The Effective Target of the Social Security Disability Benefits Reform Act of 1984

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Abstract: The Social Security Disability Insurance rolls increased substantially during the 1980s and 1990s, especially for musculoskeletal conditions and mental illness. This increase has been largely attributed to the Social Security Disability Benefits Reform Act of 1984. Using data from the National Health Interview Survey, this study characterizes whom the Act effectively targeted. The analysis shows that new enrollees with musculoskeletal conditions were healthier, taller, and more educated relative to previous enrollees with the same conditions. Exploiting changes in benefit receipt by height, the data suggest a one-for-one relationship between expanded SSDI enrollment and non labor force participation, but no precise relationship between SSDI and employment.

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I. Introduction

The Social Security Disability Insurance (SSDI) program provides cash transfers to disabled individuals who are incapable of work. In 2008, the program distributed $94.3 billion in benefits to 9.3 million disabled workers and their dependents. The program targets disabled workers by requiring applicants to satisfy a set of work history and medical eligibility criteria. The work history criteria require beneficiaries to have sufficient earnings in five of the last ten years prior to application; the medical eligibility criteria require beneficiaries to be unable to engage in a substantial gainful activity, defined by the Social Security Administration as the ability to earn more than $1,000 in 2010.

A major change to the program's medical eligibility criteria occurred in 1984 with the passing of the Social Security Disability Benefits Reform Act. The Act contained three particular changes that expanded SSDI rolls. The first change allowed claimants with multiple, non-severe disabilities to qualify for benefits; prior to the Act, a claimant must have had at least one severe medical impairment. The second change allowed pain to be a factor in determining functional capacity, though the pain must result from an identifiable medical condition. As a result, individuals with identifiable impairments causing pain, particularly musculoskeletal conditions, became newly eligible for benefits. The third change relaxed the eligibility criteria for mental illness by placing less weight on medical factors and more weight on functional factors. This change increased the likelihood of an SSDI award, particularly for mental illnesses other than "mental retardation".

The Act of 1984 had a dramatic effect on disability roll growth. Between 1984 and 2004, disability rolls more than doubled from 2.60 million to 5.87 million. According to Duggan and Imberman (2008), approximately 53 percent of the growth among males and 38 percent of the growth among females is attributable to musculoskeletal conditions and mental illness, the two conditions associated with the Act. But beyond medical conditions, little is known about new beneficiaries as a result of the Act – referred to as the Act's effective target. Did the Act expand benefits to individuals who were healthier and more educated than previous beneficiaries? Did the expansion of benefits encourage labor force exit among individuals who would otherwise work? This study attempts to address these questions.

The data come from the National Health Interview Survey (NHIS), which contains rich information on health and demographics. Due to limitations of the NHIS, SSDI receipt is determined by Medicare enrollment, and SSDI receipt by diagnostic category is determined by Medicare enrollment combined with information on work-limiting disabilities. The analysis focuses on male enrollees with musculoskeletal conditions: as shown, the percent of males in the NHIS who are enrolled in Medicare and who report a musculoskeletal condition closely approximate the actual rate of SSDI receipt computed from administrative data. I characterize enrollees along various dimensions, including the precise nature of the musculoskeletal condition, number of doctor visits, self-reported health, and the completion of a high school diploma. Enrollees are also characterized by height, which is known to be positively associated with health and socioeconomic status (Case and Paxson 2008). Height is a more objective measure of health than self-reported measures, which may be influenced by disability benefit generosity and labor force attachment.[1]

The analysis shows that, after the Act, SSDI beneficiaries for musculoskeletal conditions were healthier, taller, and more educated than beneficiaries before the Act, suggesting that the Act expanded benefits to males in better health and socioeconomic status. I explore alternative

[1] Studies on the subjectivity of self-reported health include Benitez-Silva, Buchinsky, and Rust (2004) and Bound (1991).

explanations for these changes, including cohort effects, a general expansion of the SSDI program, and compositional effects related to diagnostic conditions. I find that the increase in education can be potentially explained by cohort effects and a general expansion of the SSDI program. Moreover, the increase in height among enrollees aged 50 to 64 is not significantly different from the trend in height among the entire male population. The only objective, robust indication of improved health and socioeconomic status is the increased height among enrollees aged 30 to 49.

I then estimate the effects of disability benefits on labor supply, a well-studied but unresolved issue.[2] To estimate labor-supply effects, I exploit the fact that SSDI enrollment increased more for some categories of height relative to others. The labor-supply effects are estimated by relating relative changes in labor supply to relative changes in SSDI across height categories. Controlling for education-specific trends in labor supply, instrumental variable estimates reveal that a one percentage point increase in SSDI receipt increases non labor force participation by one percentage point. The effect is more precise when estimated among males with no high school diploma, who experienced greater increases in SSDI receipt than their more educated counterparts. In contrast to non labor force participation, no precise relationship is found between SSDI receipt and employment. Taken together, the results suggest that expanded benefits encouraged labor force exit among young males, but many who had left the labor force might have otherwise been unemployed.

An advantage of the empirical strategy relative to those used in the literature is that identification comes from differential increases in SSDI receipt over time and across height

[2] Studies that measure the labor-supply effects of disability benefits, including benefits targeted at veterans, include Leonard (1979), Parsons (1980), Bound (1989), Gruber (2000), Campolieti (2001), Campolieti (2004), and Duggan, Rosenheck, and Singleton (2010).

categories. In contrast, Parsons (1980) relies on cross-sectional variation in benefit generosity, but due to the progressive benefit formula, generosity is necessarily correlated with labor force attachment, leading one to overstate the effect of disability benefits on labor supply (Bound 1989). Moreover, I can control for education-specific trends in employment when estimating the labor-supply effects of disability benefits, trends that presumably control for skill-specific changes in labor demand.[3] Labor demand could not be controlled using the identification strategy of Bound and Waidmann (1992), who posit that if increased benefit generosity had discouraged labor force participation among individuals who would otherwise work, then disability prevalence and non labor force participation should increase in tandem.   But, as the authors note, their strategy cannot separate the effect of benefit generosity on roll growth and labor supply from the effect of labor demand.

The identification strategy also differs fundamentally from Bound (1989), who measures the potential labor supply of disability recipients by the observed labor supply of rejected disability applicants, contending that the labor supply of accepted applicants can be no greater than the labor supply of rejected applicants.[4] A potential drawback of this strategy, as von Wachter, Song, and Manchester (2010) note, is that the estimate is sensitive to the number and type of individuals who apply, particularly those who are rejected. The estimator from this study, in contrast, represents the labor-supply effect among individuals who had actually enrolled in Medicare, which is arguably more reliable for making cross-study comparisons.

Despite the methodological differences, the substantive conclusions on the labor-supply effects of disability benefits are consistent with conclusions from previous studies. Bound and

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[3] Studies show that labor demand is a factor in disability benefit demand. These studies include Black, Daniel, Sanders (2002), Rupp and Stapleton (1995), and Autor and Duggan (2003).
[4] Variations of this strategy is used in Bound, Burkhauser, and Nichols (2003), Chen and van der Klauww (2008), Maestas and Yin (2006), and von Wachter et al. (2010).

Waidmann, cited above, find that the prevalence of work-preventing disabilities increased in tandem with non labor force participation among young males, suggesting a one-for-one-relationship between benefit receipt and non labor force participation. This finding is consistent with the results presented here, particularly for young, less-educated males. This study also finds a smaller, less precise relationship between disability benefits and employment, which is consistent with consistent with Wachter, Song, and Manchester (2010). In their study, they find that only 50 to 60 percent of males aged 30 to 44 who had applied for SSDI benefit, but had been rejected, return to employment two years later.[5] If employment of rejected applicants serves as an upper bound for the employment of accepted applicants, as the authors contend, then the effect of SSDI receipt on employment is substantially less than one. In summary, the results from this study and others suggest that disability benefits discourage labor force participation among young males, but many who leave the labor force would otherwise be unemployed.

