

**Changes in the Economic Outcomes of Allowed and Denied
Applicants to Social Security Disability Insurance from 1978 to 2004:
An Analysis using Longitudinal Administrative Records**

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Abstract

Recent research suggests an increasing role of economic conditions in inducing less-advantaged workers to apply for and receive Social Security Disability Insurance (DI). Yet little is known about the actual evolution of the economic status of workers in the DI program. To help isolate the role of economic fluctuations in inducing workers to apply for DI, we use longitudinal administrative data on individual earnings and details of disability applications to analyze how employment and earnings among allowed and denied applicants before and after application to DI have changed over time. We find that employment and earnings of denied workers are substantial after application, and that this difference is remarkably stable over time. These preliminary findings suggest that there is an important fraction of workers applying to DI because of adverse economic conditions, but that a substantial proportion is screened out during the application process. However, changes over time in economic background of applicants are mainly driven by an increase in application rates of workers that have permanently low earnings, not stable workers affected by worsening economic fortunes.

I. Introduction

Since the late 1970s, the Social Security Disability Insurance (DI) program has experienced large fluctuations and important increases in the number of applicants and new entrants. A growing literature has related these developments to changes in the DI program and the economic environment. The results suggest new beneficiaries have become increasingly younger, more likely to be disabled by musculoskeletal conditions and mental health impairments, and increasingly more likely to be induced to apply to DI in the course of a recession. Although these results imply potentially important changes in the economic background of applicants, new entrants, or denied applicants, less is known about the evolution of income and employment of workers entering or passing through the DI program. Yet, such information has important implications for understanding whether workers are induced to apply for DI due to economic difficulties, how this affects efforts to reintegrate beneficiaries into the labor force, and whether the screening process for DI is able to identify induced but ineligible applicants.

In this paper we use a unique longitudinal administrative data set to analyze the evolution of earnings and employment of applicants, new beneficiaries, and denied applicants since the late 1970s. First, we analyze whether DI attracts workers with permanently lower earnings potential, and whether this pattern has strengthened over time. To do so, we study year-to-year fluctuations in long-term average earnings of applicants and compare differences in permanent earnings of denied and allowed workers. Second, we analyze whether the development of employment and earnings before and after application of allowed and denied DI applicants suggests that an important and increasing group of workers is induced to apply to DI because of worsening economic circumstances. In light of results from the first part, here we explicitly strive to compare workers with similar past earnings potential but subject to different economic and health outcomes prior to

application to DI. Third, we assess health differences among alternative groups of applicants by analyzing the long-term mortality outcomes past application.

To implement this analysis, we use detailed individual-level, longitudinal data on annual earnings and information on DI applications from the Social Security Administration (SSA) based on a 1 percent sample of the U.S. population for the last 25 years. These data allow us to explore several aspects not seen in the prior literature, such as the focus on long-term average earnings, the potential to follow year-to-year fluctuations, and the ability to explicitly compare the evolving economic outcomes of allowed and denied applicants. Moreover, our large sample size and detailed information on past career histories and worker characteristics allow us to follow the evolution of earnings and employment before and after application within narrow cells in the population, to compare applicants at different stages of the application process, and to analyze the evolution of mortality rates.

Our findings suggest that the overall economic background of applicants – measured by five or ten year average earnings prior to application – has declined over time and that this decline is strongest for denied applicants.¹ We also find that denied workers retain substantial work attachment after application, albeit at reduced annual earnings. Moreover, denied workers experience stronger declines in earnings and employment prior to application even controlling for differences in initial average earnings. Perhaps surprisingly, holding average pre-application earnings constant, the differences between allowed and denied workers before and after application are very stable over time.

These results suggest a substantial fraction of denied applicants may be workers induced to apply because of economic difficulties and screened out during the initial stages of the adjudication process. These workers retain a substantial attachment to the labor force past application and have

¹ This is a summary and update of a more detailed comparison between long-term average earnings prior to application of applicants in von Wachter, Song, and Manchester (2006).

significantly lower mortality rates than new beneficiaries. Among new beneficiaries, only those initially denied but later allowed during the judicial phase of the adjudication process bear characteristics of applicants possibly induced by economic conditions. This group has a much lower mortality rate is much lower than that of other new beneficiaries that appears closer to that of finally denied workers and that of the full population of non-applicants. Moreover, this group drives the majority of the decline in long-term average earnings prior to application among allowed applicants we find.

Overall, our preliminary findings suggest adverse economic conditions indeed have led to an increase in application rates of workers in economic difficulties, but that a substantial part of these induced applicants are screened out during the application process. The change over time in the economic background of allowed and denied applicants is mainly driven by increasing application rates of workers with low permanent earnings. The incentives inherent in the system for a worker of given economic background appear to have remained stable over time.

II. Previous Literature

A growing number of papers have analyzed the effect of evolving economic conditions and changes in the disability insurance (DI) program on the growth of the number of DI beneficiaries since the late 1970s. The literature has analyzed conditions affecting the supply of benefits, such as changes in the adjudication process or benefit generosity, as well as variation in the demand for benefits due to availability of other government transfers or income support programs, medical insurance, or changes in economic conditions that affect the opportunity cost of receiving DI (Rupp and Stapleton 1995). Among ‘supply’ conditions, the end of the disability tightening of the early 1980s and the increasing weight of functional rather than medical criteria in the adjudication process have received particular attention (Duggan and Imberman 2006). Among ‘demand’ conditions,

economists have worried in particular about the effect of cyclical labor market conditions on the incentive to apply for disability insurance (e.g., Stapleton et al. 1995), as well as about increases in the replacement rate resulting from a widening earnings distribution and a rigid benefit formula (Autor and Duggan 2003).

A related but separate literature has shown that older and less advantaged workers tend to suffer long-term earnings losses from economic shocks such as layoffs or recessions.² These losses are likely to be more severe and long-lasting for disabled workers, leading to a decline in the fraction of these workers with access to substantial gainful activity (SGA) in recessions. Thus, adverse aggregate economic conditions are expected to lead to a rise in the number of applications and allowances into DI. Insofar as recessions have had increasingly negative effects on less advantaged workers, this would explain a rise in disability rolls. In addition, the well-documented widening of the earnings distribution and decline in real wages for low-skilled workers (Katz and Autor 1999) may have helped to accentuate the decline of workers with SGA. Perhaps not surprisingly, the existing literature reports a robust correlation between unemployment rates and program growth (Stapleton et al. 1995) that is particularly pronounced when screening for DI admissions is more flexible (Autor and Duggan 2003).

At the same time, the increase in the disability rolls and its evident correlation with the business cycle has also renewed the debate on whether the presence of the DI program itself induces workers capable of employment to exit the labor force (Autor and Duggan 2006). This question is hard to answer, in part because of the difficulty of finding an appropriate control group of workers who are similar to marginal new beneficiaries but not (or less) at risk of entering the DI program. Analysts have tried several approaches to determine the degree of work disincentive effects. A seminal paper by Bound (1989) compared the earnings of allowed and denied DI applicants, finding

² E.g., Jacobson, Lalonde, and Sullivan (1993), Chen and Stevens (2002), Hines, Hoynes, and Krueger (2002), Cutler and Katz (2000), Oreopoulos, von Wachter, and Heisz (2005).

a weak but non-zero employment rate for denied workers. Other papers exploited institutional variation in the DI system, e.g., among Canadian provinces (Gruber 2000), or due to applicant age (Chen and van der Klaauw 2005). Alternatively, Autor and Duggan (2003) exploited state variation in effective replacement rates due to a national benefit formula and differences in wage levels across states. Although no definite answer stands out, in part due to continuing empirical difficulties, the existing literature tends to point to rather small disincentive effects.

The large changes in the number of applicants and beneficiaries, as well as the important changes in the DI program, are likely to have had important impacts on the characteristics of workers applying for and receiving DI, and therefore on the potential for work disincentives. This is true for changes in the gender, age, or industry decomposition of applicants, and in particular for changes in the economic background. However, increasing heterogeneity of economic status of applicants may also make it more difficult to isolate disincentive effects of permanently worsening economic conditions of both allowed and denied applicants.

On the one hand, due to the concavity of benefit schedules workers with permanently low earnings are likely to apply to DI. This ‘selection effect’ is likely to have strengthened over time due to indexing of benefit schedules and worsening economic conditions of low income workers (Autor and Duggan 2003). On the other hand, DI may attract workers with typically stable employment and earnings affected by worsening economic circumstances. For these latter workers, DI becomes an imperfect means for smoothing income fluctuations. This is distinct from the ‘selection effect,’ where DI becomes a channel for income support. In the empirical analysis we first assess the degree of selection of workers into DI with lower long-term average earnings. The main focus of the second part of the analysis is on workers induced to apply by temporary economic fluctuations, holding long-term economic background constant.

III. Data

The sample of annual DI applicants and non-applicants for the years 1980 through 2003 comes from the 1 percent files of Social Security administrative data. The sample includes first-time DI applicants as well as non-applicants who have sufficient work experience to be DI insured, but that have never applied for DI benefits. A person who applies for DI benefits in a given year will be removed from the sample in subsequent years. The sample includes persons who are ages 35 through 60 as of the end of each year. We exclude persons under age 35 because their disability incidence rates are low, and many are unlikely to have sufficient past work activity for our analysis. Persons over age 60 are excluded because they are nearing the early retirement age.

The 1 percent files of SSA administrative data used to construct the annual series of DI applicants and non-applicants come from three different sources. The three sources include the 2004 Continuous Work History Sample (CWHS) active file, the 1 percent extracts of the 831 file for 1977 through 2004, and the Longitudinal Employee-Employer Data (LEED) for 1957 through 1977. SSA 1 percent samples are selected by a “stratified cluster design” based on certain serial digits of the Social Security Number (SSN). They are generally considered to be random samples and contain a large number of observations that represent the general population. Individuals are followed through their lives, thereby giving us longitudinal data.

The 2004 CWHS gives us the baseline sample universe and the matching longitudinal earnings and demographic information. It contains information on Social Security covered (“capped”) earnings from 1951 through 2004, uncapped total earnings from 1978 through 2004, and basic demographic characteristics of persons who have any report of covered earnings in 1951 through 2004 as well as those who have any report of uncovered earnings in 1978 through 2004. Because only covered earnings up to the Social Security taxable maximum are available in the CWHS for years prior to 1978, we used total earnings in the LEED for years 1957-1977. Annual total

earnings in the LEED from 1957 through 1977 are imputed using Method II based on quarterly earnings.

The SSA “831” disability file is used to identify DI applicants. An 831 record is established when the Disability Determination Services (DDS) renders an initial medical determination or a reconsideration decision for an individual applying for disability benefits under Social Security (Title II) or Supplemental Security Income (Title XVI). An individual can have more than one 831 record resulting from multiple applications. For example, a person can have a record for the initial application and another for a reconsideration application for DI. A concurrent applicant will have records for DI as well as SSI applications.³ Because the focus of this paper is to analyze earnings and labor force activities for the period prior to filing the earliest application for DI benefits, we define the applicant sample based on the earliest observable initial DI application date.

The 831 file identifies DI applicants and the year of application, but it does not identify the ultimate DI decision on eligibility. Benefit payment status reported in the Master Beneficiary Record could be used to identify the ultimate eligibility outcome, including administrative law judge and Appeals Council decisions that occur at later stages. However, we consider only the initial and reconsideration decisions to separate those who are awarded benefits from those who are denied on a consistent basis. As a result, we may be missing some percentage of applicants who appeal the early-stage decision and ultimately receive benefits. Because of lags in deciding claims at later stages, increases over time in the percentage of allowances coming from later stages, and the sample selection issues that arise from the expenses of time and money involved in appeals, we limit our sample to those allowed at the initial and reconsideration stages. To the extent that persons who are awarded benefits at the later stages tend to have weaker earnings histories than those who are found

³ For further discussion regarding SSA administrative records, see the SSA Program Data User’s Manual (Panis and others, 2000).

eligible at the earlier stages, the results reported here may somewhat overstate earnings differences between denied and allowed applicants, particularly in more recent years.

The resulting sample sizes in 1980 are 4,409 DI applicants (1,502 allowed and 2,907 denied) and 339,601 non-applicants. Some of the key variables used in this study include earnings (5- and 10-year averages), age, sex, race, average indexed monthly earnings (AIME), and primary insurance amount (PIA). We report annual sample sizes and mean values of key variables in Appendix Table 1.⁴

To analyze the differences in economic outcomes between allowed and denied workers before and after application to DI we work with two samples. One includes all workers insured by disability insurance in a baseline period. In addition, we also generated a sample of worker that at some point had a minimal attachment to the labor force. In particular, to limit the degree of heterogeneity in career histories, we required individuals to work in stable employment with minimal earnings for at least three consecutive years during a baseline period. We further limit ourselves to workers that remain at a single employer during that period. We believe these restrictions help to isolate individuals with normal work experience that should be expected to continue to work absent a disability or an adverse economic shock.⁵

⁴ We calculate both the AIME and PIA in each year for both applicants and non-applicants. To calculate the AIME, workers' annual earnings are indexed by multiplying each worker's taxable earnings by the national average wage of the corresponding year and dividing by the national average wage of the indexing year. Next, the number of computation years is equal to the number of years starting with the year of attainment of age 22 up to the year the worker becomes disabled, dies, or attains age 62, minus the number of allowed dropout years. Thus, in our case, the maximum number of computation years is 35. Finally, divide the sum of indexed earnings in the computation years by the total number of months in the computation years. The PIA is derived from the AIME. The PIA is equal to the sum of 90 percent of the AIME up to the first bend point, plus 32 percent of the AIME above the first bend point up to the second bend point, plus 15 percent of the AIME above the second bend point. For more detail, see the 2004 Annual Statistical Supplement, pp. D.3-4.

⁵ The sample of workers with three consecutive years of minimal earnings is about 75-85% of the unrestricted sample for non-applicants, 60-70% for allowed applicants, and 50-60% for denied applicants, with the exact fraction depending on the baseline year. Among these, the sample of workers that also remains at the same employer during the same period is about 30% of the unrestricted for non-applicants and allowed applicants, and about 28% for denied applicants. On average, the fraction of stable workers among applicants has been increasing over time, in particular between the years of 1987 and 1991.

We focus on three groups of workers either insured or in stable employment between 1979-1981, 1984-1986, and 1989-1991. The analysis follows employment and earnings ten years before and after the year of first application of workers applying in the years 1982-1987, 1987-1992, and 1992-1997. The three time periods are chosen to represent three important periods in the disability system marked by the DI ‘retrenchment’ in the early 1980s, the change in eligibility criteria in 1986 putting more weight on functional rather than medical criteria, and the social security ‘reach out’ in 1992. To ensure the time periods chosen do not represent outliers, we have also analyzed single application years.

To avoid effects from early retirement in our main results we focus on male workers age 34 to 45 at baseline that apply within six years and whose age is at most 60 during the follow up period. We separately report estimates for older workers, women, and a longer period after baseline until application. To compare the sub-sample of stable workers to the full sample of insured workers, Appendix Figure 1 shows the evolution of application rates in the two samples. Application rates increase substantially as workers age and as they move away from the baseline period of stable employment. Consistent with results for the full sample, the gradient becomes steeper and there are significant upward shifts in the mid 1980s and early 1990s. The pattern is quite similar for men and women. In addition, Appendix Tables 2A and 2B further show average characteristics for allowed and denied applicants for the three time periods for the full and stable sample, by age, gender, and year of application relative to baseline.

IV. Empirical Strategy

A classic approach to obtain a counterfactual for employment and earnings development of new beneficiaries in the absence of DI has been the analysis of denied workers (Bound 1989). Although denied workers are still an imperfect control group – since they should be on average

healthier than those truly disabled – their economic outcomes should be more similar to that of new beneficiaries than that of the total population. As further discussed below, the difference between allowed and denied workers is the sum of a “pure disincentive” effect and a “pure disability” effect, and cannot be interpreted further without additional assumptions. Yet, we argue that under reasonable assumptions the difference between allowed and denied workers can still be used to assess the potential importance of economically induced disability applicants.

We replicate Bound’s straightforward before-after comparison of allowed and denied applicants with four important extensions only made possible by the access to exceptional data. First, we can both compare long-term averages and follow the annual pattern of employment and earnings ten years before and after application. Second, we can compare allowed and denied workers within narrow cells of the labor force. This is important since average characteristics of allowed and denied workers differ substantially and have changed over time. Third, we can examine whether the difference between allowed and denied applicants has changed in the past twenty years in response to the recent evolution of the DI system. Fourth, we will analyze the difference between allowed and denied workers by gender, age, industry, education, and earnings classes.

We begin by using our data to briefly describe the evolution of the disability insurance system in the last three decades. This summarizes a more thorough description in von Wachter, Song, and Manchester (2006) using the same data. Based on these preliminaries, the first part of the empirical analysis examines the average economic characteristics of disability applicants, new beneficiaries and denied applicants five and ten years before and after the date of first application. This section contains some of the main results of the paper. The second part of the empirical section then deepens these results by providing a full analysis of the dynamic evolution of employment and earnings for allowed and denied applicants before and after application.

In the second part, we follow employment and earnings patterns of allowed and denied applicants before and after the date of first application to DI, controlling for a flexible time-trend estimated by the inclusion of a sample of non-applicants in the analysis. In addition, we can control for a rich set of pre-period characteristics and compare workers within narrow cells of the labor force. Let y_{it} stand for either annual employment (a dummy for positive earnings in a given year) or annual earnings (in \$1000 deflated by average nominal wage growth in constant 2000 prices). Then we estimate the following distributed lag model

$$y_{it} = \alpha + \theta_t + \gamma X_{it} + \sum_{k \geq -8}^{\leq 10} \delta^k D_{it}^k ALD_i + \sum_{k \geq -8}^{\leq 10} \beta^k D_{it}^k DEN_i + u_{it} \quad (1)$$

where i indexes individuals and t calendar years, X_{it} capture individual characteristics, the dummies D_{it}^k indicate the k -th year before or after application to disability, and ALD_i and DEN_i are dummies for whether workers are allowed or denied applicants. The parameter δ^k (β^k) measures the *change* in employment or earnings of allowed (denied) workers in the k -th year before and after application to DI relative to the baseline and *relative* to the change over time for non-applicants (captured by unrestricted year dummies θ_t). This is a de facto dynamic difference-in-difference model akin to models estimated in Jacobson, Lalonde, and Sullivan (1993) for the event of job loss and in Krueger and Kruse (1995) for the event of spinal chord injury. In addition, our basic model also includes a fourth order polynomial in both current age and average annual earnings during the baseline period. All of our models will be estimated separately by gender and by broad age groups.

To further address the concern that heterogeneity may affect our comparison, we extend our base model to include a range of additional worker and career characteristics. First, we include effects for two digit industry of the baseline job, effects for the employer of the baseline job, and effects for earnings class to make sure that the comparison is not affected by differences in

economic background of allowed and denied workers. Second, we replace the single time trend by interactions of year-dummies with two digit baseline industry, earnings class, and earnings class-industry groups. This ensures that the comparison of the *evolution* of earnings and employment of allowed and denied workers is made with workers in similar industry or earnings cells. Further experimentation with additional controls led to very similar results.

To summarize the effects we find, we follow Jacobson et al. (1993) and Krueger and Kruse (1995) and impose a parsimonious but flexible functional form on the evolution of employment and earnings before and after application. This parameterization also gives us a convenient way to assess differences in the comparison between allowed and denied workers across groups (e.g., by industry or education), and to test for the significance of these differences.

Specifically, we split the pattern into a dip prior to application, a drop during application, and a recovery following application. Thereby, the ‘dip’ is captured by a variable that is a linear trend -6 to -3 years prior to application and zero elsewhere; the ‘drop’ is captured by a dummy that is equal to one starting two years after application and zero before; the ‘recovery’ is captured by a variable that is linear starting three years after application and zero elsewhere. To obtain an estimate of the difference of allowed and denied workers with respect to non-applicants, instead of a main effect we also include a dummy for the base period. If k indexes the years before and after application, we have

$$base^k = 1 \text{ if } k < -6, \quad = 0 \text{ else}$$

$$dip^k = k + 7 \text{ if } -6 \leq k \leq -3, \quad = 0 \text{ else}$$

$$drop^k = 1 \text{ if } k \geq 2, \quad = 0 \text{ else}$$

$$rec^k = k - 2 \text{ if } k \geq 2, \quad = 0 \text{ else}$$

Our basic model can then be rewritten as

$$y_{it} = \alpha + \theta_t + \gamma X_{it} + \delta^0 base_{it}^k ALD_i + \delta^1 dip_{it}^k ALD_i + \delta^2 drop_{it}^k ALD_i + \delta^3 rec_{it}^k ALD_i + \beta^0 base_{it}^k DEN_i + \beta^1 dip_{it}^k DEN_i + \beta^2 drop_{it}^k DEN_i + \beta^3 rec_{it}^k DEN_i + u_{it} \quad (2)$$

where we are particularly interested in the difference in the patterns of base, dip, drop, or recovery for allowed and denied workers, over time, and across sub-samples of the population. These are captured by the two triplets of parameters $(\delta^0, \delta^1, \delta^2, \delta^3)$ and $(\beta^0, \beta^1, \beta^2, \beta^3)$.

