	0.001
	(0.498)	(0.496)	(0.500)			
Married	0.493	0.519	0.506	0.344	0.641	0.578
	(0.500)	(0.500)	(0.500)			
No children	0.573	0.658	0.595			
	(0.495)	(0.474)	(0.491)			
One child	0.208	0.155	0.178	0.011	0.257	0.065
	(0.406)	(0.362)	(0.383)			
Two children	0.148	0.117	0.142	0.015	0.594	0.038
	(0.355)	(0.321)	(0.349)			
Three or more children	0.070	0.070	0.085	0.459	0.448	0.087
	(0.256)	(0.255)	(0.278)			
Black	0.197	0.207	0.208	0.365	0.308	0.896
	(0.397)	(0.405)	(0.406)			
Hispanic	0.112	0.116	0.130	0.790	0.360	0.480
	(0.315)	(0.321)	(0.336)			
Foreign born	0.054	0.083	0.091			
	(0.227)	(0.276)	(0.288)			
No high school degree	0.265	0.157	0.149			
	(0.441)	(0.364)	(0.356)			
High school degree	0.315	0.329	0.288	0.000	0.002	0.613
	(0.464)	(0.470)	(0.453)			
Some college	0.280	0.373	0.396	0.000	0.000	0.452
	(0.449)	(0.484)	(0.489)			

Table 5. *Characteristics of All Disability Benefit Applicants, by Year of Application - SIPP Sample* (continued)

	Mean (standard error)			P-value		
Demographics	2001-2003	2004-2006	2008-2010	2001 vs. 2004	2001 vs. 2008	2004 vs. 2008
College degree or more	0.104	0.094	0.101	0.037	0.008	0.539
	(0.305)	(0.292)	(0.302)			
Income/poverty						
0 - 100 percent	0.278	0.256	0.216			
	(0.448)	(0.437)	(0.411)			
100 - 200 percent	0.252	0.250	0.216	0.661	0.551	0.834
	(0.434)	(0.433)	(0.412)			
200 - 300 percent	0.167	0.156	0.185	0.928	0.048	0.025
	(0.373)	(0.363)	(0.388)			
300 - 400 percent	0.122	0.130	0.135	0.448	0.073	0.214
	(0.327)	(0.336)	(0.342)			
400 percent or more	0.180	0.208	0.247	0.197	0.001	0.014
	(0.384)	(0.406)	(0.432)			
2001 wealth quintiles						
1st	0.260	0.241	0.212			
	(0.438)	(0.428)	(0.409)			
2nd	0.279	0.241	0.269	0.667	0.329	0.086
	(0.448)	(0.428)	(0.443)			
3rd	0.156	0.166	0.172	0.461	0.105	0.282
	(0.363)	(0.372)	(0.377)			
4th	0.107	0.134	0.171	0.139	0.001	0.020
	(0.309)	(0.340)	(0.376)			
5th	0.098	0.123	0.094	0.153	0.477	0.433
	(0.298)	(0.329)	(0.292)			
Full time work	0.490	0.417	0.526			
	(0.500)	(0.493)	(0.499)			
Part time work	0.065	0.067	0.069	0.356	0.963	0.290
	(0.246)	(0.250)	(0.253)			
Not working	0.439	0.506	0.372	0.012	0.051	0.000
	(0.496)	(0.500)	(0.483)			
Industry						
Manufacturing	0.093	0.100	0.122			
	(0.290)	(0.300)	(0.327)			
Wholesale and retail trade	0.187	0.108	0.155	0.012	0.056	0.420
	(0.390)	(0.311)	(0.362)			
Services, FIRE, public admin	0.305	0.361	0.411	0.620	0.891	0.659
	(0.461)	(0.480)	(0.492)			

Table 5. *Characteristics of All Disability Benefit Applicants, by Year of Application - SIPP Sample* (continued)