II. Data and Summary Statistics

A. Data

The data come from National Health Interview Survey (NHIS), conducted annually to track health trends in the non-institutionalized US population. To analyze the effective target of the Act of 1984, I select survey years that span before and after the reform. For the pre-reform period, I use survey years 1983 to 1986, excluding survey year 1985; for the post-reform period, I use survey years 1994 to 1996. The choice of years depends on a number of factors. First, a major redesign to the NHIS survey occurred in 1982 and 1997, precluding a direct comparison of

[5] A major difference between the employment-effect estimate of von Wachter et al. and the one presented here is that the former is measured by having any earnings over the course a year, whereas the latter is measured by whether a survey respondent reports having been employed during the past two weeks.

data across these years. Second, the survey in year 1982 does not report the medical conditions of work limited respondents, conditions that that are necessary for the empirical analysis below. Third, none of the data contain information on SSDI receipt specifically. However, the health supplement to the NHIS does report whether an individual is enrolled in Medicare, and since nearly all Medicare enrollees under the age of 65 are SSDI beneficiaries – beneficiaries become eligible for Medicare after two years of receiving SSDI benefits – I use Medicare enrollment as an indicator of SSDI receipt.[6] I must therefore exclude survey year 1985 from the analysis, which does not contain the insurance supplement. (Note that the two year lag between SSDI receipt and Medicare enrollment ensures that Medicare enrollees in the 1984 to 1986 surveys were awarded SSDI benefit in or before 1984) And finally, Duggan and Imberman (2008) show that much of the rise in SSDI enrollment for musculoskeletal and mental illness did not start until around 1990. Given this, and that Medicare enrollment lags SSDI receipt by two years, I define the post-period as years 1994 to 1996, thus excluding years 1987 to 1993 from the analysis.

Three restrictions were imposed on the remaining sample. First, individuals that do not report Medicare enrollment information – either because they are not linked to the insurance supplement or because they are linked but do not report information on Medicare – were dropped from the analysis. Second, consistent with studies in the literature, the analysis focuses on males only. And finally, the sample is restricted to individuals between the ages of 30 to 64 - individuals younger than 30 may not yet be eligible for SSDI benefits because of the work-history criteria, and individuals older than 64 are referred to Social Security's retirement program. The final sample contains 95,691 observations.

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[6] Individuals with end-stage renal disease who do not receive SSDI benefits are also eligible for Medicare benefits before the age of 65. However, most respondents who have renal disease and report being completely unable to work are SSDI beneficiaries. I therefore include individuals with renal disease on Medicare in the estimation of Medicare enrollment rates.

B. Changes in SSDI and Medicare Enrollment between 1983 and 1994

The empirical objective is to characterize the effective target of the Act of 1984 using data from the NHIS. Whether NHIS data can be used for such an objective depends on how well they approximate actual trends in SSDI receipt over time. However, stated above, the NHIS does not contain precise information on SSDI receipt, so SSDI beneficiaries are instead identified by whether they are enrolled in Medicare.

Table 1 allows for comparing rates of Medicare enrollment, estimated from the NHIS, to actual rates of SSDI receipt, calculated from administrative data. Aggregate rates of SSDI receipt, reported on the right side of the panel A, are provided for years 1986 and 1993. The numerator of the SSDI rate - the number of SSDI beneficiaries - comes from Ferron (1995) who, using administrative data from the SSA, reports the total number of SSDI beneficiaries in December of 1986 and 1993; the denominator - the estimated population of males - comes from US Census data. Aggregate rates of Medicare enrollment, reported on the left side of panel A, are estimated from pooled NHIS surveys in years 1983, 1984, and 1986 (hereafter referred to as 1983) and from pooled surveys in years 1994 through 1996 (hereafter referred to as 1994).[7] Both SSDI and Medicare rates are disaggregated into four age categories.

According to the figures, rates of Medicare enrollment are lower than the rates of SSDI receipt for both time periods and for all four age categories. In levels, Medicare rates are underestimated more at older ages; however, in relative terms - the Medicare rate as a proportion of the SSDI rate - the underestimate is consistent across ages. One factor that contributes to the underestimates is that Medicare eligibility lags SSDI eligibility by two years, so recent SSDI

[7] The NHIS samples vary considerably across years. To avoid arbitrarily overweighting smaller sample years using sample weights, I rescale the sample weights within survey year to sum to the sample size before any sample restrictions were made.

beneficiaries are not yet eligible for Medicare. In 1986, 15.4 percent of all disabled workers receiving SSDI beneficiaries were awarded benefits in that year, meaning they were SSDI beneficiaries but not yet eligible for Medicare. The respective figure in 1993 is 17.0 percent. It should be noted, however, that not all new SSDI beneficiaries will remain on the program long enough to receive Medicare: according to Hennessey and Dykacz (1993), only 68 percent of new beneficiaries remain on the program after four years.[8] Another factor for the underestimate is that, even when precise information on SSDI benefits is available, survey data tend to underestimate actual rates of SSDI receipt (Autor and Duggan 2006).

Although the estimated rates of Medicare consistently underestimate rates of SSDI, changes in Medicare closely approximate changes in SSDI from before to after the reform. Shown in the right of panel A in Table 1, the increase in SSDI between 1986 and 1993 occurred predominately among the youngest three age categories - the rate actually declined by 0.11 percentage points among the oldest age category. This pattern is evident in the NHIS data as well. The magnitudes of the changes are also comparable. For the youngest age category, the change in SSDI receipt is 0.45 percentage points, compared to an estimated change in Medicare enrollment of 0.40.

Although estimated changes in Medicare approximate well actual changes in SSDI, for the purpose of this study, it is important to determine whether changes in Medicare approximate changes in SSDI receipt for musculoskeletal conditions and mental illness, the two conditions that became more prevalent on the disability rolls because of the Act. Rates of Medicare and SSDI for musculoskeletal and mental illness are presented in panels of B and C, respectively, in Table 1. To assign Medicare enrollees to diagnostic categories, I use information in the NHIS on

[8] 22 percent die; 4 percent recover; 6 percent retire.

self-reported, work-limiting disabilities. In the survey, respondents can report as many work-limiting conditions as applicable, but must designate one condition as the main condition that limits work. It is this main, work-limiting condition that is used to assign Medicare enrollees to diagnostic categories.

For musculoskeletal conditions, rates of Medicare receipt approximate well both the level and changes in actual SSDI receipt. Both sets of figures indicate that receipt for musculoskeletal conditions is greatest for older males: in 1983, the rate of Medicare among males aged 30 to 39 is 0.16 percent, compared to 2.17 among males aged 60 to 64. The respective SSDI figures in 1986 are 0.09 and 2.21. The increase in receipt from before and after the Act is also greater among older meals: the rate of Medicare among young males aged 30 to 39 increased by 0.11 percentage points, compared to 0.83 among males aged 60 to 64. The respective SSDI figures are 0.09 and 0.63. The increase in receipt relative to 1986 levels, however, is greater among younger males: among males aged 30 to 39, the SSDI more than doubled, compared to an increase of just 29 percent (2.21 to 2.85) among males aged 60 to 64.

Rates of SSDI receipt for mental disorders, in contrast, are not well approximated by Medicare rates from the NHIS. Shown in panel C of Table 1, the NHIS consistently underestimates SSDI receipt in levels, and the underestimate is greater at older ages. Moreover, changes in Medicare do not correspond with actual changes in SSDI. One possible factor for the poor estimates is that not all Medicare enrollees in the NHIS report their work-limiting conditions. This factor cannot explain the entire disparity in the estimates, though, since the percent of the sample who report Medicare coverage but not a work-limiting condition is 0.4. Nor can the disparity be accounted for by differential exit rates following a SSDI award: according to Hennessey and Dykacz, the likelihood of remaining on SSDI four years after an award is greater for mental illness (88.2 percent) than musculoskeletal conditions (81.6 percent). The disparity may reflect greater stigma towards mental illness, leading respondents to underreport it, though this is simply a conjecture.