We also extend this model and further interact the base dip, drop, and recovery coefficients with dummies indicating additional worker characteristics. For simplicity, we focus on binary sample characteristics; denote these by E_{it}^j , where j indexes a characteristic. Then the model we estimate is

$$y_{it} = \alpha + \theta_t + \gamma X_{it} + [\phi^0 base_{it}^k + \phi^1 dip_{it}^k + \phi^2 drop_{it}^k + \phi^3 rec_{it}^k] ALD_i + [\psi^0 base_{it}^k + \psi^1 dip_{it}^k + \psi^2 drop_{it}^k + \psi^3 rec_{it}^k] DEN_i + [\tilde{\phi}^0 base_{it}^k + \tilde{\phi}^1 dip_{it}^k + \tilde{\phi}^2 drop_{it}^k + \tilde{\phi}^3 rec_{it}^k] ALD_i E_{it}^j + [\tilde{\psi}^0 base_{it}^k + \tilde{\psi}^1 dip_{it}^k + \tilde{\psi}^2 drop_{it}^k + \tilde{\psi}^3 rec_{it}^k] DEN_i E_{it}^j + u_{it} \quad (3)$$

where the interactions between the characteristics and base, dip, drop, and recovery measures capture the difference in the comparison of allowed and denied before and after application across groups. We will include interactions with a dummy for non-white, for education beyond high school, for baseline earnings greater than the median, for baseline industry equal to manufacturing or services. Thereby, we will first include each additional characteristic separately, and then pool all interactions in a single model.

The coefficients of the model in equation (2) can be used to express alternative hypotheses regarding the nature of disability applicants. For example, if the majority of denied workers are healthy individuals struck by adverse economic conditions, we would expect their employment and earnings to drop after the application to disability, but to remain significantly higher than that of similar allowed workers. Similarly, we may expect the earnings of denied workers to drop before the

application below the level of that of workers experiencing disability due to a sudden injury (this may not be the case for impairments not necessarily associated with sudden drops in earnings capacity such as mental health).

If the presence of induced applicants increases over time, we would also expect to see a drop in the earnings of denied workers after application, and possibly also a decline in the earnings beforehand. Similarly, economic outcomes of denied workers should be a function of the business cycle or economic conditions in their industry. We would also expect differences among allowed and denied workers to differ between education groups, age groups, or industries, depending on the employment conditions that workers face.

Finally, additional assumptions are necessary to interpret the estimated coefficients as disincentive effects of DI. The ideal comparison to obtain an estimate of the reduction in employment due to the presence of DI would be between two identical healthy workers induced to apply because of economic conditions, but of which only one receives disability benefits (the “pure” disincentive effect). Alternatively, if instead one of the two identical workers becomes truly disabled, the comparison yields an estimate of society’s loss in earnings capacity – the “pure” disability effect.⁶

If all new beneficiaries are truly disabled, the comparison of allowed and denied yields an estimate of the latter. If a non-zero fraction of new beneficiaries is really able to work, then the comparison yields a combination of the disability and disincentive effect. The fraction of able beneficiaries thereby captures the part of the difference in economic outcomes attributable to the disincentive effect. To obtain a measure of the importance of the disincentive effect, we thus need an estimate or a guess as to the proportion of ‘false positives’ in the adjudication process.⁷

⁶ Note that the same set of comparisons could be made between an individual obtaining disability insurance and an identical worker that never applies. The comparison in the text is based on the notion that the economic outcomes of denied workers yield a better counterfactual for those of allowed applicants.

⁷ This discussion presumes that there are no truly disabled workers among those denied. Presence of such ‘false negatives’ makes the foregoing discussion more complicated.

V. Descriptive Analysis

A. Average Employment and Earnings before Application to DI

The descriptive analysis of the evolution of the disability insurance system in von Wachter, Song, and Manchester (2006) provided four basic results. First, we confirm that application rates have been rising and have become more correlated with the business cycle over time. As others have found before us, allowance rates have been rising as well, but vary *inversely* with the business cycle (e.g., Rupp and Stapleton 1995). Second, we find that average earnings ten years before application to DI has declined among first time applicants, and that this decline is strongest for denied applicants. Third, we find that average earnings of both allowed and denied beneficiaries have become increasingly negatively correlated with the business cycle, and that this effect is more pronounced for denied workers. Fourth, these trends and correlations are solely driven by changes in the earnings distribution or changes in other characteristics of applicants such as age or impairment codes.

Figure 1 displays the most relevant results from the earlier analysis for the sample used in the present paper.⁸ The first panel shows the approximate doubling of the number of new beneficiaries between the early 1980s and the late 1990s. The figure also shows that a large fraction of applicants eventually obtain benefits. The fraction of denied workers over the period is between 25% and 35%. About 30% of allowed workers were initially denied during the administrative adjudication stages and obtained benefits by recursion to the judicial adjudication phase (See Appendix Figure 2).

Panel B of Figure 1 shows the average earnings of all applicants five years before application, and the same separately for allowed and denied applicants. Applicants' average earnings have decline by about 10% in the last decades. Thereby, average earnings have declined most strongly for denied

⁸ In von Wachter, Song, and Manchester (2006) we only use information on adjudication from the first two administrative stages of the adjudication process. The data used here also includes information from decisions made in the judicial reconsideration stage.

workers, by more than 25%. The remaining two panels show the same pattern for mature (age 35-44 at application, about 35% of all applicants) and older applicants (age 45-54 at application, about 50% of all applicants).⁹ Two results stand out. First, the decline in average earnings among all applicants is larger for younger workers. As shown in Appendix Figure 2 and Appendix Table 3, this decline is driven to a large extent by applicants that were initially denied and who obtained benefits through the judicial reconsideration stage.

Second, the decline in average earnings of denied workers is much stronger for older applicants. It appears that these workers may be in particular economic difficulty before applying to disability insurance. Table 1 provides further evidence for these patterns by showing the pre-application differences in average earnings ten years prior application. The Table also displays the average number of years with positive earnings in the five or ten years prior to application.

Consistent with these patterns, Table 1 shows that older denied applicants on average have a lower labor force attachment than allowed workers. On the other hand, employment of younger individuals prior to application does not differ strongly between allowed and denied. However, while earnings for applicants and specially denied has been declining, overall work attachment has been increasing slightly, consistent with trends in the overall population. This underscores the importance of controlling for general population trends in the economic outcomes of non-applicants, an issue taken up in the second part of the empirical analysis.

B. Average Employment and Earnings After Application to DI

Figure 2 shows economic outcomes for applicants age 35 to 45 five and ten years before and after application to DI. The first two panels show average years worked (out of five and ten years,

⁹ The residual age group – applicants below age 35 – also has declining average earnings. Given it is only a minor fraction of the sample (about 15%, we do not analyze this group separately here).

respectively). The bottom two panels show average real annual earnings in \$1000. Figure 3 shows the same for older workers. Table 1 contains the numbers for three representative groups of years.

The numbers yield the following results about employment of denied workers after application. First, employment of denied applicants remains substantial even after denial. The average number of years worked out of five declines by about one year from four to five (Panel A), and by about two years (from eight to six) over a ten year horizon. The losses in employment are slightly stronger for older workers, especially over a ten year horizon. Second, the differences tend to be quite stable over time – at best losses in employment are declining.

Although attachment to employment is substantial after denial, denied workers suffer substantial earnings declines. The approximate percent change in earnings at denial varies by year group due to different cyclical environments and worker decomposition (that are controlled for in the next section). But overall, younger workers' ten year average earnings after application decline by 20%. It appears that on average, post and pre application earnings move in parallel, something borne out in Figures 2 and 3, at least until the mid-1990s.

The five year average earnings loss is larger, suggesting that workers take some time to reintegrate into the labor force, something analyzed in more detail below. Earnings losses are substantially larger for older workers at about 40% and again quite stable over time. Overall, these losses are of the same order of magnitude as those found for workers displaced at layoffs or plant closings in similar age ranges (e.g., Jacobson, Lalonde, and Sullivan 1993). It is not surprising that an exit of the labor force of at least six months (the required period of earnings below the limit prior to application) would lead to similar earnings declines as a job loss.

VI. Economic Outcomes of Allowed and Denied Prior to Application

The previous section has demonstrated important changes in the economic background of denied applicants to DI and has shown that average employment and earnings of these applicants, albeit reduced, remains substantial after application. These patterns are consistent with the notion that an increasing fraction among denied applicants applies to DI because of economic difficulties. A substantial fraction of these workers appear to return to the labor force after denial. The economic background of allowed applicants has declined somewhat, albeit relative to the trends for denied workers these changes are rather small.¹⁰

The goal in the following section is to learn more about the presence of economically motivated applicants among individuals denied and allowed benefits by comparing year-to-year variation the employment and earnings outcomes before and after application to DI of those allowed and denied benefits. Thereby, we are particularly interested in changes over time in the pattern we find, and make special efforts to compare workers with similar characteristics and career histories.

We obtain the following core results from a comparison of the economic outcomes of denied and allowed applicants for three groups of middle-aged men applying in 1982-1986, 1987-1992, and 1992-1997.

- Denied applicants' employment and earnings decline after application but remain substantial. The reduction is much less than the drop for new beneficiaries, leading to important differences in employment and earnings of allowed and denied workers after application to DI that are robust to a broad range of regression specifications.

¹⁰ The same holds for workers applying at age below 35 not analyzed separately here (the earnings for allowed workers declines about 9% from the early 1980s to the early 1990s; the earnings for denied workers declines about 25%).

- The employment and earnings of both allowed and denied workers decline prior to application, but the drop is significantly larger for denied workers applying a sufficient number of years past the stable-employment baseline.
- The differences in economic outcomes past application are stable over time. The only change is a drop in average baseline earnings of denied workers after 1986 consistent with the pattern documented in the descriptive analysis.
- The patterns we find are very similar for women, who experience similar declines in employment but lower reductions in earnings past application. The results are also very similar for applicants from manufacturing and service sectors.
- Applicants stable jobs at baseline and applicants with high baseline earnings experience smaller losses in employment, but more substantial earnings losses. These workers may have lost hard-to-find high paying jobs, but may have kept their stronger ties to the labor market.
- Older workers on the other hand suffer substantially larger losses in both earnings and employment, consistent with what we found in the descriptive analysis.

Overall, we interpret these results to suggest that there is a substantial fraction of applicants to DI that are motivated to apply because of economic conditions. These applicants have lower earnings prior to application than new beneficiaries, but continue to have substantial attachment to the labor force after denial. These patterns are remarkably stable over time. Together with the descriptive results in the first part, this suggests that changes in the characteristics of applicants to DI mainly derive from workers with permanently low earnings potential, not from stable workers affected by worsening economic conditions.

The remaining paragraphs discuss the evolution of employment and earnings of allowed and denied workers pre/post application to DI in detail using our sample of ‘stable’ workers. By construction, among this group, allowed and denied applicants have more similar earnings, age, and

industry distribution than in the full sample of applicants (Appendix Table 2). However, there are expected changes in characteristics over time – applicants have become younger and are less likely to come from manufacturing. On average, female applicants are more likely to come from services, whereas older applicants tend to have lower earnings. We will control for these differences in characteristics explicitly below.

As a first contrast, we analyze average outcomes of applicants who were 34-45 at baseline and applied within six years of completing the stable work period. The three six-year periods roughly represent the three recent stages of the DI system. Figure 4 shows employment and earnings of allowed and denied workers 8 years before and 10 years after the year of first application for both the full and the stable sample. Consider male employment rates in Panel A. Allowed applicants show a drop in employment two years prior to application, then a large drop at application, and a remaining employment rate of about 10%. Denied workers have a stronger reduction in employment prior to application. However, the employment decline of denied at application is much smaller, leaving them with employment rates of about 60% that decline only slightly as workers age. This pattern is stable over time, with the increase for applicants during 1992-1997 likely due to the prolonged economic expansion of the late 1990s. Panel B shows the same results for workers with initially stronger employment attachment; for these workers by construction initially everybody is working. After application, both the employment rate and the employment loss remain higher for denied stable workers compared to the full sample.

The lower panels replicate the same figure for real annual earnings (in \$1000). For the full sample in Panel C, we see similar declines in pre-application earnings for both allowed and denied workers starting about three years prior to application. A year prior and at application, the earnings of allowed workers drop substantially, consistent with the earnings limit imposed by the DI eligibility criteria. More interestingly, denied workers applying in 1982-1986 bounce back quite

significantly after an initial decline in earnings at denial. In the latter two time periods, the overall level of denied workers' earnings drops and there is less of a recovery after the earnings drop at application. Nevertheless, in all three time periods earnings of denied workers are at about 70-80% of baseline earnings in the years following application.

The patterns for stable workers shown in Panel D are qualitatively similar; however, earnings losses for allowed and denied workers are larger, and there is less of recovery. Moreover, the decline in overall earnings and the rate of recovery of denied applicants in the mid-1980s is larger for stable workers. In contrast to the full sample, in the early 1980s, denied workers had on average larger earnings than allowed, whereas in the two latter periods pre-application earnings of allowed and denied are similar.

Table 2 shows the annual employment and earnings developments before and after application for denied and allowed applicants for a slightly different sample. While in Figure 4 and the rest of the analysis we follow workers belonging to a given age group in a base period (say, from 1978 to 1981 for the group of workers applying in 1982-1987), in the table we start for each worker from his year of application, and analyze a fixed range of years before and after that year.

Since workers age over time and are subject to changes in macro-economic conditions, we assigned random application dates to non-applicants of similar age ranges in the three baseline periods, and obtained fictive pre/post application average employment and earnings for these workers as well. The table also shows some characteristics during the baseline period (more of which are shown in Appendix Table 2).

Overall, the results in the table confirm those in Figure 4. Labor force attachment of denied workers remains substantial after application, and only about 15-20% lower than that of non-applicants of similar age. Similarly, earnings losses are non-negligible, but there is considerable recovery, at least for the full sample of workers shown in the table. The dynamic pattern for non-

applicants suggests an important age-gradient in earnings and employment. To assess the overall loss in economic status of applicants relative where they could have been in absence of application we thus have to introduce non-applicants as explicit control group.

Since in addition there have been important changes in the economic background and demographics of DI applicants over time, Figure 5 shows the same difference as in Figure 4 controlling for year effects, age, and baseline earnings (regression model equation 1). Panel A shows the drop in employment for allowed and denied applicants for the three year-groups relative to the baseline and employment changes for non-applicants captured by year effects. Panel B shows the equivalent result for the stable sample. Allowed workers experience a loss in employment rate of about 80% whereas denied workers experience a loss of about 20%, leading to a difference between allowed and denied of 50-60% that is very similar across years. The small apparent differences are not statistically significant.¹¹

The lower panel of Figure 5 shows the corresponding results for earnings. Controlling for prior earnings eliminates differences in the level of earnings for denied and allowed workers seen in Figure 4. The differences in the earnings gap relative to non-applicants prior to application disappears and earnings differences are very stable over time. Panel D shows similar but a bit less precise patterns for the earnings gap for allowed and denied workers in the stable sample.

To further understand differences in the evolution of earnings before and after application and over time, Figure 6 shows average earnings for workers in employment (dropping zero earnings) and the corresponding regression results for the full and stable samples. Panels A and B suggest that among denied applicants working after application, recovery in average earnings is even stronger, especially for those applying in the early 1980s. The panels also show average earnings for allowed

¹¹ Note that since non-applicant men in advanced middle age tend to have declining employment, the relative comparison leads to stronger albeit still small recovery of employment application, especially for denied workers (Panels A and B).

applicant well beyond the earnings limits imposed by the rules of federal disability insurance. These trends come from about 5% of observations, and result from a combination various factors.¹² For the vast majority of working beneficiaries earnings are below the required threshold.

The lower panels of Figure 6 again control for prior earnings, age, and year effects. As expected, the differences across years disappear, and the differences in earnings before and after application look very similar to those in Figure 5. The latter period is again somewhat of an outlier for both allowed and denied workers, which may partially be due to the fact that not all applicants are fully observed for ten years after application, partially that there is a strong business cycle trend.

Figure 7 summarizes the patterns for women in the full sample. Denied women have slightly stronger changes in average employment over time (Panel A), but there are no shifts in average earnings (Panel C). While losses in employment are of comparable magnitude, the earnings decline experienced by both allowed and denied women are slightly smaller than for men (the difference is larger for the stable sample, not shown). An explanation for these patterns may be the fact that fewer women apply to DI from traditionally high wage sectors such as manufacturing, and more apply coming from services and trade (see Appendix Table 2).

Overall, we find that controlling for additional characteristics does not affect the results substantially (with the exception of denied men's earnings in the 1982-sample). We tried a range of other controls, a subset of which is displayed in Figure 8 for the full sample. Overall, we find little differences using baseline controls that correct for differences in the decomposition of allowed and denied applicants (such as industry effects, more flexible earnings controls, or employer fixed effects). Similarly, interacting dummies for industry and earnings-class with year-effects to force the comparison of allowed and denied workers vis-à-vis non-applicants to be within industry-earnings

¹² A fraction of workers may work as they go through the appeals process. A small fraction can reapply if they are denied within the window of time we set between initial application and final benefit receipt (ten years). It is possible that there are in addition coding errors in the earnings data as well as true violations of the earnings limit.

classes did not substantially affect the results. The small differences across years apparent in Figure 8 are not statistically significant. The same patterns hold for stable workers and women (not shown).

The patterns shown in Figure 5 are summarized for the full and stable sample in Tables 3 and 4. The tables show estimates for the base difference with respect to non-applicants, as well dip, drop, and recovery parameters for earnings and employment separately for allowed and denied workers with and without baseline controls. Standard errors are clustered at the individual level to allow for arbitrary correlation in error terms within individuals over time. The tables demonstrate succinctly the differences in the degree of employment and earnings losses for allowed and denied workers, and show how they are stable over time. Moreover, while especially including average baseline earnings reduces the magnitude of the difference relative to non-applicant, the *relative* difference between allowed and denied workers (the difference of the effects shown in the table) is very robust to the inclusion of individual characteristics.

Since in the current samples workers are only allowed to apply within six years of having had stable earnings, we may force individuals to have high employment and earnings prior to application to DI. Thus the first set of columns for each year-group in Tables 5 and 6 show the same specifications including workers who applied within eleven instead of six years of the baseline period. This implies workers can be up to 55 years old at application, and up to 65 years old in the period following the loss. The results indeed show that now employment and earnings of denied workers are significantly lower than that of allowed workers prior to application (these should be compared to the columns ‘Basic Model’ in Tables 3 and 4). Moreover, losses at application are now somewhat larger, suggesting that these workers lose more of their attachment to the labor force. Otherwise, the main patterns are essentially unchanged.¹³

¹³ The apparent stronger recovery in employment for denied applicants in 1992 is a mechanical effect due to changes in the cohort composition of applicants; the inclusion of older workers leads to larger losses right after application

Part of the effect of allowing a longer follow up period may be due to aging of the sample. To see this explicitly, the second set of columns for each year-group in Tables 5 and 6 show the results of a model with basic covariates for workers age 45 to 55 at the time of application. For this sub-sample the employment and earnings after application to DI tends to be lower for denied workers. Since the economic conditions of allowed older workers differs little with respect to younger workers (the majority is not working), this leads to smaller differences between allowed and denied workers. Note that the apparent ‘catch-up’ of allowed and denied is again attributable to the fact that employment and earnings of non-applicants of similar age declines during the same period (the pattern is not present in the raw averages).

Tables 7 and 8 further break up the estimated employment and earnings losses for the full and stable samples by individual characteristics as explained in Equation (3). Table 7 shows the results when interactions with dummies for high education (more than high school), high earnings (more than median annual earnings at baseline), and manufacturing (work in manufacturing at baseline) are included jointly in the regressions.

A few remarkable results stand out. First, Table 7 shows that both allowed and denied high-earning applicants to DI have less of a drop in employment prior to application, and smaller drops in employment at the date of the application. However, they have larger pre-declines in earnings and much larger instant drops in earnings at the actual time of application. This difference is particularly pronounced for allowed workers until 1992, when the losses of allowed and denied high earners are similar. These patterns are stable across years and robust to the inclusion of other interactions.¹⁴ It

without depressing the effect later due to the end of the sample period. Similarly, the recovery apparent for older workers in earnings is likely to be due to the receipt of retirement benefits.