	Mean (standard error)			P-value		
Demographics	2001-2003	2004-2006	2008-2010	2001 vs. 2004	2001 vs. 2008	2004 vs. 2008
Mining, construction, utilities	0.112	0.115	0.164	0.832	0.622	0.417
	(0.316)	(0.319)	(0.370)			
N/A	0.302	0.316	0.148	0.898	0.000	0.000
	(0.459)	(0.465)	(0.355)			
Occupation						
Managerial and professional	0.132	0.111	0.171			
	(0.339)	(0.315)	(0.377)			
Technical/sales/admin	0.184	0.189	0.229	0.359	0.868	0.160
	(0.387)	(0.392)	(0.420)			
Other	0.382	0.381	0.450	0.314	0.578	0.083
	(0.486)	(0.486)	(0.498)			
No health insurance	0.443	0.433	0.381	0.731	0.029	0.026
	(0.497)	(0.496)	(0.486)			
Work-limiting disability	0.740	0.743	0.468	0.895	0.000	0.000
	(0.439)	(0.437)	(0.499)			
State unemployment rate	5.5	5.0	8.2	0.000	0.000	0.000
	(0.7)	(0.8)	(1.5)			
SSDI benefit (2008$)	717.33	751.61	794.05	0.186	0.003	0.052
	(469.89)	(467.27)	(452.51)			
Federal SSI benefit (2008$)	360.43	342.53	360.89	0.188	0.973	0.125
	(243.66)	(251.24)	(246.41)			
Sample size	664	1102	1140			

Source: Survey of Income and Program Participation Gold Standard File, 2001-2010

Table 6. Fully-Interacted Probit Regression Results using HRS - SSDI and SSI Combined