In summary, the figures from Table 1 suggest that, in levels, rates of Medicare enrollment tend to underestimate rates of SSDI receipt, which likely reflects that Medicare eligibility lags SSDI receipt by two years. Additionally, NHIS data approximate well rates of SSDI receipt for musculoskeletal conditions, but not mental illness. Thus, the rest of the analysis focuses on musculoskeletal conditions only.

C. SSDI Enrollment, Work-Disability Prevalence, and Labor Supply

SSDI enrollment among males rose dramatically during the 1960s and 1970s, following the program's inception in 1956 and several reforms shortly thereafter. The rise in SSDI receipt, particularly among older males, occurred in tandem with a decline in labor force participation. These coincident trends have raised the question whether disability benefits discourage labor force participation among males who would otherwise participate.

To gauge the labor supply effects of disability benefits, Bound and Waidmann (1992) consider the extent to which changes in self-reported work limitations can account for changes in non labor force participation. The logic is that if disability benefits had discouraged labor-force participation of able-bodied males, then the percent of males reporting work-preventing disabilities should rise in tandem with non labor force participation. They find that, among males aged 55 and above, the prevalence of work-limiting conditions did not change substantially during the 1970s, suggesting that the drop in labor force participation among them cannot be attributed to expanding disability rolls. In contrast, the prevalence of work-limiting conditions among males aged 45 to 54 closely approximates the decline in labor force participation among them, suggesting greater labor disincentive effects for younger males.

I extend the analysis by Bound and Waidmann by presenting similar information for the periods before and after the Act of 1984. This information, estimated from the NHIS and reported in Table 2, includes Medicare receipt (hereafter referred to as SSDI receipt) by musculoskeletal status (panel A), disability prevalence by musculoskeletal status and disability severity (panel B), and labor supply (panel C). To improve the precision of the estimates, I pool observations into two age categories: 30 to 49 and 50 to 64. Although the age categories and time periods in Table 2 do not correspond directly with those in Bound and Waidmann, the substantive conclusions are similar: work-preventing disabilities – labeled as "Unable to Work" - increased in tandem with non labor force participation among younger males – 1.48 and 1.69 percentage points, respectively - but not among older males. For older males, the prevalence of work-preventing disabilities did not change significantly, despite a 1.0 percentage point increase in non labor force participation.

Although the near one-for-one relationship between the prevalence of work-preventing disabilities and the rate of non labor force participation suggests a causal relationship between disability benefits and labor supply among younger males, it is important to note that the estimated rise in all SSDI receipt, reported in panel A of Table 2, is only a fraction of the rise in non labor force participation. This suggests that factors other than expanded disability benefits increased non labor force participation among younger males during this time period. Panel C also shows that, despite increases in labor force non participation for both age categories, the likelihood of being employed did not change significantly for either category. This suggests that those who had left the labor force during this time period - for whatever reason - would have otherwise been unemployed.

Table 2 also reports the rate of SSDI receipt for, and the prevalence of, work-limiting conditions resulting from a musculoskeletal condition. “Any” refers to respondents that report a musculoskeletal condition at all; whereas “Main” refers to respondents that report that the musculoskeletal condition is the main cause for their work limitation. As shown, the increase in SSDI receipt for musculoskeletal conditions among males aged 30 to 49 is 0.24 percentage points. This increase is smaller than the 1.13 percent of males who were unable to work because of a musculoskeletal condition and not receiving SSDI in 1983 (1.35 minus .22) and smaller than the 0.61 percentage point increase in the prevalence of work-preventing disabilities caused by musculoskeletal conditions between 1983 and 1994. Thus, it is not clear from Table 2 whether those newly enrolled for musculoskeletal conditions were disabled before the Act or newly reported a musculoskeletal condition, and potentially exited the labor force, because of the Act – the distinction made by Bound and Waidmann. I return to the potential effect of SSDI receipt on labor supply below.

III. The Effective Target Population of the Act of 1984

Despite the dramatic effect of the Act on SSDI enrollment for musculoskeletal conditions, no study systematically examines whom the Act effectively targeted. I use the rich demographic information from the NHIS to characterize the Act’s effective target. I initially assume that the characteristics of SSDI recipients for musculoskeletal conditions would have remained constant in the absence of the Act, so that changes in observable characteristics between 1983 and 1994 only reflect new enrollees as a result of the Act. The validity of this assumption is challenged once the characteristics are reported and discussed.

A. Characteristic Changes of SSDI Recipients with Musculoskeletal Conditions

Table 3 reports demographic and health characteristics of SSDI recipients who report a musculoskeletal condition as their main disability. As before, characteristics are reported for two age categories, ages 30 to 49 and ages 50 to 64, and two periods, 1983 and 1994. The table shows that several characteristics of SSDI recipients changed significantly between 1983 and 1994. First, evident for both age categories, is an increase in the percent of beneficiaries with a high school diploma – 15.5 percentage points among young males and 13.4 percentage points among older males - matched nearly one-for-one with a decrease in enrollees with a without a high school diploma. Beneficiaries with college degrees did not change significantly over time for either age category, nor did race or marital status.

The second noticeable change is a rise in the proportion of enrollees who report a musculoskeletal condition associated with the back, labeled "Dorsopathy" in Table 3. This proportion increased by 9.1 percentage points among males aged 30 to 49 and by 14.8 percentage points among males aged 50 to 64. Only the latter estimate is statistically significant. These figures support the largely anecdotal claim that much of the rise in musculoskeletal conditions after the Act of 1984 is due to conditions related to the back.

The third set of changes occurred with indicators of bad health: the proportion of individuals who had visited a doctor in the past 12 months, the number of bed days during the past 12 months, and the proportion who self-report poor health. Doctor visits and the proportion reporting poor health declined for both age categories over time, but only the declines among males aged 50 to 64 are statistically significant. These figures provide suggestive evidence that new SSDI recipients for musculoskeletal conditions are on average healthier than previous enrollees.

Finally, height in centimeters, which is positively associated with both health and socioeconomic status, increased significantly for both age categories. Between 1983 and 1994, height increased by 2.9 centimeters among younger enrollees and by 1.8 centimeters among older enrollees. Previous studies show that adult height is strongly influence by early-life nutrition and health (see Case and Paxson 2008), and that early-life nutrition and health positively impact both health and socioeconomic status in adulthood. Indeed, NHIS in this study confirm that height is positively associated with educational attainment and the ability to work. Thus, height may be a more objective indicator of health than self-reported measures.

B. Alternative Explanations for Increased Height and Educational Attainment

The increase in education and height among SSDI recipients suggests that the Act effectively targeted males in better health and socioeconomic status than previous enrollees. An alternative explanation is that the average education and height had been increasing during this time period for the entire male population. If so, the changing demographics of SSDI recipients may reflect cohort effects rather than a distinctively different population targeted by the Act.

To explore the possibility of cohort effects, I estimate the change in education and height among SSDI recipients relative to the entire male population. Estimates of the relative changes are presented using a difference-in-differences framework in Table 4. The top panel reports height estimates; the bottom panel reports education estimates. Both estimates are presented by age, year, and SSDI receipt status. In Table 4, SSDI refers to beneficiaries who report a musculoskeletal condition as their main work-limiting condition.

As shown in the left side of the top panel, height among SSDI recipients with musculoskeletal conditions aged 30 to 49 increased by 2.9 centimeters, compared to no change in height among the entire male population. These figures amount to a relative change in height of 2.9 centimeters, which is statistically significant at the 5 percent level. Shown in the right side of the top panel, height among SSDI recipients aged 50 to 64 increased by 1.8 centimeters, compared to a 0.49 centimeters among the entire male population. These figures amount to a relative change in height of 1.3 centimeters, though the estimate is not statistically significant. Thus, the increase in height among SSDI recipients, particularly younger males, cannot be attributed to cohort effects.