¹⁴ We have also included interactions with a service dummy or a non-white dummy. The former showed no significant difference in the effects, the latter suggests earnings losses are lower but employment losses are higher for non-whites are lower than for the full sample of allowed non-white applicants (there is no differences for denied non-white applicants).

appears high earners are less likely to lose their job before applying to DI, but are subject to substantial earnings losses prior to and at application.

Second, a similar pattern of differential losses at application holds for highly educated applicants, albeit the differences are smaller and decline over time. In the years after 1987, denied highly educated applicants do not experience significantly larger earnings losses (but keep an employment advantage). Third, workers applying from manufacturing have much smaller and barely significant advantages in terms of employment. Only the difference for allowed workers is significant, suggesting that workers trained in manufacturing are more likely to engage in some form of activity once receiving benefits.

VII. Preliminary Interpretation and Mortality Differences

Overall, Tables 3 to 8, and Figures 4 to 8 document that denied workers experience much smaller losses in employment and earnings at application than allowed applicants. Both groups experience a large drop in employment and earnings at application to DI, but denied workers retain a substantial attachment to the labor force at reduced but still substantial earnings. This leads to a large difference in economic outcomes after application between allowed and denied workers that is remarkably stable over time, similar across genders, and robust to inclusion of further regression controls.

We also find that allowed and denied workers differ significantly prior to application. In particular, denied workers have lower average earnings and employment. These differences are eliminated by controlling for baseline average earnings. However, even conditional on a wide range of economic characteristics denied workers tend to experience larger drops in employment and earnings before application than allowed applicants.

These results suggest that an important fraction of denied applicants are workers that were induced to apply to DI because of adverse economic conditions, and that were screened out during the application process. After denial, an important fraction of these workers return to the labor force. The employment and earnings losses among this group are of similar order of magnitude with effects job loss for comparable samples of workers.

The fraction of such applicants appears to have risen over time with a particular jump in the mid-1980s. Our results suggest that controlling for these changes in the decomposition of applicants, the difference between allowed and denied workers is stable. Thus while the type of workers applying appears to have changed, for a similar type of worker the incentive effects inherent in the system do not appear to have changed.

We have also found that allowed applicants experience a drop in employment and specially a drop in earnings prior to application. Results from the descriptive part suggest that allowed applicants have also been of increasingly lower economic background (although as discussed above, Appendix Figure 2 and Appendix Table 3 suggest that this trend is mainly driven by workers that are initially denied and obtain benefits through the judicial review). Does this indicate that an increasing fraction of new beneficiaries are workers induced to apply because economic conditions, too? This question is of course very difficult to answer in absence of a proper control group. In particular, the stark differences between allowed and denied workers after application we find suggest we may pick up more of a ‘disability’ effect due to differential health rather than a ‘disincentive’ effect due to the incentives inherent in the DI system to exit the labor force.

To differentiate between these two effects we would need an estimate of the fraction of ‘false positives’ and ‘false negatives’ in the adjudication decision. One such estimate is available from the annual continuing disability review the Social Security Administration conducts among existing beneficiaries. The typical rate of dismissal from the program due to sufficient health and work

capacity is about 10% (similar numbers are cited in Bound 1989). This would imply a low fraction of the differences between allowed and denied workers we find is due to a disincentive effect of disability insurance.

An alternative strategy to obtain additional information on the nature of allowed and denied workers is to compare their health outcomes. To do so, we have begun analyzing the rate of death past application for allowed and denied applicants as well as non-applicants using Social Security's Numident file that records the exact date of death for each individual. The preliminary results are shown in Figure 9. Panels A and B of the figure show the fraction of applicants that has died for each year post application for applicants aged 34-55 at baseline applying in 1982-1987 and 1987-1992 for the full and stable sample, respectively.

The differences between allowed and denied workers are stark. While over 30% of allowed applicants have died ten years after application, the same is true for only 10% of denied applicants. Overall, the mortality rate of denied workers is only slightly larger than that of the population of non-applicants (the differences could arise from a variety of sources other than health, such as small differences in age or larger differences in average earnings). These differences are very stable over time despite the change in the economic background of applicants.

From the mortality data, it does indeed appear that denied are more similar to the full population than to allowed workers, and that allowed workers are of substantially worse health on average. We have noted that the decline in average earnings of new beneficiaries is mainly driven by workers that were initially denied. We thus recalculated mortality for these allowed workers separately. It turns out that their mortality rate is very similar to that of denied workers and that of the sample of non-applicants (Panels C and D). Thus, while it does not appear applicants induced by economic conditions are a substantial fraction allowed workers as a whole, they may be more strongly represented in the group of applicants initially denied and later reinstated.

VIII. Summary and Outlook

Our findings suggest that there is indeed an important fraction of workers induced to apply to DI for economic reasons, and that a substantial part of these applicants is screened out during the application process. Once denied benefits, a majority of these applicants return to the labor force, albeit at reduced earnings. The results also imply that the fraction of workers induced to apply because of adverse economic conditions has risen, and that this increase in application rates has significantly altered the average economic status of new beneficiaries and overall program applicants. However, this trend is due to increasing number of applicants with permanently lower earnings, not due to formerly stable workers in difficulty because of a reversal in their economic situation.

These preliminary conclusions are reinforced by the strong differences in mortality rates between allowed and denied workers we find. While denied workers' mortality rate is similar to that of the population of non-applicants, the mortality rate of new beneficiaries is four to five times higher. Only those applicants that have been initially denied and later received benefits during the judicial reconsideration phase have much lower mortality rates. This group of new beneficiaries, although a roughly stable fraction of applicants, also has had declining average pre-application earnings over time. Further analyzing the economic background and behavior of this group of applicants appears a promising avenue of future research.

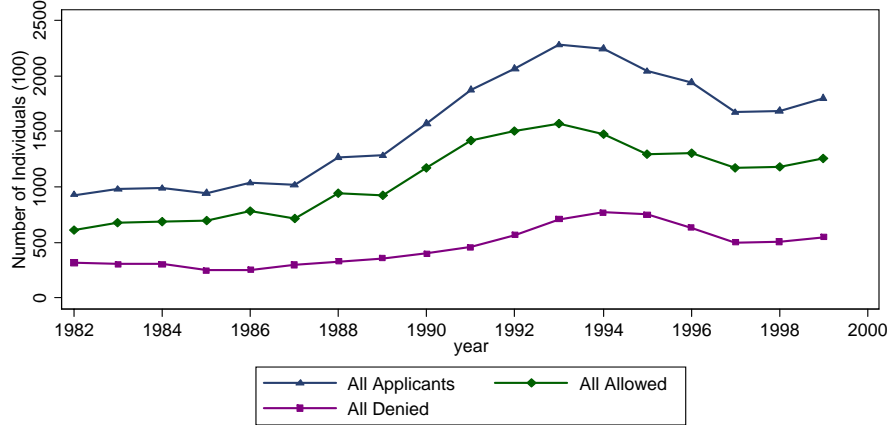
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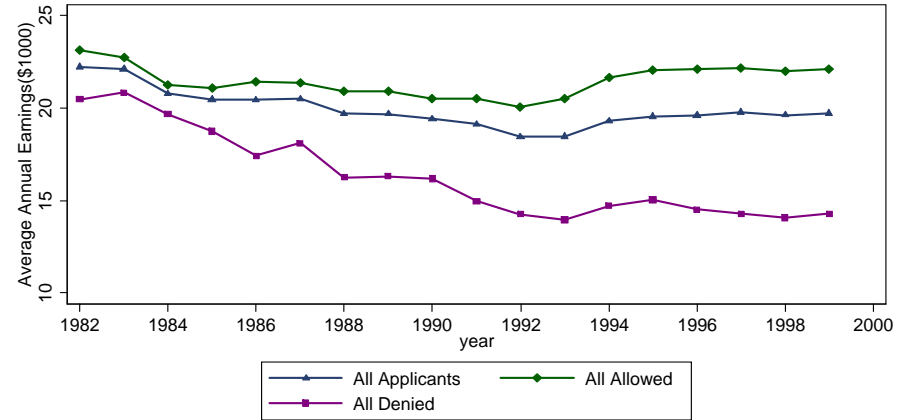
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Figure 1: Number, Employment, and Earnings of All DI Applicants and of Allowed and Denied Men Various Ages Five Years Before and After First Application to DI

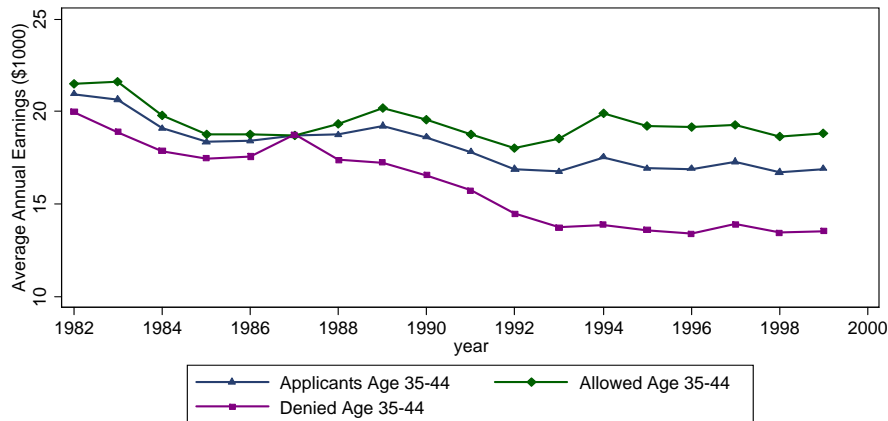
Panel A: Number of Applicants to DI and Number of Allowed and Denied Men All Ages



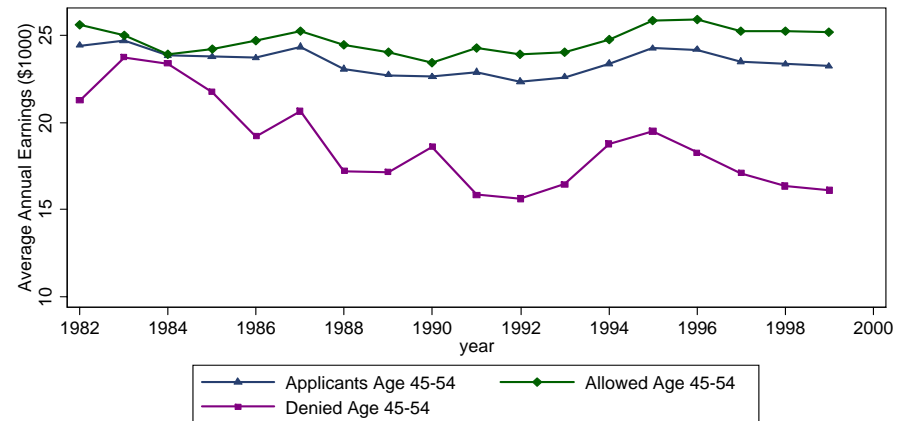
Panel B: Average Annual Earnings of All DI Applicants, and Allowed and Denied Applicants Men All Ages



Panel C: Average Annual Earnings of Men Age 35-44 Five Years Before and After First Application to DI



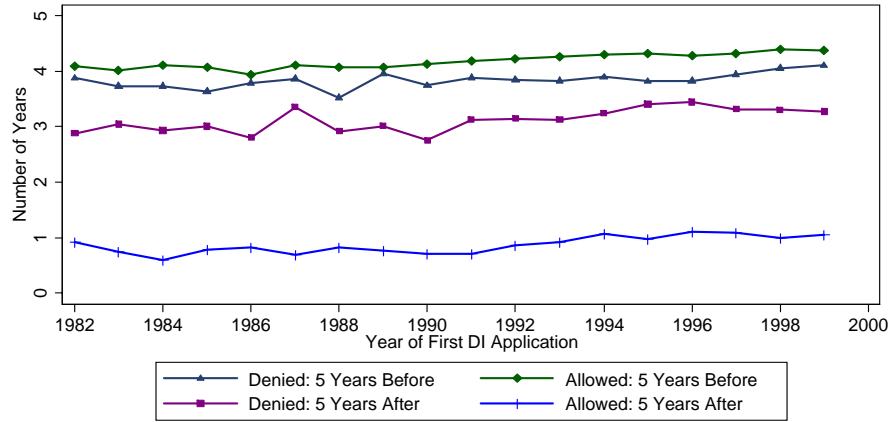
Panel D: Average Annual Earnings of Men Age 45-54 Five Years Before and After First Application to DI



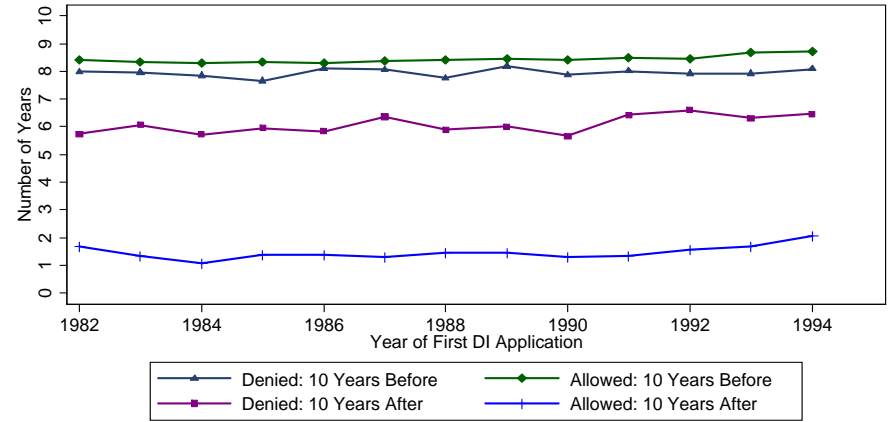
Source: 1% Files of Social Security administrative data (see text), Authors' Calculations.

Figure 2: Employment and Earnings of Allowed and Denied Men Age 34-44 Five and Ten Years Before and After First Application to DI

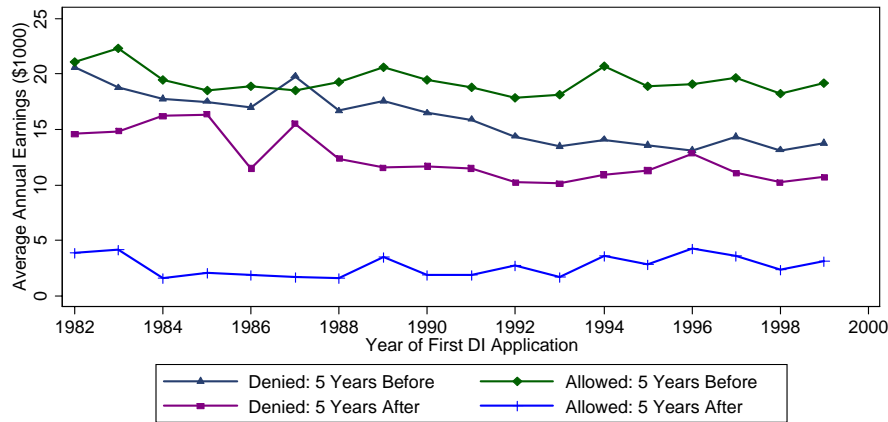
Panel A: Average Number of Years Worked Five Years Before and After First Application to DI



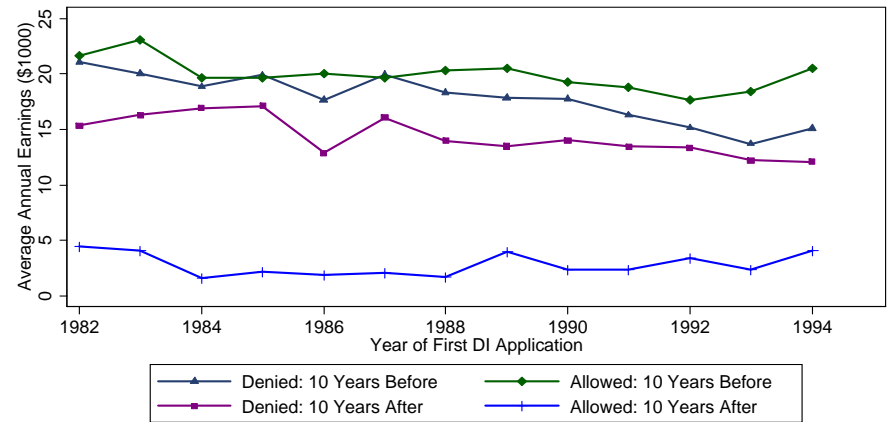
Panel A: Average Number of Years Worked Ten Years Before and After First Application to DI



Panel A: Average Annual Earnings Age Five Years Before and After First Application to DI



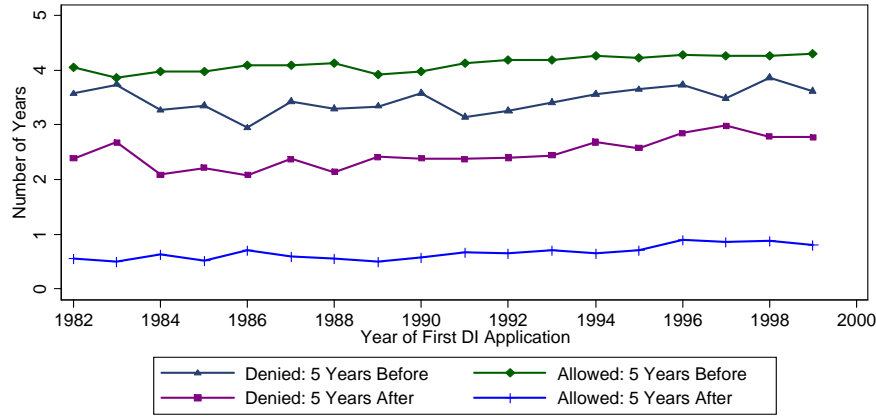
Panel A: Average Annual Earnings Age Ten Years Before and After First Application to DI



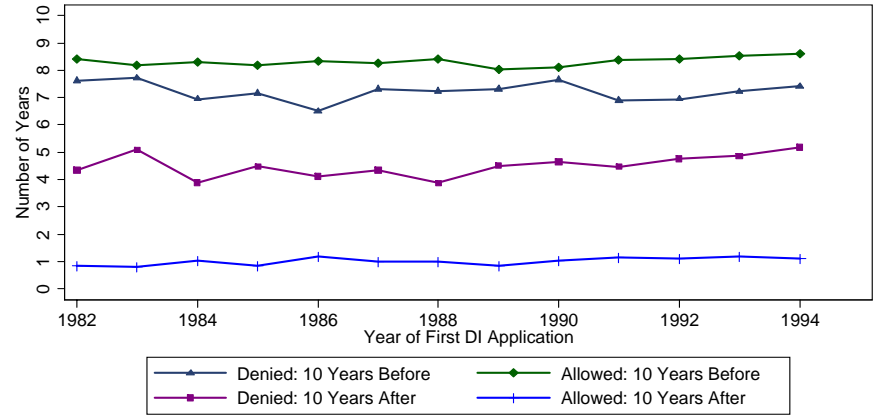
Source: 1% Files of Social Security administrative data (see text).