	All Applied/Eligible			All Allowed/Eligible			All Allowed/Applied		
		Period 1 interaction	Period 3 interaction		Period 1 interaction	Period 3 interaction		Period 1 interaction	Period 3 interaction
2001-2003	0.002	-	-	0.000	-	-	0.040	-	-
	(0.016)			(0.011)			(0.183)		
2008-2010	0.001	-	-	0.006	-	-	0.057	-	-
	(0.014)			(0.011)			(0.152)		
Age 25 to 29	-0.027 ***	0.0015	0.0115 ***	-0.016 ***	0.0091 ***	0.0093 ***	-0.298 ***	-0.0253	0.1515 ***
	(0.002)	(0.003)	(0.002)	(0.001)	(0.001)	(0.001)	(0.052)	(0.076)	(0.053)
Age 30 to 34	-0.023 ***	0.0059	0.0043	-0.017 ***	0.0133 ***	0.0084 ***	-0.334 ***	0.1999 ***	0.1229 ***
	(0.002)	(0.004)	(0.003)	(0.001)	(0.001)	(0.001)	(0.041)	(0.071)	(0.043)
Age 35 to 39	-0.017 ***	0.0023	0.0040	-0.015 ***	0.0114 ***	0.0072 ***	-0.311 ***	0.1360 **	0.0616
	(0.003)	(0.004)	(0.003)	(0.001)	(0.002)	(0.001)	(0.039)	(0.063)	(0.043)
Age 40 to 44	-0.013 ***	0.0033	-0.0002	-0.014 ***	0.0093 ***	0.0068 ***	-0.307 ***	0.0682	0.1013 ***
	(0.003)	(0.004)	(0.003)	(0.001)	(0.002)	(0.001)	(0.036)	(0.056)	(0.038)
Age 45 to 49	-0.008 **	-0.0036	0.0041	-0.010 ***	0.0039 *	0.0063 ***	-0.230 ***	0.0091	0.1042 **
	(0.003)	(0.005)	(0.003)	(0.001)	(0.002)	(0.001)	(0.037)	(0.058)	(0.040)
Age 50 to 54	0.000	0.0035	-0.0032	-0.003 *	0.0007	0.0011	-0.111 ***	-0.0836	0.0410
	(0.004)	(0.005)	(0.004)	(0.002)	(0.003)	(0.001)	(0.041)	(0.061)	(0.046)
Male	0.001	-0.0035	0.0052 **	0.002	-0.0031	0.0012	0.017	0.0010	0.0129
	(0.002)	(0.004)	(0.003)	(0.002)	(0.003)	(0.001)	(0.035)	(0.054)	(0.042)
Married	0.001	0.0032	-0.0043	0.000	-0.0013	-0.0002	-0.007	-0.0491	0.0463
	(0.003)	(0.004)	(0.003)	(0.002)	(0.003)	(0.001)	(0.034)	(0.052)	(0.040)
1 child	-0.002	0.0075 *	0.0002	-0.002	0.0066 **	-0.0009	-0.020	0.0634	-0.0678
	(0.003)	(0.004)	(0.003)	(0.002)	(0.003)	(0.002)	(0.041)	(0.063)	(0.048)
2 children	-0.003	0.0076	0.0005	-0.002	0.0049	0.0007	-0.024	0.0187	-0.0038
	(0.003)	(0.005)	(0.003)	(0.002)	(0.003)	(0.002)	(0.047)	(0.072)	(0.056)
3+ children	-0.008 **	0.0000	0.0060 *	-0.006 **	0.0031	0.0033 *	-0.048	-0.0033	0.0190
	(0.003)	(0.005)	(0.003)	(0.002)	(0.003)	(0.002)	(0.059)	(0.090)	(0.068)
Black	0.016 ***	-0.0064	-0.0071 *	0.007 **	-0.0023	-0.0053 **	-0.005	0.1060 *	-0.0451
	(0.004)	(0.006)	(0.004)	(0.003)	(0.004)	(0.002)	(0.037)	(0.059)	(0.044)
Hispanic	0.001	-0.0020	-0.0035	-0.001	0.0004	0.0009	-0.058	0.0640	0.0532
	(0.004)	(0.006)	(0.004)	(0.003)	(0.004)	(0.002)	(0.055)	(0.084)	(0.064)
Foreign born	-0.014 ***	-0.0066	0.0083 ***	-0.004	0.0018	0.0021	0.068	0.1595	-0.0879
	(0.003)	(0.004)	(0.003)	(0.002)	(0.003)	(0.002)	(0.065)	(0.112)	(0.082)
High school degree	-0.005	-0.0025	0.0026	-0.002	-0.0029	0.0013	0.018	-0.0869	0.0261
	(0.003)	(0.004)	(0.003)	(0.002)	(0.003)	(0.002)	(0.042)	(0.060)	(0.050)
Some college	-0.007 **	-0.0065	0.0068 **	-0.002	-0.0042	0.0029 *	0.004	-0.1059 *	0.0543
	(0.003)	(0.004)	(0.003)	(0.002)	(0.003)	(0.001)	(0.042)	(0.063)	(0.051)
College degree +	-0.017 ***	0.0046	0.0072 **	-0.007 ***	0.0031	0.0044 ***	0.002	-0.0006	0.0785
	(0.003)	(0.004)	(0.003)	(0.002)	(0.003)	(0.002)	(0.064)	(0.099)	(0.078)
Inc/Pov 100-200%	-0.008 **	0.0009	0.0018	-0.001	0.0022	-0.0019	0.047	0.0323	-0.0842
	(0.003)	(0.005)	(0.003)	(0.003)	(0.004)	(0.002)	(0.046)	(0.070)	(0.055)
Inc/Pov 200-300%	-0.016 ***	0.0019	0.0071 **	-0.004	0.0010	0.0007	0.086	-0.0216	-0.0791
	(0.003)	(0.004)	(0.003)	(0.003)	(0.004)	(0.002)	(0.055)	(0.085)	(0.068)
Inc/Pov 300-400%	-0.018 ***	0.0024	0.0065 **	-0.004	0.0046	-0.0006	0.142 **	0.0739	-0.1557 **
	(0.003)	(0.004)	(0.003)	(0.003)	(0.004)	(0.002)	(0.062)	(0.097)	(0.078)
Inc/Pov 400% +	-0.024 ***	-0.0002	0.0103 ***	-0.006 **	0.0031	0.0007	0.148 **	-0.0282	-0.1843 **
	(0.003)	(0.005)	(0.003)	(0.003)	(0.004)	(0.002)	(0.066)	(0.104)	(0.082)
2nd wealth quintile	-0.003	-0.0011	0.0031	-0.001	0.0003	0.0000	0.029	0.0518	-0.0448
	(0.003)	(0.004)	(0.003)	(0.002)	(0.003)	(0.002)	(0.042)	(0.065)	(0.051)
3rd wealth quintile	-0.010 ***	0.0001	0.0066 **	-0.004 **	0.0048	0.0021	-0.008	0.1314 *	-0.0196
	(0.003)	(0.004)	(0.003)	(0.002)	(0.003)	(0.002)	(0.048)	(0.076)	(0.057)
4th wealth quintile	-0.011 ***	0.0006	0.0079 **	-0.006 ***	0.0051	0.0034 **	-0.028	0.1107	-0.0097
	(0.003)	(0.005)	(0.003)	(0.002)	(0.003)	(0.002)	(0.053)	(0.087)	(0.063)
5th wealth quintile	-0.017 ***	0.0081 *	0.0050	-0.008 ***	0.0098 ***	0.0030 *	0.041	0.1499	-0.0262
	(0.003)	(0.005)	(0.003)	(0.002)	(0.003)	(0.002)	(0.063)	(0.102)	(0.078)
N/A wealth	0.000	0.0086	-0.0022	0.002	0.0030	-0.0016	0.027	-0.0069	0.0045
	(0.004)	(0.007)	(0.004)	(0.003)	(0.005)	(0.003)	(0.060)	(0.090)	(0.073)