Nor can cohort effects account for the relative increase in education among young SSDI recipients with musculoskeletal conditions. According to the bottom panel of Table 4, the percent of SSDI recipients with a high school diploma increased by 15.9 percentage points, compared to just 3.7 percentage points among the entire male population. These figures amount to a relative increase of 12.3 percentage points, though the estimate is not statistically significant. In contrast, the increase in education among older SSDI recipients corresponds with a near-identical increase in education among the entire population, so cohort effects cannot be ruled out for this group.

Another possible explanation for the increase in height and education among young SSDI recipients - other than the Act itself - is that SSDI receipt for all conditions, not just musculoskeletal conditions, was expanding to include individuals in better health and socioeconomic status. This is a legitimate concern considering the historical context in which the Act was implemented. Shortly after the program was implemented, in 1956, the disability rolls grew dramatically, with program expenditures outstripping revenues in 1977 by 25 percent

(Duggan and Autor 2006). Concern for such rapid growth was followed by a clampdown of the program between 1980 and 1983. During the clampdown, SSDI awards declined, and some benefits in current payment status were terminated. Subsequent backlash against the clampdown led to several administrative and legislative changes to the SSDI program, including the Act of 1984, which made it easier to qualify for SSDI benefits. Thus, the observed rise in education and height among enrollees for musculoskeletal might not have resulted from the Act itself, but a systemic expansion of the SSDI program.

If the increase in height and education reflects a systemic expansion of disability rolls, then the height and education should have increased for all SSDI beneficiaries, not just those with musculoskeletal conditions. To examine the validity of this alternative explanation, I estimate the change in height and educational attainment of SSDI beneficiaries for main disabilities other than musculoskeletal conditions. These estimates are reported in Table 5. Shown in the top panel, for both age categories, there is no relative change in height among SSDI recipients relative to the entire male population. However, shown in the bottom panel of Table 5, the educational attainment of young SSDI beneficiaries had increased relative to the general population. Thus, a general expansion of the SSDI program cannot be ruled out in explaining the increase in education among young beneficiaries with musculoskeletal conditions.

Only the increase in height among young beneficiaries with musculoskeletal conditions cannot be explained by cohort effects or a general expansion of the program. Another alternative explanation for the increased height is that individuals who suffer from back-related conditions are generally taller than individuals who suffer from other musculoskeletal conditions. If so, the increase in height may simply reflect a compositional change of SSDI recipients by diagnostic conditions. However, NHIS data reveal no average height difference between those who are unable to work because of a back-related condition (176.3 centimeters) and those who are unable to work because of musculoskeletal condition not related to the back (176.9 centimeters).

In summary, the NHIS data reveal that young SSDI recipients targeted by the Act of 1984 for musculoskeletal condition were taller than previous enrollees, and the height increase cannot be explained by cohort effects, a general expansion of the SSDI program, or compositional effects related to diagnostic conditions only. But since the post-reform height in Table 3 reflects beneficiaries targeted by the Act as well as enrollees who would have been enrolled in the absence of the Act, it is not directly evident how much taller the latter are relative to the former. To make this height comparison, I simulate the height of new SSDI beneficiaries as a result of the Act, taking into account the upward trend in height among the entire male population. The simulation comes from the following linear regression:

$$H_t = \alpha_0 + \alpha_1 P_t + \alpha_2 M + \alpha_3 P_t * M + \varepsilon_{it},$$

where H_t is height, P_t is a period indicator for years 1994, and M is an indicator of SSDI receipt for a musculoskeletal condition (individual subscripts are suppressed). The equation is estimated from the full sample of males, so α_1 reflects the national change in height from the pre- and post-reform periods, and α_3 reflects the differential change in height among SSDI recipients. The estimated height of SSDI recipients in the absence of the Act is given by:

$$\hat{\alpha}_0 + \hat{\alpha}_1 + \hat{\alpha}_2.$$

And the simulated height of new SSDI recipients as a result of the Act is given by:

$$\frac{(\hat{\alpha}_0 + \hat{\alpha}_1 + \hat{\alpha}_2 + \hat{\alpha}_3) - S_p(\hat{\alpha}_0 + \hat{\alpha}_1 + \hat{\alpha}_2)}{S_{\boldsymbol{n}}},$$

where the terms S_p and S_n represent the share of previous and new enrollees among all SSDI recipients in 1993. These shares are implied by the prevalence estimates reported in the top row of Table 3 and are assumed nonrandom.[9]

Table 6 reports the predicted heights of counterfactual recipients and of new recipients as a result of the Act. As shown, new recipients aged 30 to 49 were 5.6 centimeters taller than counterfactual recipients, which is statistically significant (F-stat: 6.4). New recipients aged 50 to 64 were 5.0 centimeters taller, though the estimate is marginally insignificant at the five percent level (F-stat: 3.8).

IV. Measuring the Effect of SSDI Receipt on Labor Supply

The above analysis shows that the Act targeted males who were significantly taller than previous SSDI recipients, particularly among the young. If the Act is known to have targeted a particular range of heights, then under certain identifying assumptions, the effects of expanded SSDI receipt benefits on the labor supply can be estimated. This can be accomplished by first defining two height ranges: one that exhibits a large change in SSDI receipt and another that does not. Once defined, the relative change in labor supply can be attributed to the relative change in SSDI receipt, assuming that, in the absence of the Act, the relative change in labor supply between the two groups would have been zero. This identification strategy is pursued in this section.

A. SSDI Receipt and Labor Supply by Height

I first determine whether certain ranges of height exhibit substantial increases in SSDI receipt relative to others. To do so, I estimate and plot rates of SSDI receipt in 1983 and 1994

[9] The nonrandom assumption seems reasonable since the estimated rates of Medicare receipt for musculoskeletal conditions closely approximate the rates of SSDI receipt.

across seven height categories. The height categories span 162 centimeters to 195 centimeters, which excludes 6.5 percent of the weighted sample. SSDI rates for males aged 30 to 49 are plotted in panel A of Figure 1; Rates for males aged 50 to 64 are plotted in panel A of Figure 2. For young males, rate estimates and standard errors are also presented in the top rows of Table 7. For both age categories, the data indicate that SSDI receipt generally decreases with height, with a slight increase from the sixth to seventh category.

For young males, the data show that rates of SSDI receipt from 1983 to 1994 increased the most among males between 172 and 190 centimeters tall. This is evident in panel A of Figure 1 as well as the rate estimates reported in Table 7. According to the table, rates of SSDI receipt increased along this height range by a statistically significant 0.6 to 0.8 percentage points. The increase along this height range is responsible for the increase in average height among all SSDI recipients with musculoskeletal conditions, whose average height in 1983 was just 174.3 centimeters (Table 3). In contrast, rates of SSDI receipt did not change significantly among males just above and below this height range, between 162 and 170 centimeters tall and between 193 and 195 centimeters tall.

If the expansion of SSDI benefits had discouraged labor supply among males who would otherwise work, then labor supply should have declined among males who belong to the targeted height range relative to males who do not. Rates of non labor force participation and employment for the same seven height categories are plotted in panels B and C. Employment is measured by whether an individual reports having been employed during the past two weeks. The panels show that labor supply generally decreases with height. Panel B illustrates that, between 1983 and 1994, non labor force participation increased among all height categories, but there is no differential increase in non labor force participation among the targeted height range.

If anything, the increase in non labor force participation generally decreases with height: among males between 162 and 165 centimeters tall, non labor force participation increased by 2.26 percentage points, compared to an increase of 0.98 percentage points among males between 193 and 195 centimeters tall. No graphical relationship exists either between changes in SSDI receipt and changes in employment: according to panel C of Figure 1, employment did not change substantially for any height category.