Figure 3: Employment and Earnings of Allowed and Denied Men Age 45-54 Five and Ten Years Before and After First Application to DI

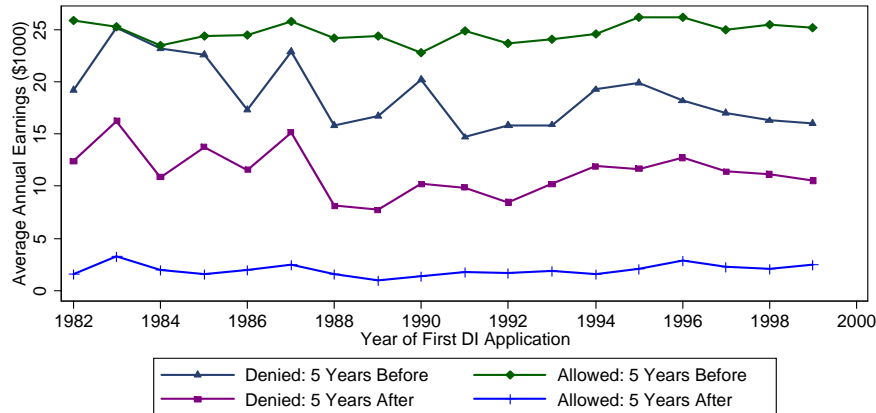
Panel B: Average Number of Years Worked Five Years Before and After First Application to DI



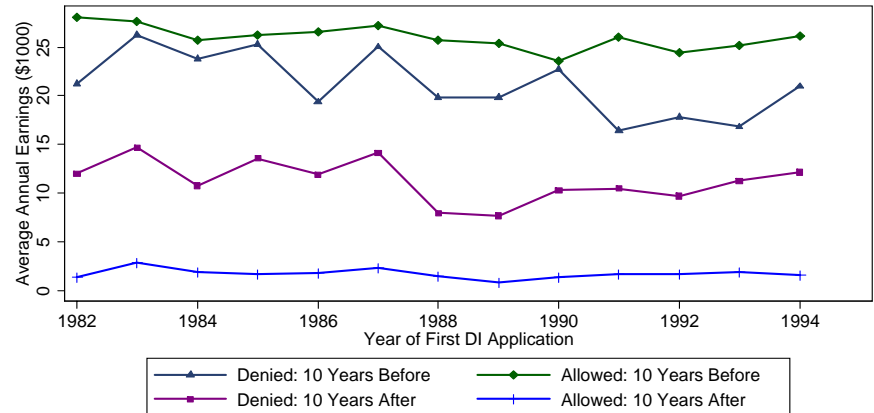
Panel B: Average Number of Years Worked Ten Years Before and After First Application to DI



Panel B: Average Annual Earnings Five Years Before and After First Application to DI



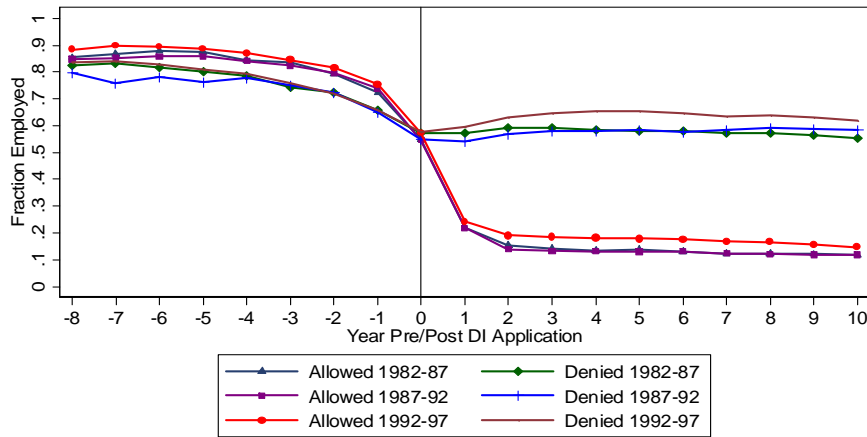
Panel B: Average Annual Earnings Ten Years Before and After First Application to DI



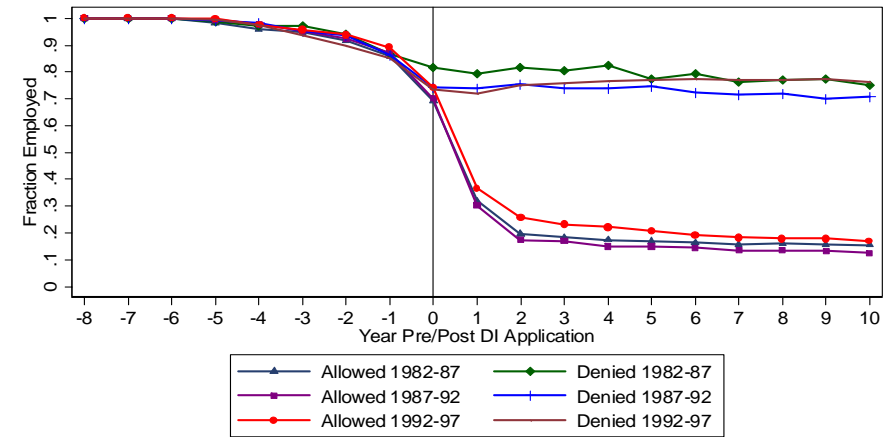
Source: 1% Files of Social Security administrative data (see text).

Figure 4: Average Annual Employment and Earnings for Allowed and Denied Male DI Applicants Before and After Application for Disability Insurance

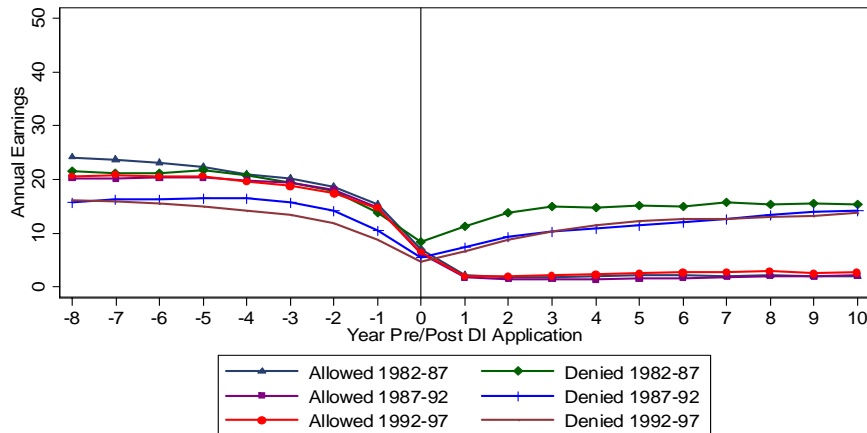
Panel A: Annual Fraction Employed Allowed and Denied Applicants, Full Sample



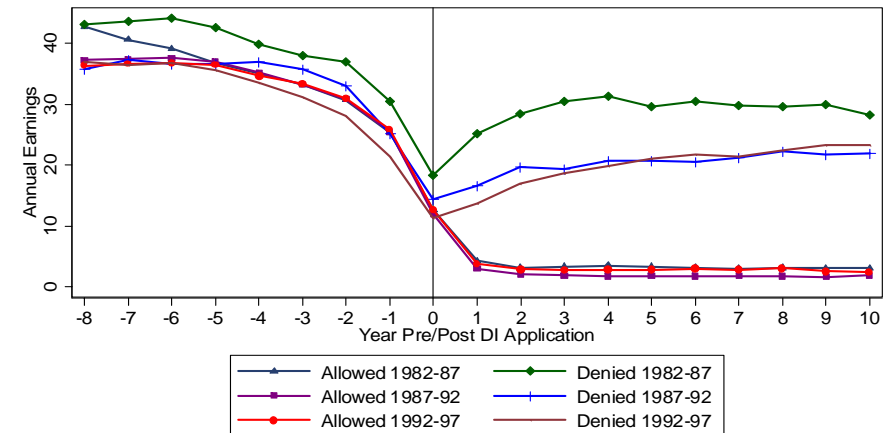
Panel B: Annual Fraction Employed Allowed and Applicants, Stable Sample



Panel C: Annual Earnings (\$1000) Allowed and Denied Applicants, Full Sample



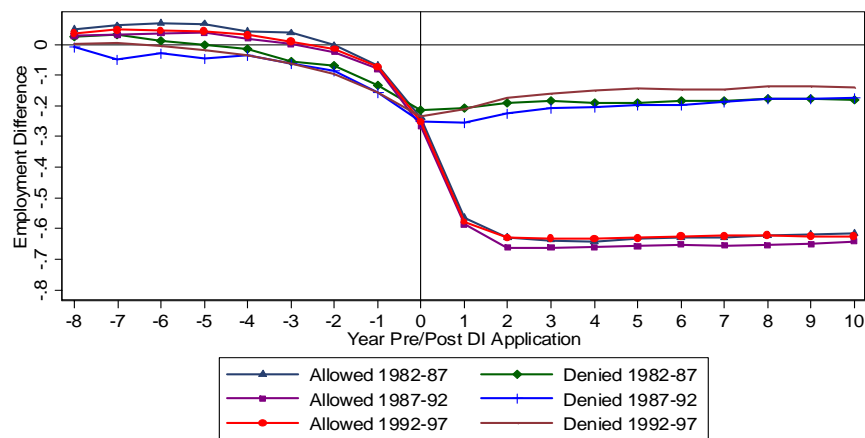
Panel D: Annual Earnings (\$1000) Allowed and Denied Applicants, Stable Sample



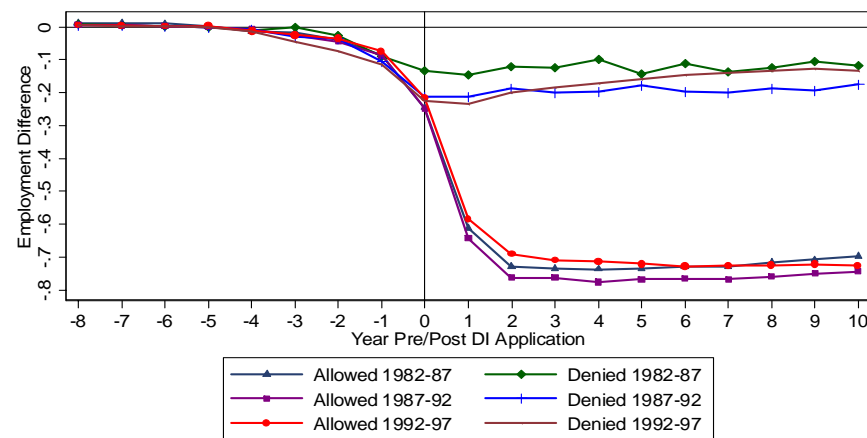
Source: 1% Files of Social Security administrative data (see text).

Figure 5: Difference in Employment and Earnings Between Allowed or Denied Men and Non-Applicants Before and After DI Application

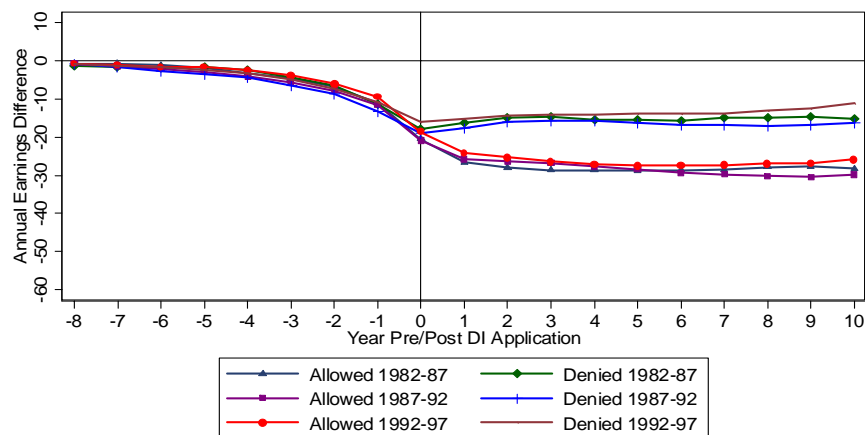
Panel A: Difference in Fraction Employed Relative to Non-Applicants Relative to Non-Applicants



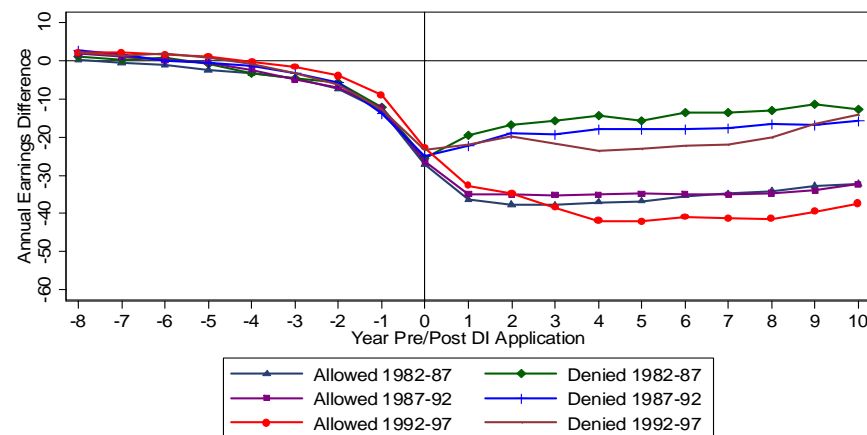
Panel B: Difference in Fraction Employed Relative to Non-Applicants, Stable Sample



Panel C: Difference in Annual Earnings (\$1000) Relative to Non-Applicants, Full Sample



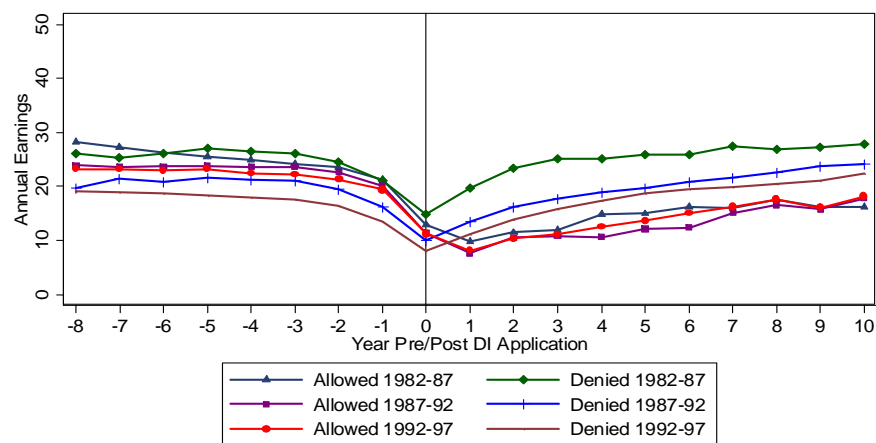
Panel D: Difference in Annual Earnings Relative to Non-Applicants (\$1000), Stable Sample



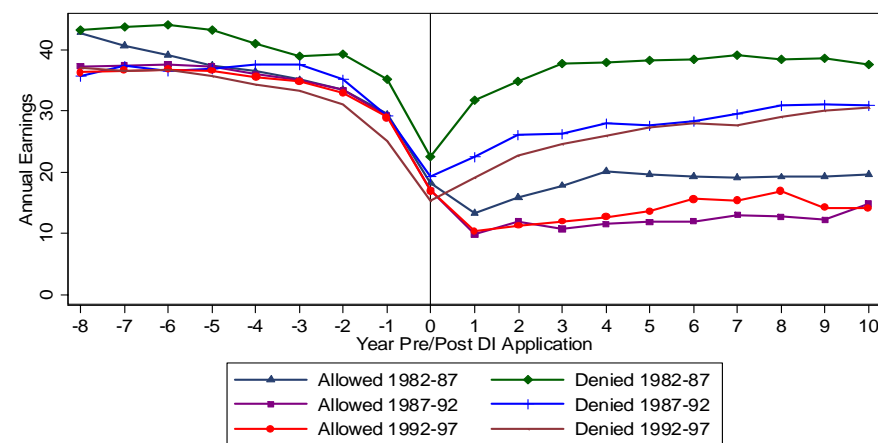
Source: 1% Files of Social Security administrative data (see text), Authors' Calculations.

Figure 6: Average Positive Annual Earnings for Allowed and Denied Male Applicants Before/After DI Application and Difference to Non-Applicants

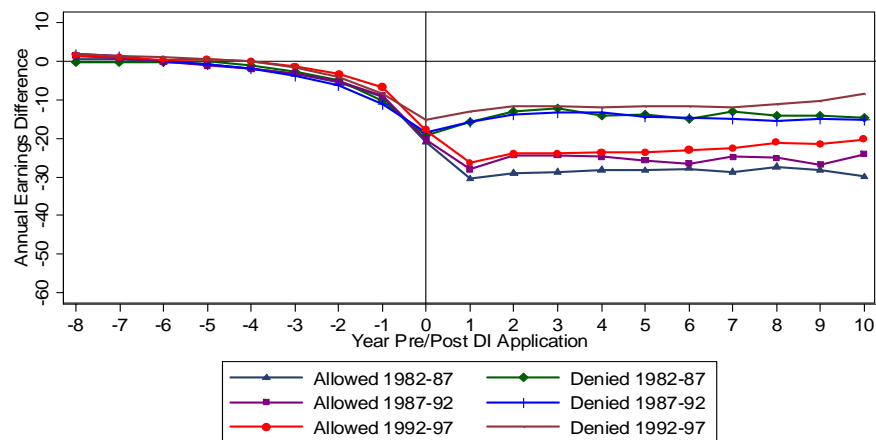
Panel A: Positive Annual Earnings (\$1000) Allowed and Denied Applicants, Full Sample



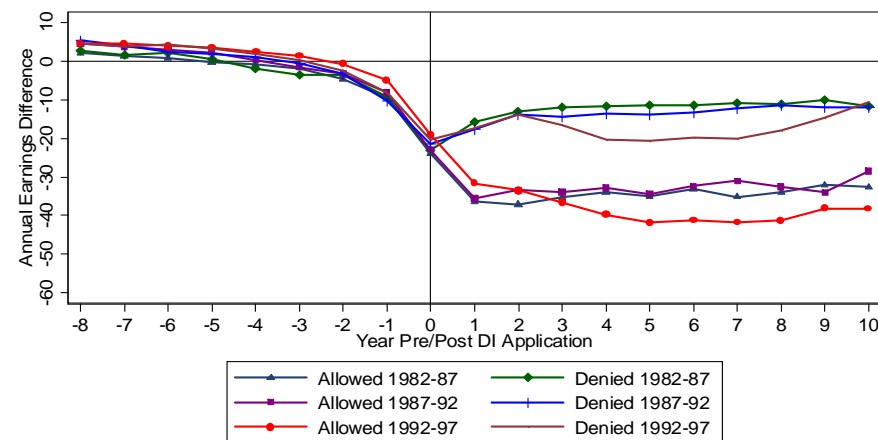
Panel B: Positive Annual Earnings (\$1000) Allowed and Denied Applicants, Stable Sample



Panel C: Difference in Positive Annual Earnings (\$1000) Relative to Non-Applicants, Full Sample



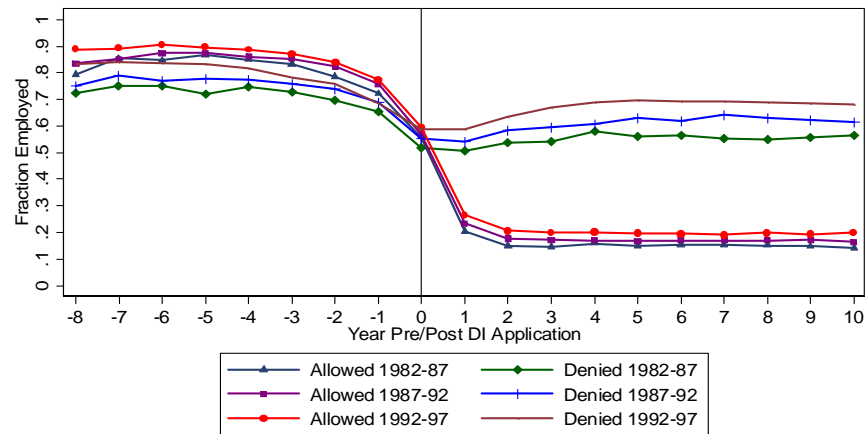
Panel D: Difference in Positive Annual Earnings (\$1000) Relative to Non-Applicants, Stable Sample



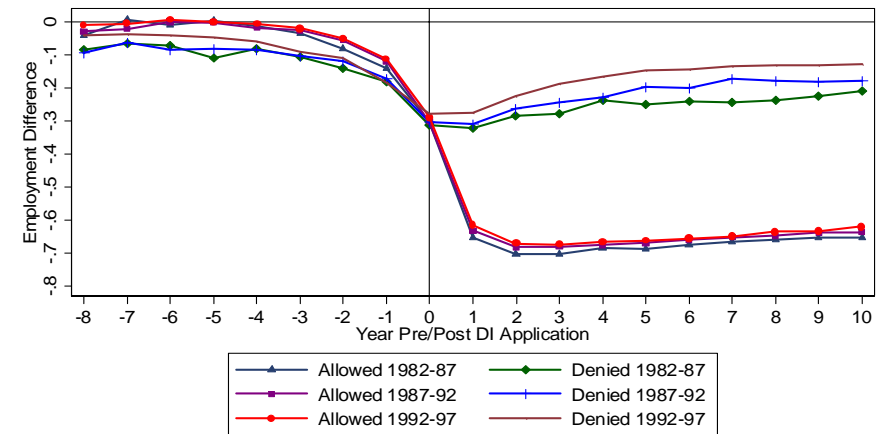
Source: 1% Files of Social Security administrative data (see text).