Table 6. Fully-Interacted Probit Regression Results using HRS - SSDI and SSI Combined (continued)

	All Applied/Eligible			All Allowed/Eligible			All Allowed/Applied		
		Period 1 interaction	Period 3 interaction		Period 1 interaction	Period 3 interaction		Period 1 interaction	Period 3 interaction
Full time work	-0.005 *	0.0045	0.0007	-0.001	0.0041	-0.0007	0.029	0.0682	-0.0427
	(0.003)	(0.005)	(0.003)	(0.002)	(0.004)	(0.002)	(0.043)	(0.072)	(0.053)
Part time work	-0.005	0.0032	-0.0011	-0.001	0.0065	-0.0017	0.031	0.0753	-0.0921
	(0.004)	(0.007)	(0.004)	(0.003)	(0.005)	(0.003)	(0.066)	(0.105)	(0.079)
Trade	0.006	0.0143 *	-0.0075	0.003	0.0118 **	-0.0037	-0.024	0.1673 *	0.0411
	(0.005)	(0.008)	(0.005)	(0.003)	(0.006)	(0.003)	(0.059)	(0.097)	(0.072)
Services	-0.002	0.0066	-0.0026	0.000	0.0073 *	-0.0027	0.009	0.1480 *	-0.0472
	(0.004)	(0.006)	(0.004)	(0.003)	(0.004)	(0.002)	(0.053)	(0.086)	(0.064)
Mining, etc.	0.003	0.0079	-0.0039	0.003	0.0008	-0.0033	0.038	-0.0374	-0.0002
	(0.004)	(0.007)	(0.005)	(0.003)	(0.005)	(0.003)	(0.061)	(0.098)	(0.076)
N/A industry	0.005	0.0125	-0.0206 ***	0.003	0.0138 *	-0.0105 **	-0.024	0.1766	-0.0963
	(0.006)	(0.010)	(0.007)	(0.005)	(0.007)	(0.005)	(0.077)	(0.127)	(0.092)
Tech/sales/admin	0.004	-0.0112 **	-0.0002	0.000	-0.0056	0.0004	-0.037	-0.0679	-0.0013
	(0.004)	(0.005)	(0.004)	(0.002)	(0.003)	(0.002)	(0.054)	(0.084)	(0.064)
Other occupation	0.010 **	-0.0087	-0.0031	0.005 *	-0.0057	-0.0024	-0.017	-0.0480	0.0101
	(0.004)	(0.006)	(0.004)	(0.003)	(0.004)	(0.002)	(0.050)	(0.078)	(0.060)
No health insurance	0.009 ***	0.0004	-0.0028	0.003	0.0004	-0.0017	-0.001	0.0423	-0.0069
	(0.003)	(0.005)	(0.003)	(0.002)	(0.004)	(0.002)	(0.039)	(0.059)	(0.046)
Work limitation	0.061 ***	0.0083	-0.0511 ***	0.025 ***	-0.0055	-0.0211 ***	-0.014	-0.0021	-0.0255
	(0.005)	(0.007)	(0.005)	(0.003)	(0.005)	(0.003)	(0.034)	(0.053)	(0.041)
State unemp rate	0.000	0.0004	0.0002	-0.001	0.0011	-0.0011			
	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)			
SSDI ben ($1000s)	-0.0047	0.0058	-0.0137 **	-0.0013	0.0045	-0.0085 *	0.0057	0.0637	-0.0330
	(0.003)	N/A	(0.007)	(0.002)	(0.003)	(0.005)	(0.044)	(0.070)	(0.063)
SSI ben ($1000s)	0.0003	0.0055	-0.0092	0.0001	0.0050	-0.0104	######	0.1132	-0.1253
	(0.005)	(0.008)	(0.007)	(0.003)	(0.006)	(0.007)	(0.068)	(0.107)	(0.099)
N	88,491			88,491			2,755		
R^2	0.196			0.179			0.159		