SSDI rates for older males are illustrated panel A of Figure 2. As shown, there is no consistent relationship between changes in SSDI and height, so the proposed identification strategy is untenable for older males. It is important to note, nonetheless, that no consistent relationship exists between changes in non labor force participation and employment by height, shown in panels B and C, respectively.

B. First-Stage, Reduced-Form, and Instrumental Variable Estimates

The three panels of Figure 1 indicate that, among young males, no graphical relationship exists between expanded SSDI receipt and changes in labor supply: the increase in non labor force participation was nearly constant across height categories, despite a measurable increase in SSDI receipt along a specific height range. However, it would premature to conclude from these figures that SSDI receipt has no effect on labor supply. A particular concern is that the expansion in SSDI had indeed decreased labor supply along the targeted range, but factors other than SSDI had decreased labor supply for the non-targeted range. The concern for other factors influencing labor supply is particularly valid during the period of the analysis, when declining real wages had increased non labor force participation and decreased employment among low skilled workers (Juhn 1992; Juhn, Murphy, and Topel 1991). These labor-demand changes may have decreased labor supply differentially for the non-targeted range relative to the targeted range: shown in Table 7, males in the non-targeted range between 162 and 170 centimeters tall are less educated, less likely to be white, and less likely to have ever been married compared to males in the targeted range. If these labor demand changes differentially decreased labor supply for the non-targeted range, and benefits had causally decreased labor supply for the targeted group, then there may be no observable difference in labor supply between the two groups – the case of Figure 1.

I use a regression framework to address the concern for changes in labor-demand. The linear probability model of labor supply is given by the following equation:

$$Y = \beta_0 + \beta_1 M + \beta_2 P + \beta_3 X + f(H) + \mu.$$

In this equation, Y is an indicator of non labor force participation or employment, M is an indicator of SSDI receipt, P is an indicator of the post-reform period 1994, X is a vector of individual characteristics, and $f(H)$ is a set of six height-category fixed effects and their respective coefficients (individual subscripts are suppressed). The term μ is the error.

The equation is estimated using pooled data from both pre- and post-reform periods. Of course, SSDI receipt is endogeneous and very likely correlated with factors that independently affect labor supply. To address this issue, I exploit the fact that the expansion in SSDI occurred along a particular height range. I therefore instrument SSDI receipt with the factored term TP, where P is an indicator of the post-reform period 1994 and T is an indicator of belonging to the targeted height range. The values of T are defined in the top rows of Table 7. The effect of SSDI receipt on enrollment, measured by β_1, is thus identified only by the expansion of SSDI receipt between the two time periods along the targeted height range.

The vector of variables X controls for factors that independently affect labor supply. The vector contains educational attainment (dummy variables for less than a high school diploma and a college degree – the left out group is a high school diploma), race (dummy variable for white – the left out group is non-white), marital status (dummy variable for having ever been married – the left out group is being single), age (linearly), and region fixed effects (Northeast, Midwest, South, and West). The specification also includes interactions between the post-period fixed effect and the education fixed effects, which control for skill-specific trends in labor demand between the two time periods, the concern highlighted above. The effects of the control variables are identified from males in both the targeted and non-targeted height ranges.

The first-stage, reduced-form, and instrumental variable estimates for the full sample are presented in the first three columns of Table 8. The first column reports the first-stage estimates of the likelihood of SSDI receipt; the second and third columns report the reduced-form estimates of the likelihood of non labor force participation and employment, respectively. As shown, belonging to the targeted height range post-reform is associated with a 0.67 percentage point increase in the likelihood of enrollment. The estimate is statistically significant at the five percent level. The second and third columns show that the targeted height range is also associated with an increase in non labor force participation (0.72 percentage points) and decline in employment (-0.23 percentage points); however, neither estimate for the labor supply measures is statistically significant.

The instrumental variable estimates are presented in a separate row in Table 8. As indicated, the first-stage and reduced-form estimates imply that a one percentage point increase in SSDI receipt increases non labor force participation by 1.08 percentage points and decreases employment by 0.35 percentage points. These labor-supply effects are considerably larger than those implied by the collective panels of Figure 1, which again do not show a differential decrease in labor supply along the targeted height range. To determine whether skill-specific trends in labor demand account for the difference in results, as suggested above, I re-estimate the instrumental variable estimates without the interactions between educational attainment and time. The resulting estimates validate the concern that education-specific trends in labor supply indeed mask differential changes to employment due to the expansion of SSDI in Figure 1: without education-specific trends, the estimated effect of SSDI on labor force participation and employment are 0.30 (standard error: 0.93) and 0.03 (standard error: 1.23), respectively.

I next determine whether the labor-supply effects vary by educational attainment. The sample is first restricted to males with no college degree. The first-stage, reduced-form, and instrumental variable estimates from this restricted sample are reported in the second panel of Table 8. As shown, all estimates in the second panel are similar to those in the first, suggesting a nearly one-for-one relationship between SSDI receipt and non labor force participation, but a less direct relationship between SSDI and employment. Neither instrumental variable estimate is statistically significant, however.

The third panel of Table 8 reports estimates when the sample is restricted to males with no high school diploma. As shown, the effect of belonging to the targeted height range is associated with a 1.99 percentage point increase in the likelihood of SSDI receipt - the estimate is greater than 0.67 percentage points estimated from the full sample. The targeted height range among the restricted sample is also associated with greater declines in labor supply: the likelihood of non labor force participation increased by 2.95 percentage points, and the likelihood of employment declined by 1.06 percentage points. The instrumental variable estimates for non labor force participation implies that a one percentage point increase in SSDI receipt decreases non labor force participation by 1.48 percentage points. This estimate is statistically significant at the ten percent level. As before, the estimated effect on employment is smaller in magnitude and statistically insignificant.

V. Discussion and Conclusion

This study characterizes the effective target of Social Security Disability Benefits Reform Act, which is responsible for a significant proportion of disability roll growth since 1984. The study concludes that males who had entered the disability rolls for musculoskeletal conditions because of the Act were in better health and socioeconomic status than previous enrollees for the same condition. Additionally, the expansion in benefits during this period is associated with labor force exit - particularly among young, less-educated males - but no precise relationship exists between benefit receipt and employment.

An important limitation of the study is that it does not characterize the Act's effective target with mental illnesses, one of the two medical conditions associated with the reform. The limitation is due to the fact that NHIS data underestimate the rate of SSDI receipt for this condition. The underestimate may reflect social stigma associated with mental illness, proxy-respondents for the mentally ill who misreport or underreport work-limiting disabilities, or individuals with mental illness that are institutionalized. More research is needed to determine the extent to which these and other factors lead to underestimated rates of SSDI receipt for mental illness in survey data.

Another limitation of the study is that SSDI receipt is determined by enrollment in Medicare, which occurs only two years after an SSDI award is made. This would be major concern for studies that examine the entire SSDI population, since 22 percent of SSDI beneficiaries are deceased after four years of an SSDI award (Hennessey and Dykacz 1993).

However, the focus of this study is young males with musculoskeletal conditions, who exhibit substantially lower mortality rates than the general SSDI population. According to Hennessey and Dykacz, only 18 percent of SSDI recipients with musculoskeletal conditions exit the program within four years of an SSDI award, and half of those who exit do so because they reach the normal retirement age and are subsequently transferred to Social Security's retirement program. Thus, in some cases, NHIS data may be a useful source of information for future research on disability insurance programs.