Figure 7: Average Annual Employment and Earnings for Allowed and Denied Female DI Applicants And Regression Adjusted Differences vs. Non-Applicants

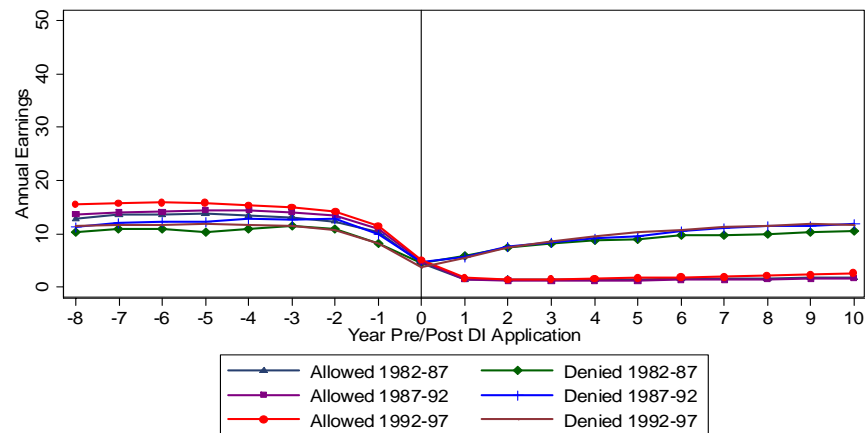
Panel A: Annual Fraction Employed Allowed and Denied Applicants, Full Sample



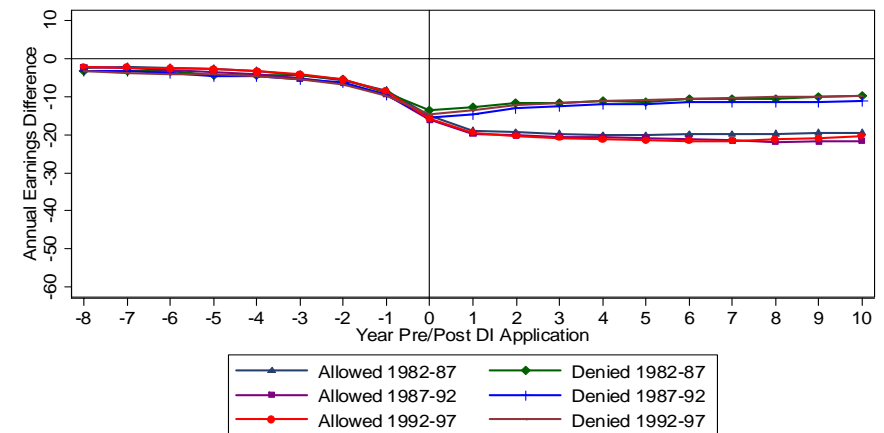
Panel B: Difference in Fraction Employed Relative to Non-Applicants, Full Sample



Panel C: Annual Earnings (\$1000) Allowed and Denied Applicants, Full Sample



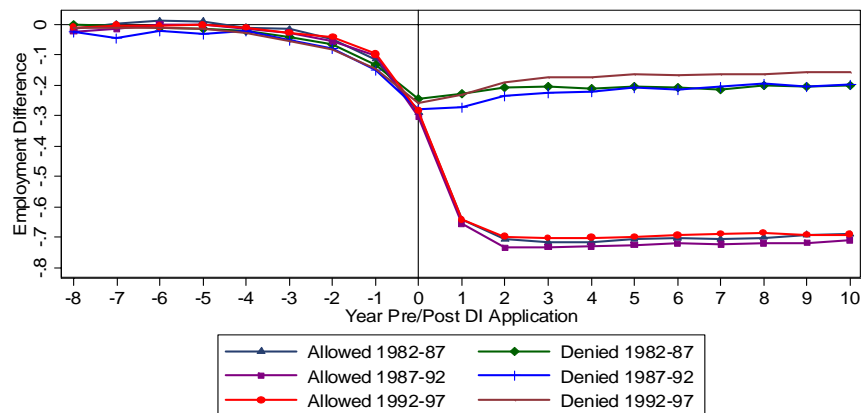
Panel D: Difference in Annual Earnings (\$1000) Relative to Non-Applicants, Full Sample



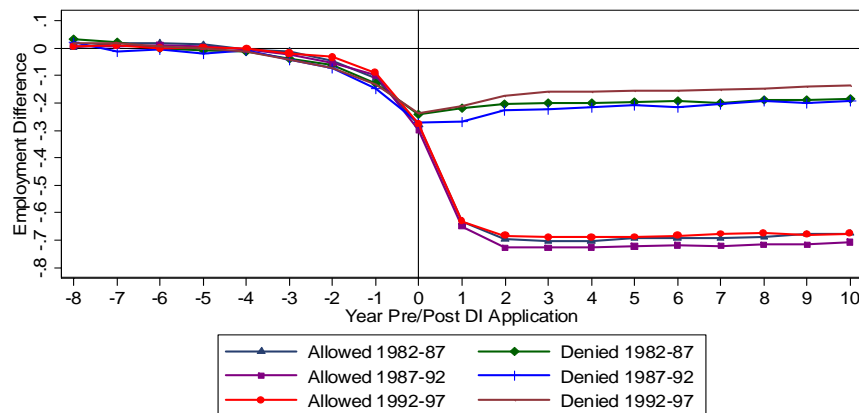
Source: 1% Files of Social Security administrative data (see text).

Figure 8: Difference in Employment and Earnings Between Allowed or Denied Men and Non-Applicants, Alternative Specifications, Full Sample

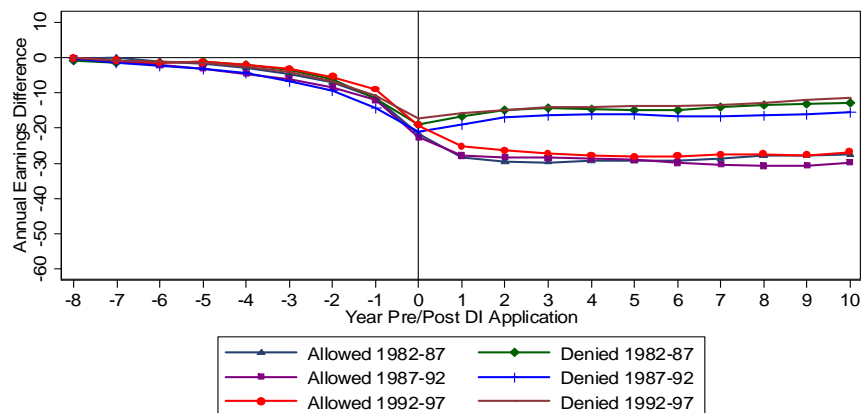
Panel A: Difference in Fraction Employed Relative to Non-Applicants With Two-Digit Industry*Year-Effects



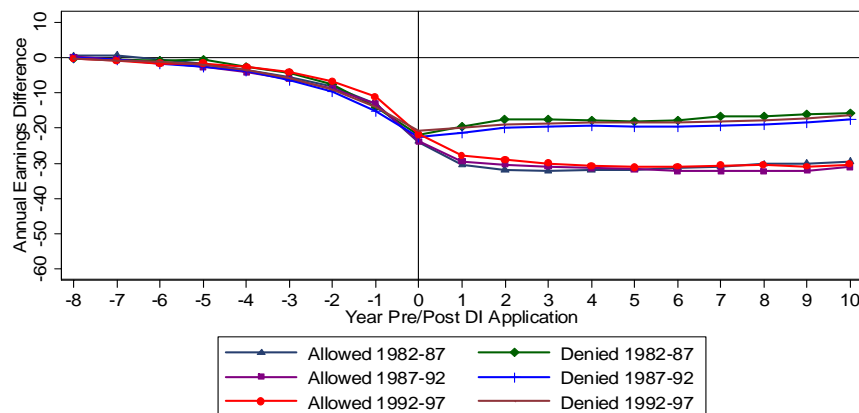
Panel B: Difference in Fraction Employed Relative to Non-Applicants With One Digit Industry*Earnings Decile*Year-Effects



Panel C: Difference in Annual Earnings (\$1000) Relative to Non-Applicants With Two-Digit Industry*Year Effects



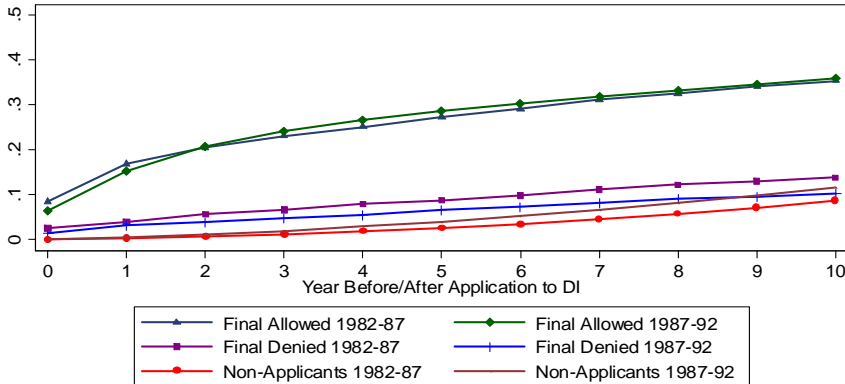
Panel D: Difference in Annual Earnings (\$1000) Relative to Non-Applicants with One-Digit Industry*Earnings Decile*Year-Effects



Source: 1% Files of Social Security administrative data (see text), Authors' Calculations.

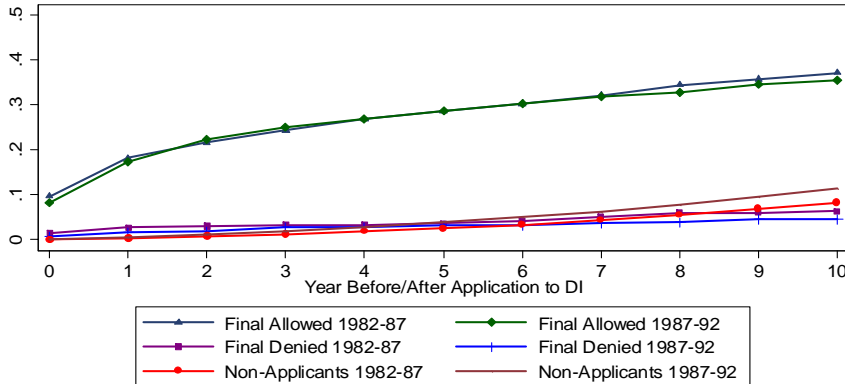
Figure 9: Fraction of Applicants Death by Year Since Application for Final and Intermediate Application Status, Full and Stable Sample

Panel A: Death by Year Since Application by Final Application Status
Men, Full Sample



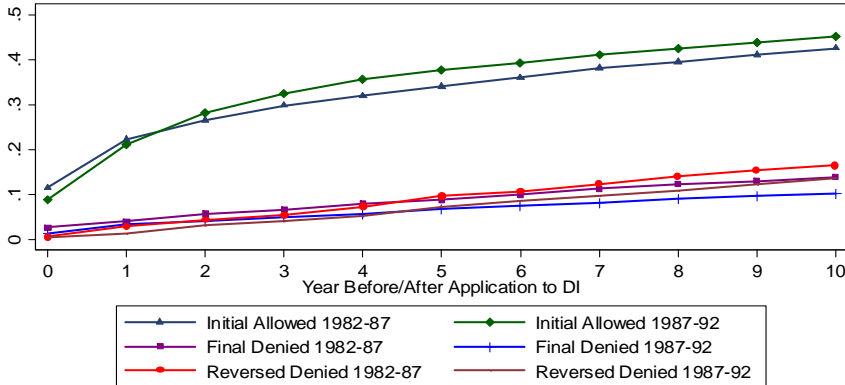
Source: 1% Files of Social Security administrative data (see text).

Panel B: Fraction Death by Year Since Application by Final Application Status
Men, Stable Sample



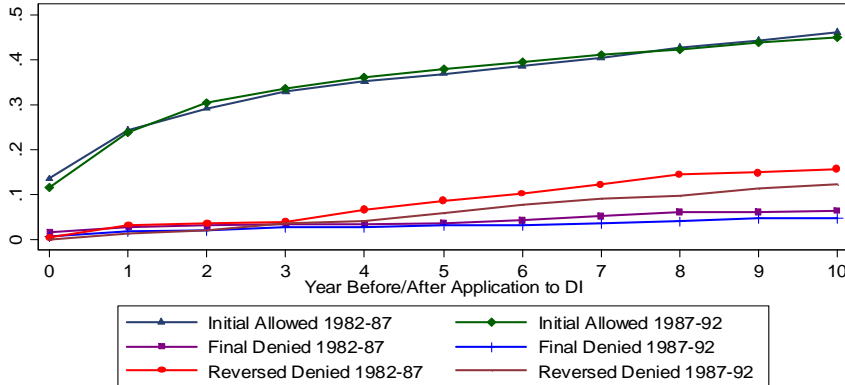
Source: 1% Files of Social Security administrative data (see text).

Panel C: Fraction Death by Year Since Application by Intermediate Application Status
Men, Full Sample



Source: 1% Files of Social Security administrative data (see text).

Panel D: Fraction Death by Year Since Application by Intermediate Application Status
Men, Stable Sample



Source: 1% Files of Social Security administrative data (see text).

Source: 1% Files of Social Security administrative data (see text).

Table 1: Average Annual Earnings and Years Employed Five and Ten Years Before and After Application to Disability Insurance, Allowed and Denied Men at Different Ages of Application and Different Application Years

		Number of Years Employed						Average Annual Earnings (\$1000)					
		1982-1986		1987-1992		1992-1997		1982-1986		1987-1992		1992-1997	
		Allowed	Denied	Allowed	Denied	Allowed	Denied	Allowed	Denied	Allowed	Denied	Allowed	Denied
A. Five Years Before and After Application													
All Ages	Pre-Avg.	4.03	3.69	4.11	3.73	4.27	3.86	21.87	19.39	20.82	16.31	21.32	14.48
	Post-Avg.	0.72	2.78	0.71	2.91	0.88	3.20	2.39	13.95	1.86	11.11	2.48	11.02
	Difference	<i>-3.31</i>	<i>-0.90</i>	<i>-3.41</i>	<i>-0.82</i>	<i>-3.38</i>	<i>-0.66</i>	<i>-19.49</i>	<i>-5.44</i>	<i>-18.95</i>	<i>-5.20</i>	<i>-18.84</i>	<i>-3.46</i>
Ages 35-44	Pre-Avg.	4.04	3.76	4.12	3.80	4.28	3.86	19.97	18.42	19.33	17.03	18.98	13.78
	Post-Avg.	0.77	2.93	0.74	3.01	0.99	3.28	2.64	14.70	2.11	12.23	3.04	11.05
	Difference	<i>-3.27</i>	<i>-0.82</i>	<i>-3.39</i>	<i>-0.79</i>	<i>-3.29</i>	<i>-0.58</i>	<i>-17.33</i>	<i>-3.72</i>	<i>-17.22</i>	<i>-4.79</i>	<i>-15.93</i>	<i>-2.73</i>
Ages 45-54	Pre-Avg.	4.00	3.41	4.05	3.35	4.24	3.53	24.67	21.63	24.31	17.85	24.90	17.91
	Post-Avg.	0.59	2.31	0.59	2.34	0.74	2.66	2.10	13.01	1.61	10.12	2.03	11.16
	Difference	<i>-3.42</i>	<i>-1.10</i>	<i>-3.47</i>	<i>-1.01</i>	<i>-3.49</i>	<i>-0.87</i>	<i>-22.57</i>	<i>-8.62</i>	<i>-22.70</i>	<i>-7.73</i>	<i>-22.87</i>	<i>-6.75</i>
B. Ten Years Before and After Application													
All Ages	Pre-Avg.	8.33	7.78	8.38	7.88	8.59	7.94	23.24	20.41	21.35	17.44	21.06	14.89
	Post-Avg.	1.25	5.47	1.29	5.78	1.50	6.25	2.39	14.52	2.06	12.58	2.48	12.14
	Difference	<i>-7.08</i>	<i>-2.32</i>	<i>-7.09</i>	<i>-2.09</i>	<i>-7.09</i>	<i>-1.69</i>	<i>-20.85</i>	<i>-5.88</i>	<i>-19.29</i>	<i>-4.86</i>	<i>-18.58</i>	<i>-2.75</i>
Ages 35-44	Pre-Avg.	8.33	7.91	8.44	7.97	8.61	7.98	20.75	19.56	19.62	17.78	18.81	14.61
	Post-Avg.	1.36	5.86	1.37	6.07	1.77	6.44	2.74	15.72	2.47	14.03	3.22	12.47
	Difference	<i>-6.97</i>	<i>-2.06</i>	<i>-7.07</i>	<i>-1.91</i>	<i>-6.84</i>	<i>-1.54</i>	<i>-18.01</i>	<i>-3.83</i>	<i>-17.16</i>	<i>-3.75</i>	<i>-15.59</i>	<i>-2.14</i>
Ages 45-54	Pre-Avg.	8.28	7.24	8.25	7.27	8.52	7.21	26.81	23.28	25.48	20.55	25.28	18.82
	Post-Avg.	0.96	4.40	1.02	4.37	1.14	4.96	1.93	12.57	1.52	10.06	1.68	11.13
	Difference	<i>-7.32</i>	<i>-2.84</i>	<i>-7.24</i>	<i>-2.90</i>	<i>-7.38</i>	<i>-2.25</i>	<i>-24.88</i>	<i>-10.71</i>	<i>-23.95</i>	<i>-10.49</i>	<i>-23.59</i>	<i>-7.69</i>

Notes: 1% Files of Social Security administrative data (see text).

Table 2: Employment and Earnings before and after Application to SSDI, Full Sample of Workers, Final Allowance and Denial Decisions, Men Only

	1982-1986			1987-1992			1992-1996		
	Final Allowed	Final Denied	Non-Applic.	Final Allowed	Final Denied	Non-Applic.	Final Allowed	Final Denied	Non-Applic.
Average Age	41.2	39.2	42.1	40.7	39.0	42.8	41.2	39.3	43.2
Fraction White	0.8	0.8	0.8	0.8	0.7	0.8	0.7	0.7	0.8
Average No. of Years with Positive Earnings, t-4 to t-1	3.2	3.0	3.4	3.3	3.0	3.5	3.4	3.1	3.5
Average No. of Years with Minimum Earnings, t-4 to t-1	2.9	2.7	3.3	3.0	2.6	3.3	3.1	2.7	3.3
Average Annual Earnings, t-4 to t-1	20,927	19,819	28,715	20,413	16,546	28,024	20,554	14,479	26,220
Fraction With Positive Earnings									
t-4	0.83	0.79	0.87	0.85	0.80	0.88	0.88	0.82	0.90
t-3	0.82	0.76	0.86	0.84	0.78	0.87	0.87	0.79	0.89
t-2	0.80	0.75	0.85	0.82	0.75	0.87	0.85	0.76	0.88
t-1	0.75	0.69	0.84	0.77	0.69	0.86	0.79	0.70	0.86
t	0.58	0.60	0.83	0.58	0.59	0.85	0.61	0.62	0.84
t+1	0.23	0.59	0.82	0.23	0.58	0.82	0.25	0.62	0.81
t+2	0.16	0.61	0.80	0.15	0.61	0.79	0.18	0.65	0.77
t+3	0.15	0.62	0.78	0.14	0.62	0.76	0.18	0.66	0.73
t+4	0.14	0.61	0.76	0.14	0.63	0.72	0.18	0.67	0.68
t+5	0.14	0.61	0.74	0.13	0.62	0.68	0.18	0.67	0.62
t+6	0.13	0.60	0.71	0.14	0.61	0.65	0.17	0.66	0.56
t+7	0.12	0.59	0.67	0.13	0.62	0.61	0.17	0.65	0.50
t+8	0.12	0.59	0.64	0.13	0.63	0.57			
t+9	0.12	0.59	0.60	0.12	0.62	0.53			
t+10	0.12	0.58	0.56	0.13	0.61	0.49			
Average Annual Earnings in 2000 Dollars									
t-4	22,747	22,511	29,350	21,815	18,900	27,953	22,409	16,806	26,983
t-3	22,314	21,120	28,917	21,773	17,995	28,195	21,819	15,839	26,447
t-2	21,000	19,733	28,365	20,775	16,631	28,218	20,439	14,250	26,120
t-1	17,647	15,912	28,230	17,290	12,657	27,728	17,549	11,021	25,330
t	8,271	9,661	27,898	7,149	6,683	27,071	7,677	5,752	24,700
t+1	2,743	12,716	27,786	2,051	8,837	25,976	2,581	8,435	23,571
t+2	2,448	15,692	27,310	1,872	11,567	24,851	2,501	11,222	22,260
t+3	2,431	16,993	26,869	2,015	12,693	23,633	2,796	12,806	21,029
t+4	2,788	17,293	25,767	2,071	13,599	22,159	3,126	13,990	19,230
t+5	3,001	17,877	24,853	2,332	14,298	21,198	3,540	15,283	17,459
t+6	3,121	17,917	23,582	2,649	15,136	20,150	3,908	15,442	15,221
t+7	2,948	18,931	22,268	2,914	16,277	19,105	4,151	15,464	12,920
t+8	3,010	18,798	21,002	3,216	17,298	17,775			
t+9	3,014	18,697	19,549	3,183	17,697	16,331			
t+10	3,166	19,136	18,730	3,515	18,018	14,768			

Notes: 1% Sampel Social Security administrative data.