Note: * significant at 10%, ** significant at 5%, *** significant at 1%.

Source: Survey of Income and Program Participation Gold Standard File, 2001-2010

Table 7. Non-Linear Blinder-Oaxaca Decomposition using SIPP - SSDI and SSI

	2001-03 vs. 2004-06			2001-03 vs. 2008-10			2004-06 vs. 2008-10		
	Applied/Eligible	Allowed/Eligible	Allowed/Applied	Applied/Eligible	Allowed/Eligible	Allowed/Applied	Applied/Eligible	Allowed/Eligible	Allowed/Applied
Base Year Probability	3.350	1.428	42.620	3.350	1.428	42.620	2.919	1.184	40.563
Later Year Probability	2.919	1.184	40.563	3.662	1.818	49.649	3.662	1.818	49.649
Change in Probability	-0.431	-0.244	-2.058	0.312	0.390	7.029	0.743	0.634	9.087
Total Explained	-0.166	0.003	1.529	0.215	-0.097	3.578	0.315	-0.192	2.192
Age	0.113 ***	0.108 ***	1.308 ***	0.265 ***	0.341 ***	1.785 ***	0.109 ***	0.168 ***	0.267 **
	(0.025)	(0.030)	(0.192)	(0.038)	(0.054)	(0.256)	(0.026)	(0.042)	(0.110)
Demographics	-0.008	0.002	0.178	0.001	-0.005	0.299	-0.028 *	-0.006	-0.035
	(0.021)	(0.016)	(0.250)	(0.021)	(0.022)	(0.234)	(0.016)	(0.014)	(0.201)
Education	-0.077 ***	-0.035 **	-0.227	-0.039 *	-0.032	-0.081	0.020	-0.009	-0.090
	(0.021)	(0.015)	(0.359)	(0.020)	(0.020)	(0.345)	(0.012)	(0.011)	(0.071)
Income	-0.060 **	-0.008	0.318 **	-0.030	-0.040	0.384	0.020	-0.008	0.669 ***
	(0.025)	(0.013)	(0.137)	(0.027)	(0.026)	(0.308)	(0.022)	(0.018)	(0.211)
Wealth	-0.058 ***	-0.031 *	-0.091	-0.043 *	-0.036	-0.048	0.034 **	0.006	-0.137
	(0.022)	(0.018)	(0.172)	(0.023)	(0.024)	(0.238)	(0.017)	(0.021)	(0.120)
Job Characteristics	-0.016	-0.019	0.100	0.009	-0.015	0.426	0.019	0.017	0.998 **
	(0.022)	(0.015)	(0.341)	(0.030)	(0.026)	(0.567)	(0.013)	(0.014)	(0.449)
Work Limitation	-0.028	-0.017	0.006	-0.055 **	-0.032	0.802	-0.008	-0.041 **	0.565
	(0.024)	(0.018)	(0.088)	(0.025)	(0.020)	(0.600)	(0.023)	(0.021)	(0.592)
Other	-0.028	0.001	0.033	0.105	-0.278 **	0.077	0.149	-0.318 **	-0.047
	(0.051)	(0.035)	(0.178)	(0.158)	(0.128)	(0.283)	(0.178)	(0.152)	(0.151)
Total Unexplained	-0.265	-0.247	-3.587	0.097	0.487	3.451	0.428	0.827	6.894
Sample Size									
Base Year	19818	19818	664	19818	19818	664	37751	37751	1102
Later Year	37751	37751	1102	31128	31128	1140	31128	31128	1140

Note: "Other" includes health insurance status, state unemployment rate, and potential SSDI and SSI benefits.

Source: Survey of Income and Program Participation Gold Standard File, 2001-2010

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