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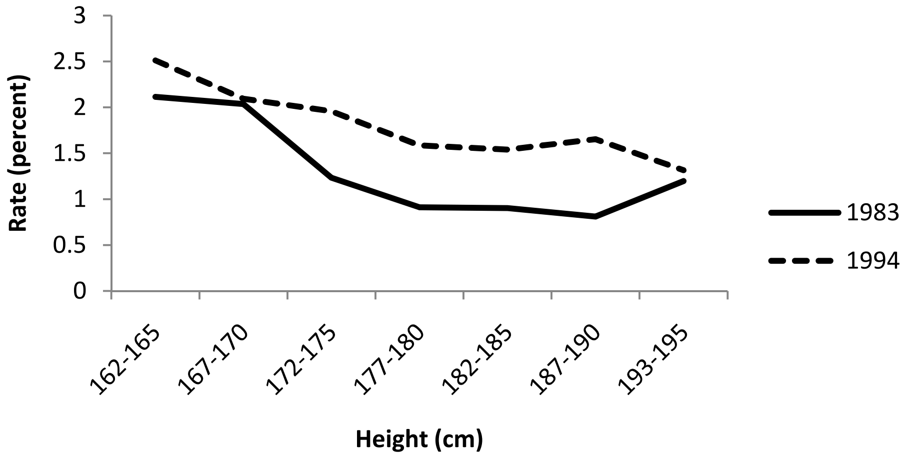

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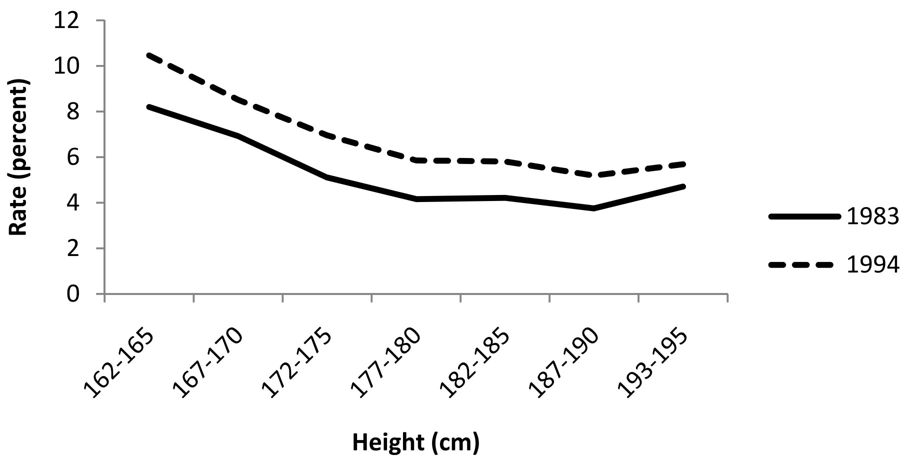
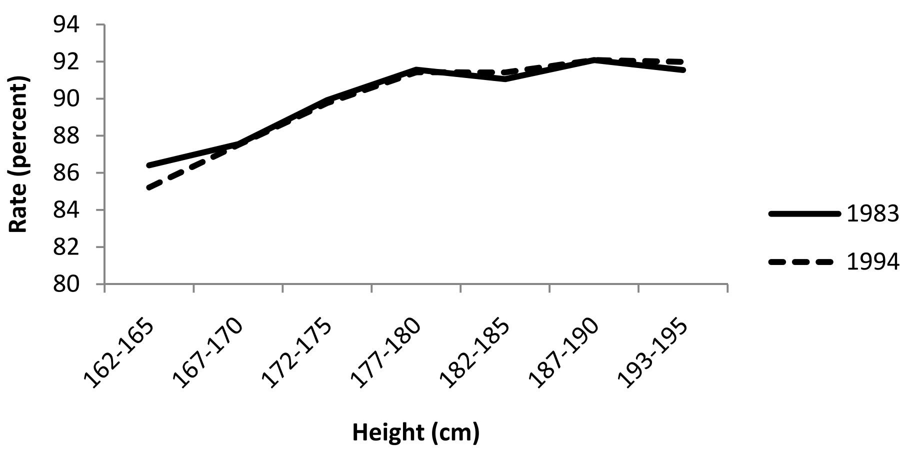
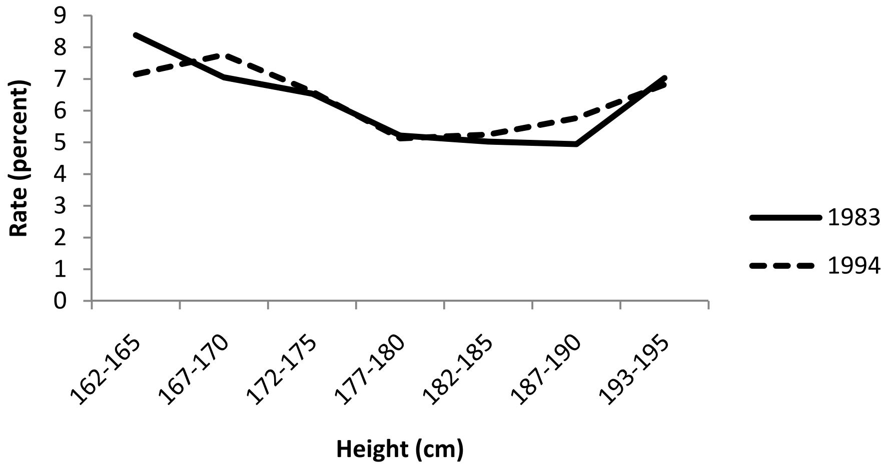


B. Non Labor Force Participation

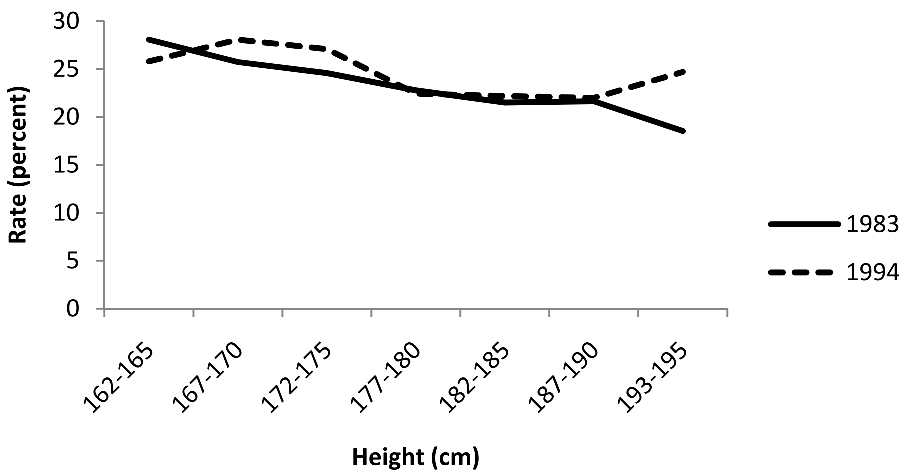


C. Employment

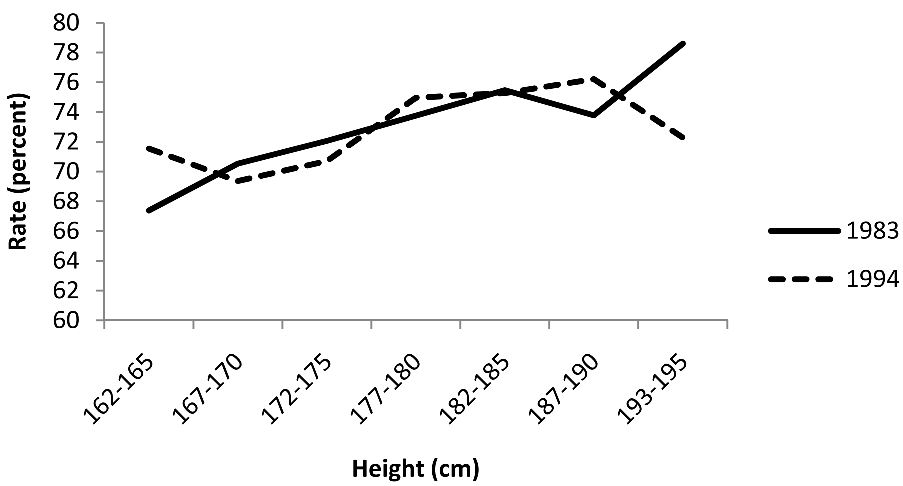
Figure 1: SSDI Receipt and Labor Supply of Males Ages 30 to 49