Table 3: Employment and Earnings Differences Before and After Application to SSDI, Main Effects for Allowed and Denied Applicants, Men Age 34-50 at Application, Full Sample

	Application During 1982-1986				Application During 1987-1992				Application During 1992-1997			
	No Covariates		Basic Model		No Covariates		Basic Model		No Covariates		Basic Model	
	Denied	Allowed	Denied	Allowed	Denied	Allowed	Denied	Allowed	Denied	Allowed	Denied	Allowed
A. Employment												
Baseline Difference	-0.007 (0.014)	0.026 (0.008)	0.033 (0.013)	0.062 (0.007)	-0.064 (0.011)	0.011 (0.006)	-0.017 (0.010)	0.042 (0.006)	-0.005 (0.008)	0.048 (0.005)	0.017 (0.008)	0.053 (0.005)
Dip Before Application	-0.021 (0.003)	0.004 (0.002)	-0.004 (0.003)	0.021 (0.002)	-0.025 (0.003)	0.000 (0.001)	-0.006 (0.002)	0.015 (0.001)	-0.020 (0.002)	0.006 (0.001)	-0.003 (0.002)	0.018 (0.001)
Drop at Application	-0.242 (0.014)	-0.689 (0.007)	-0.153 (0.013)	-0.605 (0.007)	-0.264 (0.010)	-0.702 (0.005)	-0.159 (0.010)	-0.608 (0.005)	-0.197 (0.008)	-0.652 (0.005)	-0.101 (0.007)	-0.571 (0.005)
Recovery After Application	-0.004 (0.002)	-0.004 (0.001)	-0.003 (0.002)	-0.002 (0.001)	0.002 (0.001)	-0.003 (0.001)	-0.001 (0.001)	-0.004 (0.001)	-0.002 (0.001)	-0.005 (0.001)	-0.003 (0.001)	-0.006 (0.001)
B. Annual Earnings												
Baseline Difference	-19.02 (0.91)	-16.43 (0.65)	-0.68 (0.45)	0.15 (0.38)	-24.06 (0.60)	-19.95 (0.51)	-0.42 (0.44)	-0.14 (0.33)	-20.92 (0.47)	-16.17 (0.42)	0.11 (0.30)	-0.05 (0.22)
Dip Before Application	-6.41 (0.22)	-6.25 (0.16)	-0.45 (0.13)	-0.53 (0.12)	-7.80 (0.17)	-6.63 (0.14)	-0.93 (0.14)	-0.67 (0.11)	-7.39 (0.11)	-5.62 (0.11)	-0.34 (0.09)	-0.14 (0.07)
Drop at Application	-25.90 (0.81)	-38.43 (0.40)	-12.71 (0.79)	-26.51 (0.58)	-30.56 (0.51)	-38.80 (0.36)	-12.59 (0.57)	-23.43 (0.50)	-27.14 (0.34)	-34.82 (0.26)	-10.73 (0.43)	-22.70 (0.36)
Recovery After Application	0.17 (0.08)	0.03 (0.03)	-0.22 (0.10)	-0.14 (0.07)	0.61 (0.07)	0.09 (0.02)	-0.49 (0.12)	-0.87 (0.10)	0.57 (0.06)	0.11 (0.03)	-0.05 (0.08)	-0.45 (0.06)

Notes: Basic model includes year effects, a quartic in age, and a quartic in previous earnings. Standard errors clustered at individual level in parentheses. Authors' calculations from 1% Files of Social Security administrative data (see text).

Table 4: Employment and Earnings Differences Before and After Application to SSDI, Difference for Allowed and Denied Applicants, Men 34-50 at Application, Statble Sample

	Application During 1982-1986				Application During 1987-1992				Application During 1992-1997			
	No Covariates		Basic Model		No Covariates		Basic Model		No Covariates		Basic Model	
	Denied	Allowed	Denied	Allowed	Denied	Allowed	Denied	Allowed	Denied	Allowed	Denied	Allowed
A. Employment												
Baseline Difference	0.073 (0.002)	0.073 (0.002)	0.009 (0.003)	0.017 (0.003)	0.071 (0.002)	0.071 (0.002)	0.009 (0.002)	0.011 (0.001)	0.060 (0.001)	0.060 (0.001)	0.009 (0.001)	0.010 (0.001)
Dip Before Application	0.017 (0.003)	0.012 (0.002)	0.002 (0.003)	0.002 (0.002)	0.014 (0.002)	0.014 (0.001)	0.000 (0.002)	0.002 (0.001)	0.008 (0.002)	0.011 (0.001)	-0.002 (0.002)	0.002 (0.001)
Drop at Application	-0.109 (0.026)	-0.739 (0.016)	-0.088 (0.026)	-0.707 (0.016)	-0.176 (0.025)	-0.759 (0.011)	-0.152 (0.025)	-0.730 (0.012)	-0.182 (0.018)	-0.695 (0.011)	-0.151 (0.018)	-0.662 (0.011)
Recovery After Application	-0.008 (0.004)	-0.005 (0.002)	-0.004 (0.004)	0.000 (0.002)	-0.006 (0.003)	-0.006 (0.001)	-0.005 (0.003)	-0.003 (0.002)	0.002 (0.003)	-0.011 (0.002)	0.004 (0.003)	-0.009 (0.002)
B. Annual Earnings												
Baseline Difference	-9.04 (1.85)	-10.99 (1.45)	1.19 (0.66)	0.77 (0.55)	-15.65 (1.41)	-14.95 (1.08)	2.38 (0.60)	1.69 (0.59)	-15.03 (1.30)	-15.24 (0.91)	1.20 (0.71)	1.36 (0.69)
Dip Before Application	-4.08 (0.52)	-5.73 (0.33)	-0.54 (0.26)	-0.46 (0.25)	-5.17 (0.46)	-5.68 (0.30)	-0.30 (0.27)	-0.62 (0.20)	-6.04 (0.37)	-5.55 (0.28)	-0.16 (0.23)	0.11 (0.22)
Drop at Application	-22.41 (2.35)	-49.22 (0.79)	-13.56 (1.96)	-35.44 (1.12)	-32.73 (1.59)	-50.43 (0.64)	-16.33 (1.35)	-33.14 (1.00)	-33.81 (1.21)	-48.85 (0.63)	-17.99 (1.40)	-33.03 (0.91)
Recovery After Application	-0.09 (0.21)	-0.04 (0.03)	0.07 (0.27)	0.26 (0.16)	0.33 (0.21)	-0.03 (0.03)	-0.30 (0.24)	-0.43 (0.14)	0.77 (0.17)	-0.02 (0.04)	0.22 (0.22)	-0.57 (0.15)

Notes: Basic model includes year effects, a quartic in age, and a quartic in previous earnings. Standard errors clustered at individual level in parentheses. Authors' calculations from 1% Files of Social Security administrative data (see text).

Table 5: Employment and Earnings Differences Before and After Application to SSDI, Main Effects for Allowed and Denied Applicants, Additional Samples (Older Workers and Longer Follow Period)

	Applications Starting in 1982				Applications Starting in 1987				Applications Starting in 1992			
	Young Workers, Long Follow Up: 1982-1992		Older Workers, Short Follow Up: 1982-1987		Young Workers, Long Follow Up: 1982-1992		Older Workers, Short Follow Up: 1982-1987		Young Workers, Long Follow Up: 1982-1992		Older Workers, Short Follow Up: 1982-1987	
	Denied	Allowed	Denied	Allowed	Denied	Allowed	Denied	Allowed	Denied	Allowed	Denied	Allowed
A. Employment												
Difference at Baseline	-0.020 (0.007)	0.071 (0.004)	-0.006 (0.023)	0.039 (0.010)	0.011 (0.005)	0.075 (0.003)	-0.045 (0.022)	0.064 (0.008)	0.025 (0.005)	0.087 (0.003)	0.010 (0.017)	0.078 (0.007)
Dip Before Application	-0.014 (0.002)	0.023 (0.001)	-0.011 (0.005)	0.024 (0.002)	-0.005 (0.002)	0.025 (0.001)	-0.021 (0.005)	0.024 (0.002)	0.000 (0.001)	0.027 (0.001)	-0.017 (0.004)	0.028 (0.002)
Drop at Application	-0.209 (0.008)	-0.582 (0.004)	-0.219 (0.020)	-0.573 (0.009)	-0.155 (0.006)	-0.559 (0.004)	-0.195 (0.020)	-0.579 (0.008)	-0.134 (0.006)	-0.542 (0.004)	-0.190 (0.016)	-0.564 (0.007)
Recovery After Application	0.000 (0.001)	-0.001 (0.001)	-0.001 (0.003)	0.004 (0.001)	0.001 (0.001)	-0.005 (0.001)	-0.005 (0.003)	0.002 (0.001)	0.015 (0.001)	0.002 (0.001)	-0.003 (0.003)	-0.007 (0.001)
B. Annual Earnings												
Difference at Baseline	-5.19 (0.39)	-1.89 (0.30)	-5.38 (0.72)	-2.99 (0.46)	-3.62 (0.38)	-1.84 (0.24)	-5.84 (0.81)	-2.58 (0.54)	-1.73 (0.34)	-0.32 (0.21)	-4.95 (0.61)	-3.30 (0.54)
Dip Before Application	-2.26 (0.12)	-1.31 (0.09)	-1.17 (0.18)	-0.88 (0.13)	-1.75 (0.12)	-1.02 (0.08)	-1.98 (0.22)	-1.13 (0.15)	-1.03 (0.11)	-0.41 (0.07)	-1.36 (0.16)	-0.82 (0.12)
Drop at Application	-15.24 (0.52)	-25.53 (0.37)	-14.27 (0.93)	-26.94 (0.69)	-14.21 (0.47)	-24.84 (0.35)	-14.42 (1.19)	-26.63 (0.92)	-10.09 (0.43)	-21.58 (0.27)	-12.28 (0.83)	-25.74 (0.61)
Recovery After Application	-0.41 (0.17)	-0.61 (0.17)	0.67 (0.16)	1.04 (0.09)	-0.03 (0.06)	-0.36 (0.05)	0.65 (0.16)	0.83 (0.14)	0.73 (0.07)	0.28 (0.05)	0.52 (0.16)	0.42 (0.11)

Notes: Basic model includes year effects, a quartic in age, and a quartic in previous earnings. Standard errors clustered at individual level in parentheses. Authors' calculations from 1% Files of Social Security administrative data (see text).

Table 6: Employment and Earnings Differences Before and After Application to SSDI, Main Effects for Allowed and Denied Applicants, Additional Sub-Samples, Stable Workers (Older Workers and Longer Follow Period)

	Applications Starting in 1982				Applications Starting in 1987				Applications Starting in 1992			
	Young Workers, Long Follow Up: 1982-1992		Older Workers, Short Follow Up: 1982-1987		Young Workers, Long Follow Up: 1982-1992		Older Workers, Short Follow Up: 1982-1987		Young Workers, Long Follow Up: 1982-1992		Older Workers, Short Follow Up: 1982-1987	
	Denied	Allowed	Denied	Allowed	Denied	Allowed	Denied	Allowed	Denied	Allowed	Denied	Allowed
A. Employment												
Difference at Baseline	-0.010 (0.010)	0.028 (0.004)	0.024 (0.006)	0.019 (0.003)	0.013 (0.006)	0.028 (0.003)	0.020 (0.005)	0.022 (0.003)	0.014 (0.006)	0.030 (0.003)	0.013 (0.002)	0.014 (0.002)
Dip Before Application	-0.015 (0.004)	0.007 (0.002)	0.005 (0.003)	0.008 (0.002)	-0.009 (0.003)	0.011 (0.001)	0.005 (0.004)	0.009 (0.002)	-0.005 (0.002)	0.010 (0.001)	0.004 (0.003)	0.006 (0.001)
Drop at Application	-0.177 (0.020)	-0.660 (0.009)	-0.166 (0.037)	-0.699 (0.015)	-0.194 (0.017)	-0.654 (0.007)	-0.144 (0.041)	-0.686 (0.014)	-0.200 (0.014)	-0.628 (0.007)	-0.197 (0.031)	-0.674 (0.011)
Recovery After Application	-0.003 (0.003)	0.000 (0.001)	-0.006 (0.005)	0.012 (0.002)	0.003 (0.003)	-0.006 (0.001)	-0.005 (0.005)	0.006 (0.002)	0.024 (0.003)	-0.003 (0.002)	0.002 (0.006)	-0.006 (0.002)
B. Annual Earnings												
Difference at Baseline	-4.21 (0.74)	-1.33 (0.45)	-3.25 (0.96)	-2.37 (0.78)	-1.83 (0.70)	-0.39 (0.60)	-1.38 (0.94)	-1.67 (0.86)	-2.02 (1.44)	-0.38 (0.64)	-2.89 (1.20)	-2.88 (1.27)
Dip Before Application	-2.65 (0.27)	-1.42 (0.16)	-0.62 (0.30)	-0.92 (0.26)	-1.70 (0.34)	-0.73 (0.18)	-1.22 (0.37)	-1.33 (0.32)	-1.56 (0.43)	-0.68 (0.26)	-0.75 (0.28)	-0.43 (0.27)
Drop at Application	-18.89 (1.12)	-34.24 (0.61)	-15.56 (2.17)	-34.84 (1.16)	-19.93 (1.10)	-33.51 (0.71)	-21.83 (2.10)	-35.57 (1.14)	-20.67 (2.14)	-32.44 (1.35)	-20.71 (2.48)	-33.04 (1.44)
Recovery After Application	0.43 (0.13)	0.53 (0.08)	0.38 (0.35)	1.61 (0.16)	0.28 (0.18)	0.00 (0.12)	1.30 (0.25)	1.70 (0.17)	1.42 (0.28)	0.08 (0.18)	1.08 (0.49)	1.30 (0.25)

Notes: Basic model includes year effects, a quartic in age, and a quartic in previous earnings. Standard errors clustered at individual level in parentheses. Authors' calculations from 1% Files of Social Security administrative data (see text).

Table 7: Differences Before and After Application to SSDI, Difference for Allowed and Denied Applicants, Men Age 34-50 at Application within Ten Years of Baseline, Interactions Included Jointly, Full Sample

	Employment				Annual Earnings (\$1000)			
	Difference at Baseline	Dip Before Application	Drop at Application	Recovery After Application	Difference at Baseline	Dip Before Application	Drop at Application	Recovery After Application
Panel A: 1982-1987								
Main Denied	0.0718 (0.0074)	0.0200 (0.0023)	-0.6044 (0.0075)	0.0015 (0.0010)	0.98 (0.52)	-0.17 (0.17)	-13.36 (0.55)	-0.23 (0.09)
Main Allowed	-0.0160 (0.0137)	-0.0153 (0.0042)	-0.2555 (0.0176)	-0.0002 (0.0024)	-1.73 (0.68)	-0.66 (0.22)	-8.06 (0.85)	-0.06 (0.12)
High Earner Allowed	-0.0409 (0.0069)	-0.0169 (0.0023)	-0.0656 (0.0087)	-0.0022 (0.0011)	-2.14 (0.55)	-1.78 (0.19)	-24.34 (0.57)	0.18 (0.04)
High Earner Denied	-0.0104 (0.0139)	0.0024 (0.0044)	0.0468 (0.0204)	-0.0001 (0.0027)	-2.79 (0.89)	-1.63 (0.30)	-14.67 (1.16)	0.04 (0.13)
High Education Allowed	0.1102 (0.0110)	0.0403 (0.0033)	0.1752 (0.0140)	-0.0042 (0.0019)	14.80 (0.83)	5.41 (0.26)	9.69 (0.90)	-0.23 (0.07)
High Education Denied	0.1677 (0.0183)	0.0483 (0.0060)	0.2271 (0.0274)	-0.0008 (0.0039)	14.72 (1.10)	4.71 (0.35)	12.49 (1.36)	0.04 (0.16)
Manufacturing Allowed	-0.0082 (0.0070)	0.0031 (0.0024)	-0.0026 (0.0097)	-0.0009 (0.0013)	0.69 (0.77)	0.42 (0.26)	0.26 (0.78)	-0.03 (0.04)
Manufacturing Denied	-0.0190 (0.0154)	0.0006 (0.0048)	0.0280 (0.0221)	0.0000 (0.0029)	1.24 (0.94)	0.13 (0.32)	2.60 (1.26)	-0.08 (0.12)
Panel B: 1987-1992								
Main Denied	0.0710 (0.0057)	0.0266 (0.0018)	-0.5890 (0.0066)	-0.0023 (0.0010)	-0.26 (0.56)	-0.28 (0.19)	-13.02 (0.70)	-0.52 (0.12)
Main Allowed	0.0255 (0.0088)	0.0009 (0.0029)	-0.1497 (0.0133)	0.0031 (0.0022)	-1.77 (0.82)	-0.80 (0.28)	-8.02 (0.98)	0.03 (0.16)
High Earner Allowed	-0.0536 (0.0055)	-0.0192 (0.0018)	-0.0816 (0.0079)	-0.0032 (0.0012)	-1.75 (0.58)	-1.76 (0.20)	-26.13 (0.71)	0.18 (0.06)
High Earner Denied	-0.0347 (0.0088)	-0.0144 (0.0034)	-0.0265 (0.0168)	-0.0019 (0.0026)	-0.87 (0.64)	-2.11 (0.29)	-17.03 (0.96)	0.22 (0.16)
High Education Allowed	0.0968 (0.0085)	0.0326 (0.0025)	0.1808 (0.0120)	-0.0053 (0.0018)	14.13 (0.84)	5.19 (0.25)	10.16 (0.78)	0.05 (0.11)
High Education Denied	0.1225 (0.0125)	0.0454 (0.0042)	0.1722 (0.0211)	-0.0002 (0.0035)	16.17 (0.98)	5.67 (0.34)	14.08 (1.19)	0.09 (0.19)
Manufacturing Allowed	-0.0111 (0.0057)	-0.0011 (0.0020)	0.0044 (0.0091)	0.0005 (0.0014)	1.10 (0.70)	0.74 (0.23)	0.81 (0.76)	0.07 (0.06)
Manufacturing Denied	-0.0053 (0.0102)	-0.0008 (0.0038)	0.0041 (0.0187)	-0.0029 (0.0029)	0.69 (0.74)	0.59 (0.28)	2.03 (0.97)	-0.31 (0.14)
Panel C: 1992-1997								
Main Denied	0.0906 (0.0053)	0.0279 (0.0015)	-0.5853 (0.0066)	0.0053 (0.0016)	0.20 (0.35)	-0.06 (0.11)	-12.24 (0.37)	0.05 (0.06)
Main Allowed	0.0354 (0.0079)	0.0049 (0.0023)	-0.1517 (0.0112)	0.0199 (0.0028)	-0.71 (0.40)	-0.63 (0.12)	-6.01 (0.48)	0.65 (0.10)
High Earner Allowed	-0.0653 (0.0049)	-0.0198 (0.0015)	-0.0680 (0.0079)	-0.0036 (0.0019)	-1.73 (0.36)	-1.28 (0.12)	-23.57 (0.40)	0.22 (0.10)

High Earner Denied	-0.0524 (0.0079)	-0.0147 (0.0025)	-0.0320 (0.0139)	0.0013 (0.0033)	-3.23 (0.64)	-1.64 (0.17)	-16.43 (0.88)	0.73 (0.18)
High Education Allowed	0.0897 (0.0072)	0.0343 (0.0020)	0.1846 (0.0107)	-0.0042 (0.0027)	12.42 (0.54)	4.56 (0.17)	8.92 (0.53)	0.01 (0.22)
High Education Denied	0.1030 (0.0111)	0.0391 (0.0032)	0.1407 (0.0173)	-0.0018 (0.0044)	12.73 (0.71)	4.22 (0.22)	11.72 (0.87)	-0.01 (0.23)
Manufacturing Allowed	-0.0068 (0.0053)	-0.0022 (0.0017)	0.0262 (0.0094)	-0.0026 (0.0024)	1.79 (0.50)	0.59 (0.17)	0.29 (0.55)	-0.12 (0.11)
Manufacturing Denied	0.0199 (0.0090)	0.0029 (0.0029)	0.0108 (0.0156)	-0.0065 (0.0037)	2.10 (0.58)	0.59 (0.18)	0.45 (0.72)	-0.18 (0.15)

Notes: Model includes year effects, a quartic in age, and a quartic in previous earnings. Standard errors clustered at individual level in parentheses. Authors' calculations from 1% Files of Social Security administrative data (see text).