A. SSDI Receipt



B. Non Labor Force Participation



C. Employment

Figure 2: SSDI Receipt and Labor Supply of Males Ages 50 to 64

Table 1

Rate of SSDI and Medicare Rates among Males by Year, Age, and Diagnostic Category

	Medicare			SSDI		
	1983	1994	Change	1986	1993	Change
A. All						
Age						
30-39	1.02	1.42	0.40	1.27	1.72	0.45
40-49	1.74	2.36	0.62	2.30	3.15	0.84
50-59	4.16	4.58	0.42	5.73	6.48	0.75
60-64	9.99	10.10	0.11	11.73	11.62	-0.11
B. Musculoskeletal						
Age						
30-39	0.16	0.27	0.11	0.09	0.19	0.09
40-49	0.32	0.70	0.38	0.34	0.49	0.15
50-59	0.87	1.31	0.44	0.95	1.53	0.58
60-64	2.17	3.00	0.83	2.21	2.85	0.63
C. Mental Illness/Disorder						
Age						
30-39	0.25	0.41	0.16	0.45	0.66	0.20
40-49	0.28	0.41	0.13	0.56	1.02	0.47
50-59	0.30	0.26	-0.04	0.81	1.11	0.30
60-64	0.25	0.27	0.02	1.11	1.30	0.20

Note: Rates of SSDI are the author's tabulations using enrollment figures from Ferron (1995) and US Census data. The numerator for SSDI receipt rate corresponds to December of the figure year; the denominator is based on the US civilian population in January in the year following the figure year. Rates of Medicare are estimated from the National Health Interview Survey. Year 1983 refers to survey years 1983, 1984, and 1986, and year 1994 refers to survey years 1994 through 1996. Respondents' reported main disability is used to estimate Medicare rates by diagnostic category. Sampling weights, rescaled to sum within sample year to equal the sample size, are used.

Table 2

Changes in Medicare, Disability Prevalence, and Labor Supply among Males by Age

	Ages 30 to 49			Ages 50 to 64		
	1983	1994	Change	1983	1994	Change
A. SSDI Receipt						
All	1.31	1.86	0.54	6.06	6.15	0.09
	(0.07)	(0.07)	(0.10)	(0.20)	(0.19)	(0.27)
Musculoskeletal - Any	0.33	0.61	0.28	2.18	2.52	0.35
	(0.03)	(0.04)	(0.05)	(0.12)	(0.12)	(0.17)
Musculoskeletal - Main Cause	0.22	0.47	0.24	1.30	1.79	0.50
	(0.03)	(0.04)	(0.05)	(0.09)	(0.10)	(0.14)
B. Disability Prevalence						
Limited in Work	8.46	9.57	1.11	21.03	19.58	-1.44
	(0.17)	(0.15)	(0.23)	(0.34)	(0.31)	(0.46)
Unable to Work	3.57	5.05	1.48	12.81	12.72	-0.09
	(0.11)	(0.11)	(0.16)	(0.28)	(0.26)	(0.38)
Any Musculoskeletal	4.54	5.08	0.54	9.23	9.47	0.24
	(0.13)	(0.11)	(0.17)	(0.24)	(0.23)	(0.33)
Main Musculoskeletal	4.08	4.55	0.47	6.86	7.40	0.54
	(0.12)	(0.11)	(0.16)	(0.21)	(0.21)	(0.29)
Unable to Work -	1.64	2.34	0.71	5.56	6.09	0.53
Any Musculoskeletal	(0.08)	(0.08)	(0.11)	(0.19)	(0.19)	(0.27)
Unable to Work	1.35	1.97	0.61	3.73	4.45	0.72
Main Musculosketal	(0.07)	(0.07)	(0.10)	(0.16)	(0.16)	(0.23)
C. Labor Supply						
Non Labor-Force Participation	5.12	6.81	1.69	23.71	24.71	1.00
	(0.13)	(0.13)	(0.19)	(0.35)	(0.34)	(0.49)
Not Employed	9.85	9.89	0.04	27.24	27.13	-0.11
	(0.18)	(0.15)	(0.24)	(0.37)	(0.35)	(0.51)

Note: All figures are estimated from the National Health Interview Survey. Year 1983 refers to survey years 1983, 1984, and 1986, and year 1994 refers to survey years 1994 through 1996. The respondents' reported disabilities are used to estimate Medicare and disability rates by diagnostic category. Sampling weights, rescaled to sum within sample year to equal the sample size, are used. Standard errors are in parentheses.

Table 3

Characteristics of SSDI Recipients with "Main Musculoskeletal" by Age and Year

	Ages 30 to 49			Ages 50 to 64		
	1983	1994	Change	1983	1994	Change
Percent of Population	0.22	0.47	0.25	1.30	1.79	0.49
Less Than High School	53.3	37.3	-15.9	64.1	53.6	-10.5
	(6.5)	(3.6)	(7.4)*	(3.5)	(2.9)	(4.6)*
High School Diploma	41.1	56.5	15.5	29.3	42.8	13.4
	(6.4)	(3.7)	(7.4)*	(3.3)	(2.9)	(4.4)*
College Degree	5.6	6.1	0.5	6.6	3.6	-3.0
	(3.0)	(1.8)	(3.5)	(1.8)	(1.1)	(2.1)
White	78.6	76.6	-1.99	80.8	83.5	2.72
	(5.3)	(3.2)	(6.2)	(2.9)	(2.1)	(3.6)
Ever Married	90.0	86.1	-4.0	93.2	95.6	2.4
	(3.9)	(2.6)	(4.7)	(1.8)	(1.2)	(2.2)
Dorsopathy	51.7	60.7	9.1	38.9	53.6	14.8
	(6.5)	(3.7)	(7.5)	(3.6)	(2.9)	(4.6)*
Doctor Past 6 Months	67.1	61.0	-6.1	67.2	58.4	-8.8
	(6.1)	(3.7)	(7.1)	(3.5)	(2.9)	(4.5)*
Bed Days Past 12 Months	30.7	26.9	-3.8	29.0	29.4	0.35
	(1.6)	(1.1)	(2.0)	(1.0)	(0.79)	(1.3)
Poor Health	46.9	39.5	-7.4	50.4	39.6	-10.8
	(6.5)	(3.7)	(7.5)	(3.7)	(2.8)	(4.6)*
Height (centimeters)	174.3	177.3	2.9	175.2	177.0	1.8
	(0.96)	(0.80)	(1.2)*	(0.62)	(0.50)	(0.80)*
Observations	60	186	-	179	300	-

Note: All figures are calculated using the National Health Interview Survey. Year 1983 refers to survey years 1983, 1984, and 1986, and year 1994 refers to survey years 1994 through 1996. Height estimates excludes some observations that do not report this value. The increase in dorsopathy corresponds with declines in acquired deformities of the limbs and the "residual" category. Sampling weights, rescaled to sum within sample year to equal the sample size, are used. Standard errors are in parentheses. * Indicates statistical significance at the 5 percent level, reported only for the change estimates. The percent employed and the average number of health conditions did not change significantly (not shown).

Table 4
Relative Change in Height and Education among SSDI Recipients with "Main Musculoskeletal"

	Height					
	Age 30 to 49			Age 50 to 64		
	1983	1994	Difference	1983	1994	Difference
SSDI	174.3	177.3	2.9	175.2	177.0	1.8
	(0.96)	(0.80)	(1.2)	(0.62)	(0.50)	(0.80)
All	178.0	178.0	0.0	176.9	177.4	0.49
	(0.05)	(0.04)	(0.06)	(0.06)	(0.06)	(0.08)
Diff-in-Diffs		2.9			1.3	
		(1.3)*			(0.8)	

	Education					
	Age 30 to 49			Age 50 to 64		
	1983	1994	Difference	1983	1994	Difference
SSDI	46.7	62.7	15.9	35.9	46.4	10.5
	(6.5)	(3.6)	(7.4)	(3.5)	(2.9)	(4.6)
All	83.7	87.4	3.7	67.7	79.0	11.3
	(0.22)	(0.17)	(0.28)	(0.39)	(0.32)	(0.50)
Diff-in-Diffs		12.3			-0.8	
		(7.4)			(4.6)	

Note: All figures are calculated using the National Health Interview Survey. Year 1983 refers to survey years 1983, 1984, and 1986, and year 1994 refers to survey years 1994 through 1996. Sampling weights, rescaled to sum within sample year to equal the sample size, are used. Standard errors are in parentheses. * Indicates statistical significance at the 5 percent level, reported only for the difference-in-differences estimates.

Table 5

Relative Change in Height and Education among SSDI Recipients with "Main Other"

	Height					
	Age 30 to 49			Age 50 to 64		
	1983	1994	Difference	1983	1994	Difference
SSDI	175.9	176.0	0.10	176.1	175.7	-0.34
	(0.75)	(0.56)	(0.93)	(0.38)	(0.35)	(0.52)
All	178.0	178.0	0.00	176.9	177.4	0.49
	(0.05)	(0.04)	(0.06)	(0.06)	(0.06)	(0.08)
Diff-in-Diffs		0.10			-0.83	
		(0.93)			(0.52)	

	Education					
	Age 30 to 49			Age 50 to 64		
	1983	1994	Difference	1983	1994	Difference
SSDI	51.2	66.2	15.0	41.3	53.3	12.0
	(4.0)	(2.9)	(5.0)	(2.4)	(2.4)	(3.4)
All	83.7	87.4	3.7	67.7	79.0	11.3
	(0.22)	(0.17)	(0.28)	(0.39)	(0.32)	(0.50)
Diff-in-Diffs		11.3			0.72	
		(5.0)*			(3.4)	

Note: All figures are calculated using the National Health Interview Survey. Year 1983 refers to survey years 1983, 1984, and 1986, and year 1994 refers to survey years 1994 through 1996. The "Main Other" sample excludes those with mental illness as the main cause and those with any musculoskeletal condition. Sampling weights, rescaled to sum within sample year to equal the sample size, are used. Standard errors are in parentheses. * Indicates statistical significance at the 5 percent level, reported only for the difference-in-differences estimates.

Table 6

Height among Males with "Main" Musculoskeletal in 1994

	Counterfactual SSDI Recipients	Simulated New SSDI Recipients	Difference
Age 30 to 49	174.3	179.9	5.6
	(0.58)	(1.4)	[6.4]*
Age 50 to 64	175.6	180.7	5.0
	(0.44)	(2.2)	[3.8]

Note: All figures are calculated using the National Health Interview Survey. Year 1992 refers to survey years 1994 through 1996. Sampling weights, rescaled to sum within sample year to equal the sample size, are used. Standard errors are in parentheses; F-statistics are in brackets. * Indicates statistical significance at the 5 percent level, reported only for the difference estimates.

Table 7

SSDI Receipt and Demographics by Height Category among Males Aged 30 to 49

Height	162-165	167-170	172-175	177-180	182-185	187-190	193-195
Treatment Range	No	No	Yes	Yes	Yes	Yes	No
SSDI - 1983	2.12	2.04	1.23	0.91	0.90	0.81	1.20
	(0.42)	(0.24)	(0.15)	(0.11)	(0.12)	(0.19)	(0.44)
SSDI - 1994	2.51	2.09	1.96	1.58	1.54	1.65	1.32
	(0.35)	(0.20)	(0.16)	(0.13)	(0.14)	(0.22)	(0.38)
Change	0.4	0.1	0.7	0.7	0.6	0.8	0.1
	(0.55)	(0.31)	(0.22)*	(0.17)*	(0.18)*	(0.29)*	(0.58)
Less than High School	31.8	21.6	14.9	10.5	10.3	8.9	6.3
	(0.83)	(0.44)	(0.31)	(0.24)	(0.26)	(0.37)	(0.62)
High School Diploma	48.9	55.3	57.6	58.2	57.4	56.6	59.3
	(0.89)	(0.53)	(0.43)	(0.39)	(0.42)	(0.65)	(1.3)
College Degree	19.4	23.1	27.5	31.3	32.4	34.5	34.4
	(0.71)	(0.45)	(0.39)	(0.36)	(0.39)	(0.63)	(1.2)
White	65.3	75.1	82.5	88.0	88.3	86.4	85.5
	(0.85)	(0.46)	(0.33)	(0.26)	(0.27)	(0.45)	(0.90)
Ever Married	85.5	86.6	88.4	88.6	89.1	88.9	89.0
	(0.63)	(0.37)	(0.28)	(0.25)	(0.26)	(0.41)	(0.80)
Observations	3138	8706	13326	16193	14078	5777	1530

Note: All figures are estimated from the National Health Interview Survey. Year 1983 refers to survey years 1983, 1984, and 1986, and year 1994 refers to survey years 1994 through 1996. Sampling weights, rescaled to sum within sample year to equal the sample size, are used. Standard errors are in parentheses. * indicates statistical significance at the 5 percent level, reported only for the change in Medicare receipt rates.

Table 8

Reduced-Form, First-Stage, and Instrumental Variable Estimates of SSDI, Non Labor-Force Participation, and Employment

	Full Sample			No College Degree			No High School Diploma		
	SSDI	NLFP	Employed	SSDI	NLFP	Employed	SSDI	NLFP	Employed
Target Range*Post	0.67	0.72	-0.23	0.79	0.98	-0.52	1.99	2.95	-1.06
	(0.28)**	(0.53)	(0.66)	(0.36)**	(0.66)	(0.82)	(0.96)**	(1.6)*	(1.9)
Post	0.07	0.44	0.66	-0.09	0.06	1.04	-0.25	2.75	0.03
	(0.27)	(0.51)	(0.64)	(0.33)	(0.61)	(0.76)	(0.79)	(1.3)**	(1.5)
Less Than High School	2.3	5.9	-10.3	2.2	5.7	-10.2	-	-	-
	(0.30)**	(0.53)**	(0.68)**	(0.30)**	(0.53)**	(0.69)**	-	-	-
College Degree	-0.54	-2.29	4.69	-	-	-	-	-	-
	(0.11)**	(0.24)**	(0.34)**	-	-	-	-	-	-
White	-0.20	-4.6	6.3	-0.17	-5.0	6.8	0.23	-6.4	7.9
	(0.16)	(0.34)**	(0.41)**	(0.21)	(0.42)**	(0.50)**	(0.56)	(1.0)**	(1.2)**
Ever Married	-3.6	-9.7	12.0	-4.6	-12.2	14.6	-9.8	-25.7	28.2
	(0.26)**	(0.43)**	(0.50)**	(0.36)**	(0.58)**	(0.65)**	(1.1)**	(1.7)**	(1.7)**
Age	0.12	0.24	-0.18	0.15	0.32	-0.22	0.34	0.51	-0.21
	(0.01)**	(0.02)**	(0.02)**	(0.01)**	(0.02)**	(0.03)**	(0.04)**	(0.07)**	(0.08)**
IV Estimates		1.08	-0.35		1.24	-0.65		1.48	-0.53
		(0.73)	(0.95)		(0.78)	(0.98)		(0.82)*	(0.90)
Observations	62748	62748	62748	44687	44687	44687	9093	9093	9093
R-squared	0.02	0.05	0.06	0.02	0.05	0.05	0.03	0.08	0.06

Note: All figures are estimated from the National Health Interview Survey. Variables in the regression equation that are not shown in the table consist of six height category fixed effects, four region fixed effects, and the interactions of the post-period fixed effect with the two education fixed effects. Sampling weights, rescaled to sum within sample year to equal the sample size, are used. Standard errors are in parentheses. ** indicates statistical significance at the 5 percent level; * indicates statistical significance at the 10 percent level.