Table 8: Differences Before and After Application to SSDI, Difference for Allowed and Denied Applicants, Men Age 34-50 at Application within Ten Years of Baseline, Interactions Included Jointly, Stable Sample

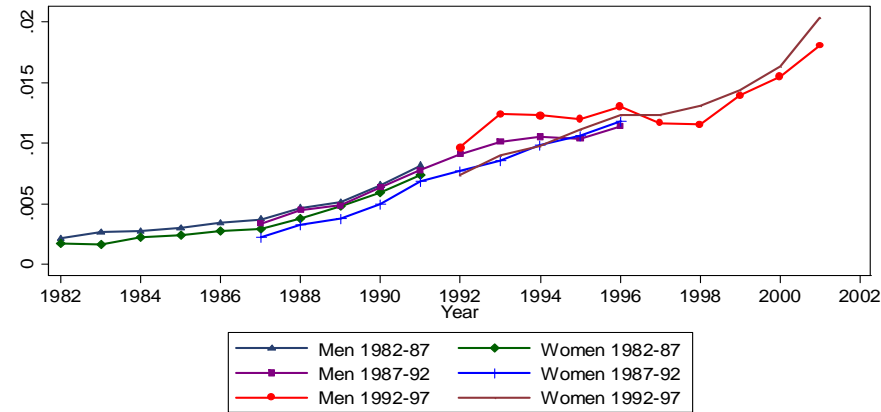
	Employment				Annual Earnings (\$1000)			
	Difference at Baseline	Dip Before Application	Drop at Application	Recovery After Application	Difference at Baseline	Dip Before Application	Drop at Application	Recovery After Application
Panel A: 1982-1987								
Main Denied	0.0541 (0.0084)	0.0060 (0.0036)	-0.7140 (0.0159)	0.0025 (0.0021)	1.78 (0.90)	-0.44 (0.30)	-22.13 (0.89)	0.32 (0.12)
Main Allowed	-0.0217 (0.0251)	-0.0321 (0.0100)	-0.3055 (0.0434)	0.0018 (0.0053)	-2.21 (1.45)	-1.46 (0.51)	-14.01 (1.92)	0.41 (0.23)
High Earner Allowed	-0.0367 (0.0083)	-0.0039 (0.0034)	0.0749 (0.0189)	-0.0043 (0.0023)	-2.76 (0.97)	-1.57 (0.38)	-23.47 (1.13)	0.03 (0.06)
High Earner Denied	0.0078 (0.0204)	0.0106 (0.0087)	0.1317 (0.0422)	0.0039 (0.0053)	-3.05 (1.59)	-1.87 (0.60)	-10.54 (2.37)	-0.01 (0.25)
High Education Allowed	0.1043 (0.0176)	0.0376 (0.0062)	0.1645 (0.0309)	-0.0020 (0.0041)	18.29 (1.72)	6.15 (0.47)	12.52 (1.82)	-0.25 (0.15)
High Education Denied	0.1472 (0.0262)	0.0348 (0.0129)	0.1836 (0.0599)	0.0012 (0.0087)	20.75 (2.37)	5.63 (1.01)	12.23 (3.34)	0.10 (0.35)
Manufacturing Allowed	-0.0226 (0.0086)	0.0002 (0.0036)	0.0354 (0.0184)	0.0003 (0.0022)	-0.33 (1.19)	0.20 (0.42)	-0.54 (1.24)	0.08 (0.06)
Manufacturing Denied	0.0056 (0.0220)	0.0146 (0.0095)	0.0675 (0.0447)	-0.0041 (0.0055)	1.63 (1.81)	0.33 (0.66)	3.33 (2.51)	-0.12 (0.26)
Panel B: 1987-1992								
Main Denied	0.0510 (0.0068)	0.0117 (0.0028)	-0.7221 (0.0133)	-0.0008 (0.0020)	1.74 (1.02)	-0.18 (0.28)	-20.48 (1.13)	0.21 (0.12)
Main Allowed	0.0183 (0.0166)	-0.0237 (0.0075)	-0.2689 (0.0357)	0.0146 (0.0052)	-1.46 (1.42)	-2.40 (0.67)	-14.95 (2.06)	0.70 (0.30)
High Earner Allowed	-0.0385 (0.0065)	-0.0048 (0.0028)	0.0644 (0.0167)	-0.0056 (0.0025)	-2.38 (1.12)	-1.91 (0.33)	-29.06 (1.41)	-0.09 (0.11)
High Earner Denied	-0.0320 (0.0129)	0.0114 (0.0067)	0.0558 (0.0390)	-0.0105 (0.0061)	0.03 (1.60)	-1.06 (0.92)	-18.10 (2.71)	-0.54 (0.41)
High Education Allowed	0.1055 (0.0142)	0.0388 (0.0044)	0.1832 (0.0248)	-0.0059 (0.0035)	18.27 (1.96)	6.32 (0.48)	11.09 (1.75)	-0.11 (0.18)
High Education Denied	0.1055 (0.0209)	0.0522 (0.0079)	0.1955 (0.0495)	-0.0073 (0.0087)	19.70 (2.26)	8.30 (1.05)	19.24 (3.63)	0.00 (0.65)
Manufacturing Allowed	-0.0210 (0.0069)	-0.0005 (0.0030)	0.0443 (0.0165)	-0.0019 (0.0024)	-0.14 (1.35)	0.61 (0.39)	1.01 (1.36)	0.03 (0.08)
Manufacturing Denied	-0.0087 (0.0145)	0.0016 (0.0074)	0.0738 (0.0401)	-0.0140 (0.0062)	0.52 (1.83)	1.12 (0.84)	5.13 (2.77)	-0.35 (0.39)
Panel C: 1992-1997								
Main Denied	0.0400 (0.0068)	0.0121 (0.0022)	-0.6938 (0.0128)	-0.0056 (0.0028)	2.73 (2.32)	0.31 (0.68)	-19.54 (0.99)	0.14 (0.15)
Main Allowed	0.0121 (0.0130)	-0.0125 (0.0053)	-0.2338 (0.0287)	0.0343 (0.0073)	1.50 (2.40)	-0.66 (0.78)	-11.56 (1.83)	1.85 (0.31)
High Earner Allowed	-0.0404 (0.0056)	-0.0096 (0.0021)	0.0640 (0.0162)	0.0040 (0.0041)	-3.94 (0.65)	-1.96 (0.28)	-29.27 (1.07)	-0.12 (0.24)

High Earner Denied	-0.0205 (0.0123)	0.0022 (0.0050)	0.0610 (0.0313)	-0.0101 (0.0073)	-4.07 (3.01)	-1.67 (0.62)	-23.30 (4.50)	0.64 (0.80)
High Education Allowed	0.1060 (0.0098)	0.0379 (0.0031)	0.2176 (0.0197)	-0.0079 (0.0052)	18.04 (1.22)	6.12 (0.39)	13.19 (1.20)	-0.50 (0.38)
High Education Denied	0.1069 (0.0168)	0.0440 (0.0058)	0.1683 (0.0366)	-0.0154 (0.0090)	20.61 (2.88)	6.92 (0.72)	21.01 (3.79)	-1.16 (0.72)
Manufacturing Allowed	0.0019 (0.0064)	-0.0016 (0.0023)	0.0596 (0.0164)	-0.0011 (0.0040)	1.28 (0.85)	0.57 (0.30)	0.69 (1.02)	-0.04 (0.20)
Manufacturing Denied	0.0096 (0.0140)	0.0047 (0.0058)	-0.0050 (0.0335)	-0.0035 (0.0081)	1.79 (1.48)	0.64 (0.52)	0.91 (2.01)	-0.70 (0.40)

Notes: Model includes year effects, a quartic in age, and a quartic in previous earnings. Standard errors clustered at individual level in parentheses. Authors' calculations from 1% Files of Social Security administrative data (see text).

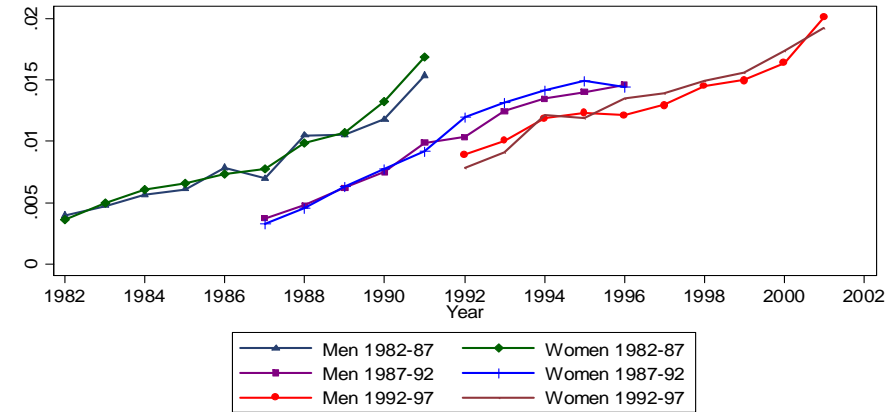
Appendix Figure 1: Annual Application Rates from Alternative Baselines Men and Women, Different Samples and Age-Groups

Panel A: Age 34-50, Full Sample



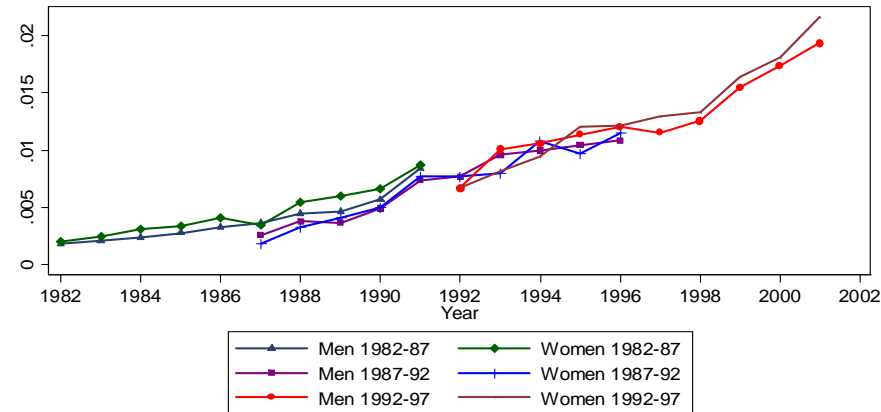
Source: 1% Files of Social Security administrative data (see text).

Panel B: Age 45-55, Full Sample



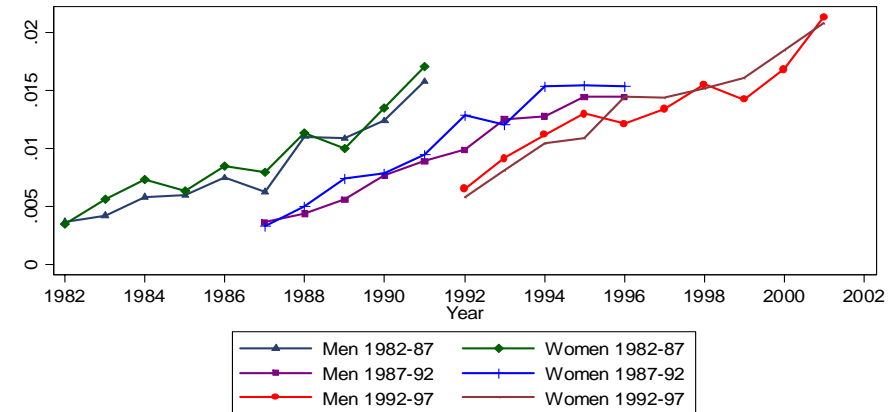
Source: 1% Files of Social Security administrative data (see text).

Panel C: Age 34-50, Stable Sample



Source: 1% Files of Social Security administrative data (see text).

Panel D: Age 45-55, Stable Sample

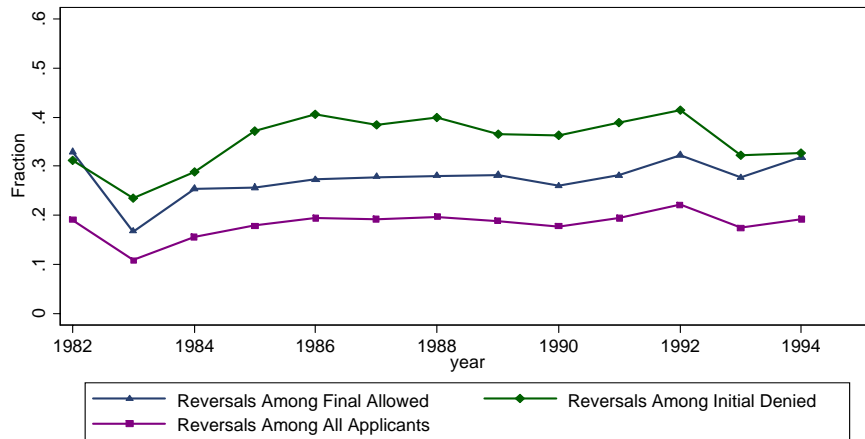


Source: 1% Files of Social Security administrative data (see text).

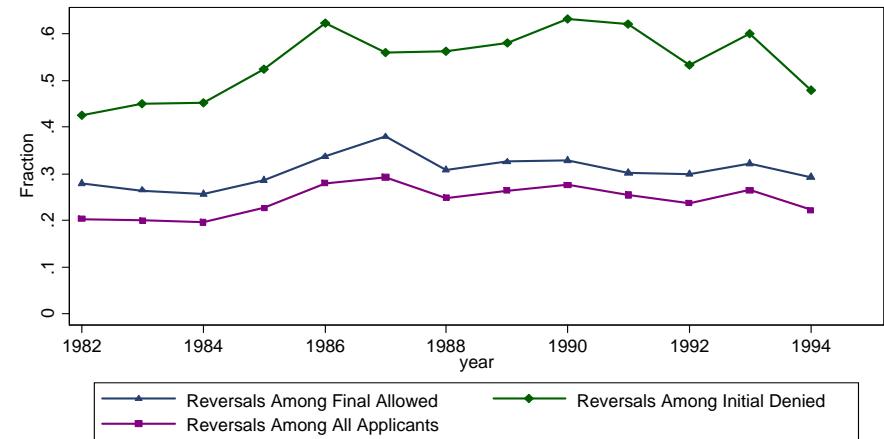
Source: 1% Files of Social Security administrative data (see text), Authors' Calculations.

Appendix Figure 2: Role of Initially Denied and Later Allowed Applicants, Fraction of Total and Average Earnings Five Years Before and After Application to DI

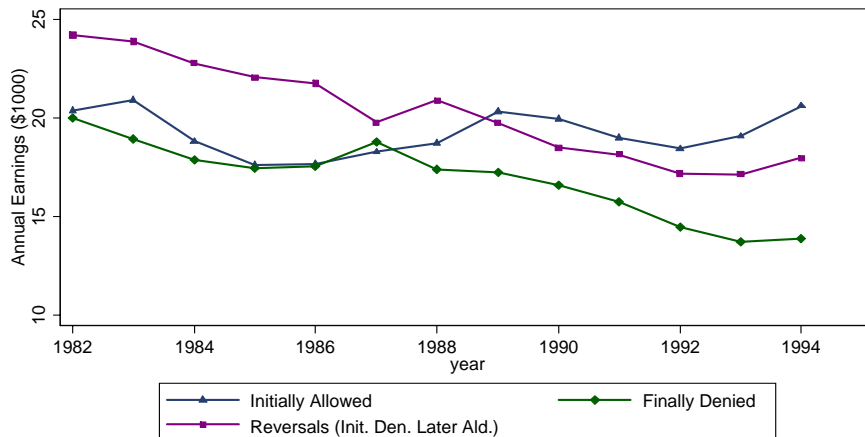
Panel A: Fraction of Applicants Initially Denied and Later Allowed (Reversals), Age 35-44



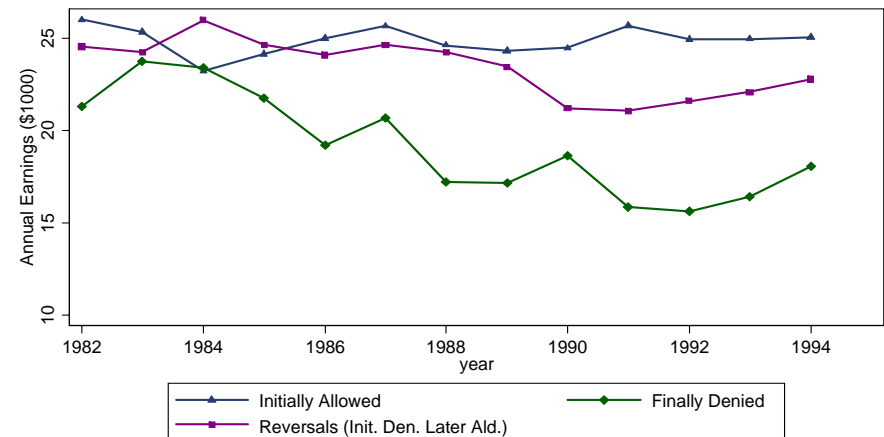
Panel B: Fraction of Applicants Initially Denied and Later Allowed (Reversals), Age 45-54



Panel C: Annual Earnings (\$1000) for Init. Denied and Later Allowed (Reversals), Age 35-44



Panel D: Annual Earnings (\$1000) for Init. Denied and Later Allowed (Reversals), Age 45-54



Source: 1% Files of Social Security administrative data (see text).

Appendix Table 1. Characteristics of Sample of Disability Applicants by Application Status and of Non-Applicants (Full Sample)

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
<i>Denied</i>												
N	2,907	2,489	2,278	2,044	2,017	1,869	2,118	2,082	2,353	2,312	2,530	2,918
Age	49.64	49.66	49.06	49.24	48.81	48.81	48.64	48.41	48.11	47.46	47.16	46.91
male	0.59	0.61	0.62	0.61	0.59	0.59	0.61	0.58	0.60	0.58	0.58	0.57
White	0.78	0.79	0.78	0.79	0.78	0.78	0.76	0.76	0.76	0.76	0.76	0.73
PIA	296.57	326.15	357.70	397.91	420.58	437.90	459.76	478.23	502.61	526.74	549.08	563.21
AIME	598.56	661.06	730.47	815.53	865.87	900.59	940.41	974.28	1,036.49	1,075.60	1,113.44	1,138.68
5-year average earnings from t-11 to t-15												
Mean	23,127.47	23,495.70	23,624.35	23,957.29	23,288.42	23,340.81	22,576.62	22,111.58	22,905.29	22,021.54	21,318.01	22,058.86
Median	19,581.56	19,879.92	19,674.46	20,367.97	19,605.73	19,142.46	18,084.47	17,227.18	17,877.36	17,680.39	17,381.64	17,725.73
5-year average earnings from t-6 to t-10												
Mean	24,281.74	24,389.61	24,518.81	25,764.64	24,713.66	25,794.41	25,187.17	25,245.54	25,293.39	23,523.54	22,679.25	22,089.74
Median	19,949.78	20,435.25	20,176.79	20,663.78	20,115.61	20,013.48	19,976.79	19,814.22	19,407.78	18,135.13	18,084.23	17,087.27
5-year average earnings from t-1 to t-5												
Mean	22,159.59	23,062.02	23,000.20	23,818.03	22,885.09	22,108.42	21,493.03	21,322.70	20,556.44	20,160.85	19,745.10	19,114.14
Median	17,332.81	17,938.17	17,604.62	18,367.12	17,173.64	16,282.27	15,548.02	15,883.26	14,071.87	14,909.08	14,830.75	13,827.50
<i>Allowed</i>												
N	1,502	1,133	1,098	1,234	1,333	1,279	1,342	1,159	1,510	1,599	1,817	2,336
Age	52.69	52.21	52.19	51.44	51.69	51.36	51.03	50.38	50.47	50.53	50.23	49.73
male	0.73	0.68	0.69	0.68	0.65	0.67	0.65	0.62	0.63	0.63	0.63	0.60
White	0.84	0.84	0.83	0.84	0.81	0.80	0.80	0.80	0.82	0.80	0.80	0.78
PIA	348.74	367.42	402.77	444.42	452.49	478.40	506.25	520.91	549.46	581.01	597.55	626.87
AIME	755.20	787.00	865.06	958.35	964.35	1,022.16	1,080.55	1,107.63	1,183.31	1,247.90	1,271.01	1,341.60
5-year average earnings from t-11 to t-15												
Mean	31,338.15	29,582.58	30,003.58	30,205.80	27,547.79	27,699.06	27,294.49	26,161.46	26,847.12	26,818.60	26,045.27	26,577.51
Median	29,435.90	27,599.91	27,419.75	26,653.12	24,272.44	23,739.28	23,785.85	22,528.23	22,936.12	22,653.01	21,711.45	22,216.73
5-year average earnings from t-6 to t-10												
Mean	32,910.64	31,120.59	30,669.09	31,814.46	29,651.31	29,823.04	30,491.65	29,227.39	29,303.66	29,435.65	27,600.83	28,386.07
Median	30,629.15	28,106.06	26,439.40	26,640.39	25,493.24	25,116.50	26,044.27	24,429.80	25,010.66	24,207.36	22,413.30	23,054.62
5-year average earnings from t-1 to t-5												
Mean	31,859.46	29,770.06	29,030.80	30,033.00	27,563.70	27,235.68	27,700.69	26,177.53	26,059.60	26,685.76	25,811.57	26,371.35
Median	27,727.00	25,758.91	24,802.91	24,603.96	22,796.55	21,467.19	22,551.17	21,618.74	22,213.89	21,840.54	19,927.93	21,417.29
<i>Non-applicant</i>												
N	389,601	398,804	411,230	422,775	433,764	445,238	458,404	472,805	486,931	503,443	520,889	538,549
Age	46.70	46.50	46.23	46.04	45.89	45.75	45.61	45.49	45.40	45.32	45.27	45.23
male	0.64	0.64	0.63	0.62	0.61	0.61	0.60	0.59	0.59	0.58	0.58	0.57
White	0.88	0.88	0.87	0.87	0.86	0.86	0.85	0.85	0.85	0.84	0.84	0.84
PIA	379.55	413.91	452.82	497.43	529.06	557.08	590.00	619.10	643.90	680.02	715.52	743.23
AIME	853.65	935.94	1,030.50	1,131.79	1,217.24	1,289.36	1,368.08	1,445.25	1,518.15	1,598.00	1,687.62	1,755.19
5-year average earnings from t-11 to t-15												

Mean	31,310.99	31,403.30	30,957.60	30,734.15	30,661.42	30,521.46	30,291.18	30,281.60	30,292.95	30,465.88	30,699.19	30,999.63
Median	27,813.53	27,739.18	27,207.62	26,878.41	26,673.94	26,422.48	26,014.00	25,810.35	25,641.91	25,533.90	25,574.92	25,726.35
5-year average earnings from t-6 to t-10												
Mean	36,820.25	36,632.25	36,581.14	36,627.24	36,861.00	37,127.99	37,421.47	37,660.93	37,681.40	37,284.29	37,042.62	37,070.75
Median	32,855.55	32,451.73	32,200.05	31,984.58	31,923.03	31,925.20	31,897.46	31,821.61	31,629.94	31,018.11	30,540.30	30,376.23
5-year average earnings from t-1 to t-5												
Mean	40,028.74	40,458.97	40,691.33	40,730.89	40,450.06	40,268.93	40,301.31	40,461.93	40,881.19	41,434.68	41,776.97	41,971.69
Median	34,292.14	34,391.73	34,226.84	33,961.99	33,390.54	32,918.32	32,812.95	32,765.32	32,919.00	33,100.06	33,168.51	33,139.93

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
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Denied

N	3,241	3,602	3,870	3,620	3,410	3,078	2,958	2,999	3,136	3,421	4,098	4,216
Age	46.73	46.60	46.95	46.60	46.92	47.08	47.25	47.44	47.12	47.20	47.33	47.50
male	0.57	0.57	0.55	0.53	0.53	0.50	0.50	0.47	0.50	0.49	0.50	0.51
White	0.72	0.71	0.72	0.71	0.73	0.73	0.72	0.73	0.73	0.72	0.72	0.71
PIA	578.82	589.87	630.03	648.44	672.60	691.66	717.41	751.38	794.54	822.63	861.81	880.42
AIME	1,163.97	1,173.11	1,267.52	1,317.41	1,378.59	1,404.46	1,450.21	1,502.72	1,598.19	1,640.95	1,707.36	1,753.07
5-year average earnings from t-11 to t-15												
Mean	21,205.78	20,057.57	20,784.60	20,125.66	20,703.93	20,178.56	20,209.10	20,008.57	21,029.90	20,474.64	19,606.46	20,190.78
Median	16,172.70	15,629.26	15,587.25	15,413.40	15,086.64	15,505.56	15,051.32	15,583.37	15,560.07	15,002.34	14,800.58	14,943.32
5-year average earnings from t-6 to t-10												
Mean	21,010.30	20,346.11	21,738.04	22,082.57	23,576.24	21,977.91	22,191.48	21,383.38	22,532.61	21,272.25	20,909.29	21,032.66
Median	16,216.79	15,183.48	16,346.72	16,933.57	17,524.34	16,953.38	16,448.95	16,532.33	16,405.76	16,186.00	15,830.74	15,638.14
5-year average earnings from t-1 to t-5												
Mean	18,677.70	17,825.50	18,632.78	19,279.70	20,209.38	18,959.65	19,825.70	19,609.95	20,440.30	19,364.72	19,133.68	18,312.11
Median	13,201.39	13,087.24	13,029.59	14,141.30	14,027.77	13,854.36	14,469.84	14,970.31	15,308.78	14,345.05	14,747.82	13,678.98

Allowed

N	2,414	2,479	2,311	2,345	2,188	2,224	2,231	2,452	2,524	2,911	2,940	2,991
Age	49.92	49.56	50.07	50.19	50.21	50.58	50.87	50.37	50.97	51.19	51.24	51.64
male	0.61	0.61	0.61	0.58	0.55	0.56	0.55	0.57	0.54	0.55	0.56	0.56
White	0.77	0.76	0.77	0.78	0.78	0.78	0.77	0.77	0.78	0.77	0.77	0.76
PIA	652.85	680.97	727.26	732.86	753.23	792.08	828.15	872.91	907.51	962.49	1,009.55	1,033.60
AIME	1,394.48	1,461.24	1,573.01	1,591.10	1,635.43	1,732.15	1,809.64	1,898.13	1,964.72	2,088.47	2,182.43	2,244.89
5-year average earnings from t-11 to t-15												
Mean	26,832.01	26,163.48	27,324.16	26,657.77	25,500.68	26,186.58	26,890.14	27,714.08	27,213.46	27,968.77	27,063.04	27,445.67
Median	21,876.70	21,628.87	22,658.56	21,357.10	20,573.95	21,990.74	21,632.24	22,028.02	22,435.70	23,136.87	21,934.83	22,320.58
5-year average earnings from t-6 to t-10												
Mean	27,468.71	27,464.52	29,234.80	29,866.42	28,775.09	28,530.08	29,061.03	29,184.61	27,998.36	28,212.88	28,042.53	28,453.20
Median	22,361.62	22,472.98	23,396.42	23,124.04	23,842.29	24,206.05	24,058.08	23,647.10	23,196.99	23,630.66	22,369.35	22,676.39
5-year average earnings from t-1 to t-5												
Mean	25,439.81	24,965.96	26,208.54	26,374.39	26,311.19	26,345.52	26,453.03	26,981.46	26,245.11	26,355.34	26,147.16	26,754.54
Median	20,381.52	20,044.75	20,609.68	20,783.22	21,629.14	22,059.56	21,361.75	21,682.25	20,550.99	21,451.29	20,900.08	20,532.74

Non-applicant

N	556,848	575,411	593,795	612,630	631,280	651,255	670,280	687,789	703,172	716,029	727,168	735,433
Age	45.23	45.27	45.33	45.40	45.48	45.57	45.69	45.81	45.97	46.15	46.33	46.49
male	0.57	0.56	0.56	0.56	0.55	0.55	0.55	0.55	0.54	0.54	0.54	0.54
White	0.83	0.83	0.83	0.83	0.82	0.82	0.81	0.81	0.80	0.79	0.79	0.78
PIA	778.41	807.93	846.97	863.85	886.79	917.83	954.28	1,001.31	1,051.09	1,102.19	1,160.78	1,187.93
AIME	1,843.14	1,918.22	2,008.33	2,068.11	2,126.70	2,194.99	2,270.52	2,369.13	2,485.22	2,593.89	2,730.70	2,796.21
5-year average earnings from t-11 to t-15												
Mean	31,239.28	31,254.25	30,964.73	30,809.96	30,835.53	30,943.91	31,263.44	31,713.63	32,143.04	32,429.08	32,448.29	32,314.49
Median	25,803.76	25,701.06	25,282.30	24,912.72	24,751.87	24,639.02	24,762.47	25,008.69	25,278.20	25,432.26	25,412.30	25,232.70
5-year average earnings from t-6 to t-10												
Mean	37,242.78	37,605.36	38,102.50	38,472.55	38,645.53	38,477.55	38,270.79	37,962.24	37,651.51	37,464.29	37,553.32	37,748.02
Median	30,338.15	30,485.43	30,670.59	30,824.22	30,805.25	30,537.68	30,213.40	29,872.11	29,517.23	29,276.06	29,219.13	29,261.05
5-year average earnings from t-1 to t-5												
Mean	41,827.16	41,623.86	41,288.19	40,916.58	40,652.39	40,635.62	40,724.83	40,879.38	41,044.41	41,232.29	41,271.32	41,033.07
Median	32,872.43	32,516.01	32,195.29	31,838.87	31,542.47	31,356.82	31,236.16	31,182.01	31,046.08	30,921.96	30,769.06	30,578.69

SOURCE: Authors' tabulations using the CWSHS 2004 active file and 1% 831 extracts for 1977-2004

NOTE: 5-year average earnings are in 2000 constant dollars.

Appendix Table 2A: Further Characteristics at Baseline of SSDI Applicants, Allowed, and Denied Individuals for Alternative Years and Age-Groups, Men, Full Sample

Year of Application	1982-1987			1987-1992			1992-1997			
	Years From Baseline	Number Applicants	Fraction Allowed	Number Denied	Number Applicants	Fraction Allowed	Number Denied	Number Applicants	Fraction Allowed	Number Denied
A. Applicants Age 34-45 at Baseline										
Total	1-5	2158	0.66	740	3416	0.69	1067	6057	0.61	2371
	6-10	4801	0.73	1302	8570	0.68	2740	8576	0.66	2911
	11-15	12149	0.72	3403	13434	0.71	3921	8789	0.63	3272
Age at Application	1-5	46.7	47.0	46.2	44.0	44.3	43.4	41.5	42.0	40.9
	6-10	46.7	47.1	45.6	44.2	44.6	43.2	42.1	42.6	41.3
	11-15	46.9	47.3	45.7	44.5	45.0	43.1	42.1	42.8	40.9
Mean Earnings at Baseline (in \$1000 Deflated by Earnings Growth)	1-5	0.22	0.22	0.24	0.24	0.23	0.27	0.31	0.28	0.36
	6-10	0.23	0.22	0.26	0.28	0.25	0.34	0.29	0.26	0.33
	11-15	0.24	0.22	0.31	0.26	0.24	0.32	0.29	0.26	0.34
Fraction Manufacturing at Baseline	1-5	21.66	21.91	21.18	18.48	19.06	17.23	17.45	19.38	14.45
	6-10	22.75	23.41	20.98	20.20	22.11	16.12	19.58	21.57	15.72
	11-15	23.62	25.29	19.34	21.55	23.87	15.90	20.39	23.15	15.74
Fraction Services at Baseline	1-5	0.31	0.30	0.32	0.27	0.27	0.26	0.23	0.23	0.23
	6-10	0.32	0.31	0.33	0.27	0.28	0.26	0.25	0.26	0.24
	11-15	0.33	0.34	0.32	0.31	0.32	0.28	0.27	0.29	0.24
Fraction Trade at Baseline	1-5	0.21	0.22	0.18	0.22	0.22	0.20	0.27	0.27	0.26
	6-10	0.18	0.19	0.15	0.19	0.18	0.19	0.25	0.25	0.24
	11-15	0.17	0.17	0.16	0.17	0.16	0.19	0.23	0.22	0.25
B. Applicants Age 45-50 at Baseline										
Total Observations	1-5	1031	800	231	1178	969	209	2065	1608	457
	6-10	2391	1936	455	3184	2678	506	3386	2825	561
	11-15	5288	4185	1103	4872	3933	939	3169	2621	548
Age at Application	1-5	57.2	57.1	57.3	54.6	54.6	54.5	52.1	52.1	51.9
	6-10	57.1	57.2	57.1	54.6	54.6	54.5	52.1	52.1	51.9
	11-15	57.0	57.0	57.1	54.5	54.4	54.6	52.1	52.1	51.9
Mean Earnings at Baseline (in \$1000 Deflated by Earnings Growth)	1-5	0.18	0.19	0.15	0.20	0.19	0.21	0.22	0.20	0.28
	6-10	0.18	0.17	0.21	0.19	0.18	0.21	0.22	0.20	0.28
	11-15	0.18	0.16	0.23	0.18	0.16	0.22	0.20	0.18	0.29
Fraction Manufacturing at Baseline	1-5	25.86	26.03	25.27	24.51	25.35	20.60	24.75	26.29	19.33
	6-10	27.62	28.81	22.54	25.79	27.09	18.91	28.08	29.61	20.38
	11-15	29.89	31.28	24.61	28.27	29.22	24.30	30.22	31.77	22.82
Fraction Services at Baseline	1-5	0.35	0.35	0.35	0.30	0.30	0.30	0.27	0.28	0.25
	6-10	0.33	0.34	0.31	0.33	0.34	0.31	0.29	0.30	0.28
	11-15	0.33	0.34	0.30	0.33	0.34	0.30	0.31	0.31	0.27
Fraction Trade at Baseline	1-5	0.15	0.15	0.16	0.18	0.17	0.25	0.24	0.23	0.29
	6-10	0.16	0.16	0.21	0.15	0.15	0.17	0.22	0.22	0.27
	11-15	0.17	0.16	0.20	0.16	0.16	0.19	0.21	0.21	0.24

Source: 1% Files of Social Security administrative data (see text).

Appendix Table 2B: Further Characteristics at Baseline of SSDI Applicants, Allowed, and Denied Individuals for Alternative Years and Age-Groups, Men, Stable Sample

Year of Application	1982-1987			1987-1992			1992-1997			
	Years From Baseline	Number Applicants	Fraction Allowed	Number Denied	Number Applicants	Fraction Allowed	Number Denied	Number Applicants	Fraction Allowed	Number Denied
A. Applicants Age 34-45 at Baseline										
Total	1-5	429	0.72	122	604	0.73	164	1125	0.73	304
	6-10	1030	0.80	211	1839	0.80	374	2007	0.79	420
	11-15	2811	0.81	525	3278	0.81	613	2080	0.75	514
Age at Application	1-5	49.3	49.5	49.0	46.6	46.8	46.0	44.3	44.5	43.6
	6-10	49.3	49.5	48.6	46.8	47.1	45.7	44.7	44.8	44.0
	11-15	49.2	49.3	48.6	46.9	47.1	46.2	44.6	44.9	43.8
Mean Earnings at Baseline (in \$1000 Deflated by Earnings Growth)	1-5	0.21	0.21	0.21	0.24	0.24	0.23	0.26	0.25	0.28
	6-10	0.20	0.21	0.18	0.24	0.23	0.31	0.26	0.26	0.26
	11-15	0.20	0.18	0.27	0.24	0.22	0.31	0.25	0.23	0.32
Fraction Manufacturing at Baseline	1-5	40.17	37.96	45.73	36.95	36.01	39.48	35.83	36.24	34.73
	6-10	40.41	40.03	41.89	38.91	39.30	37.39	37.01	36.84	37.68
	11-15	41.69	42.07	40.04	40.21	40.97	36.92	39.04	39.78	36.79
Fraction Services at Baseline	1-5	0.45	0.44	0.46	0.39	0.38	0.40	0.34	0.33	0.36
	6-10	0.45	0.44	0.47	0.42	0.42	0.44	0.37	0.37	0.39
	11-15	0.45	0.45	0.47	0.44	0.44	0.48	0.41	0.41	0.39
Fraction Trade at Baseline	1-5	0.13	0.13	0.12	0.15	0.17	0.12	0.22	0.23	0.19
	6-10	0.12	0.13	0.11	0.14	0.14	0.12	0.20	0.21	0.17
	11-15	0.11	0.11	0.10	0.11	0.11	0.11	0.17	0.16	0.18
B. Applicants Age 45-50 at Baseline										
Total Observations	1-5	363	281	82	417	360	57	776	651	125
	6-10	888	751	137	1150	1028	122	1404	1249	155
	11-15	1989	1659	330	1837	1532	305	1335	1150	185
Age at Application	1-5	57.1	57.0	57.2	54.7	54.7	54.9	52.1	52.2	51.8
	6-10	57.3	57.2	57.3	54.6	54.6	54.6	52.1	52.2	51.9
	11-15	57.1	57.0	57.1	54.4	54.4	54.6	52.2	52.2	52.0
Mean Earnings at Baseline (in \$1000 Deflated by Earnings Growth)	1-5	0.20	0.22	0.12	0.20	0.20	0.23	0.21	0.21	0.26
	6-10	0.16	0.16	0.20	0.19	0.20	0.18	0.21	0.20	0.28
	11-15	0.16	0.16	0.20	0.17	0.16	0.21	0.17	0.17	0.22
Fraction Manufacturing at Baseline	1-5	40.31	38.85	45.32	40.09	39.87	41.53	39.38	38.63	43.27
	6-10	43.49	43.88	41.34	41.90	42.19	39.48	42.60	42.51	43.28
	11-15	45.54	45.93	43.57	44.27	43.91	46.11	45.71	46.29	42.16
Fraction Services at Baseline	1-5	0.47	0.47	0.45	0.42	0.42	0.41	0.36	0.36	0.33
	6-10	0.43	0.43	0.42	0.44	0.44	0.40	0.37	0.37	0.39
	11-15	0.42	0.42	0.43	0.43	0.44	0.41	0.39	0.39	0.41
Fraction Trade at Baseline	1-5	0.10	0.10	0.11	0.15	0.15	0.18	0.22	0.21	0.30
	6-10	0.13	0.12	0.17	0.12	0.13	0.10	0.20	0.19	0.22
	11-15	0.13	0.13	0.15	0.13	0.13	0.14	0.18	0.19	0.16

Source: 1% Files of Social Security administrative data (see text).

Appendix Table 3: Characteristics of Denied and Allowed Applicants to SSDI Before and After Application by Stage of Adjudication Decision, Men Only, Full and Stable Sample

	1982-1986			1987-1992			1992-1996		
	Final denied	Allowed initial and recon	Initial denied and final allowed	Final denied	Allowed initial and recon	Initial denied and final allowed	Final denied	Allowed initial and recon	Initial denied and final allowed
Panel A: Full Sample of Applicants									
Average Age	39	41	42	39	40	42	39	41	42
Fraction White	0.78	0.77	0.82	0.71	0.75	0.80	0.66	0.73	0.78
Average No. of Years with Positive Earnings, t-4 to t-1	3.00	3.18	3.25	3.03	3.30	3.26	3.07	3.40	3.36
Average No. of Years with Positive Earnings, t+1 to t+5	3.01	0.80	0.72	3.03	0.75	0.74	3.27	0.94	0.91
Average No. of Years with Positive Earnings, t+6 to t+10	2.93	0.61	0.58	3.07	0.62	0.68	1.31	0.33	0.35
Average No. of Years with Minimal Earnings, t-4 to t-1	2.69	2.88	2.99	2.65	2.99	2.98	2.66	3.12	3.05
Average No. of Years with Minimal Earnings, t+1 to t+5	2.65	0.51	0.45	2.60	0.45	0.43	2.84	0.62	0.57
Average No. of Years with Minimal Earnings, t+6 to t+10	2.71	0.44	0.40	2.81	0.41	0.47	1.19	0.25	0.25
Average Annual Earnings, t-4 to t-1	19819	20328	22516	16546	20504	20196	14479	20854	19884
Average Annual Earnings, t+1 to t+5	15768	3040	1743	12070	2224	1792	12166	3159	2269
Average Annual Earnings, t+6 to t+10	17421	3175	1793	14876	2559	2350	13917	3492	2701
Panel B: Stable Sample of Applicants									
Average Age	40	42	43	40	42	43	41	42	43
Fraction White	0.81	0.78	0.79	0.74	0.76	0.82	0.68	0.74	0.81
Average No. of Years with Positive Earnings, t-4 to t-1	4	4	4	4	4	4	4	4	4
Average No. of Years with Positive Earnings, t+1 to t+5	4	1	1	4	1	1	4	1	1
Average No. of Years with Positive Earnings, t+6 to t+10	3.87	0.79	0.91	3.92	0.74	0.88	1.56	0.38	0.40
Average No. of Years with Minimal Earnings, t-4 to t-1	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
Average No. of Years with Minimal Earnings, t+1 to t+5	3.74	0.80	0.87	3.56	0.67	0.73	3.61	0.83	0.82
Average No. of Years with Minimal Earnings, t+6 to t+10	3.70	0.64	0.64	3.71	0.52	0.60	1.48	0.28	0.30
Average Annual Earnings, t-4 to t-1	39812	35864	36831	36258	35425	34920	32184	34217	34124
Average Annual Earnings, t+1 to t+5	28698	5125	3542	21824	3963	2805	20213	4796	3610
Average Annual Earnings, t+6 to t+10	29878	5074	3112	24434	3900	2445	21979	4845	3581

Notes: 1% Sampel Social Security administrative data.