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The Benefit Receipt Patterns and Labor Market Experiences of Older Workers Who Were Denied SSDI on the Basis of Work Capacity

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CONTENTS

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TABLES

FIGURES

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ABSTRACT

Project Number

MPR 17-05

Title

The Benefit Receipt Patterns and Labor Market Experiences of Older Workers Who Were Denied SSDI on the Basis of Work Capacity

Authors

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Key findings and policy implications

This paper considers the benefit receipt patterns and labor market experiences of older denied Social Security Disability Insurance (SSDI) applicants. The Social Security Administration (SSA) uses a five-step Sequential Evaluation process to determine whether an applicant meets the criteria for benefit award. Our analysis focuses on applicants denied during review by SSA's Disability Determination Services (DDS) for "work capacity" reasons—those denied at the fourth and fifth steps of the evaluation process.[1] In those steps, a disability examiner concludes that, based on the applicant's residual functional capacity, he or she can perform past work (step 4) or other work (step 5). At step 5, the examiner evaluates residual functional capacity in conjunction with medical-vocational guidelines which take into account the applicant's age, education, and work experience. Understanding the extent to which older denied applicants return to work after denial may signal opportunities for assessing how medical-vocational guidelines are implemented. Moreover, our findings may help determine whether there are employment services or supports that could benefit denied applicants and allow them to rejoin the labor force and remain in it longer, or to identify and assist potential applicants before they exit the labor force in the first place.

To conduct our analysis, we use the Health and Retirement Study (HRS) linked to SSA records on benefit application and receipt. By linking the HRS to SSA data, we observe 805 applicants who applied for SSDI between 1992 and 2012, when they were between age 51 and SSA's full retirement age (age 65 or 66 in our study, depending on the applicant's year of birth). Using information from the administrative records about the initial decision on the SSDI application, we stratify SSDI applicants according to whether they were initially allowed or denied and the reason for the decision (separating denials due to the capacity for past work from those for the capacity for other work). We use information in the HRS to understand the characteristics of applicants and their households prior to application, and link the HRS to

[1] It is important to note that the "work capacity" terminology is what we use throughout the paper for ease of description to refer to step 4 and 5 determinations; it is not SSA's official nomenclature.

earnings records based on Internal Revenue Service (IRS) data and occupational data from the United States Department of Labor to analyze the work histories, employment, and earnings of denied applicants.

We find the following:

- In the years prior to application, most but not all applicants who are ultimately denied benefits are working. The likelihood of employment in the years following denial is much lower than in the years prior to denial, regardless of the reason for denial. Five years after the initial decision, 10 to 20 percent of denied applicants are working, a substantially lower share than the employment rate of all older adults in the same age group. Though our estimates are imprecise, our results suggest that applicants denied at step 5 may be more successful in working after denial, and in replacing a higher share of pre-application earnings relative to other denied applicants.
- At least two-thirds of applicants initially denied SSDI for work capacity reasons are ultimately awarded SSDI benefits after appeal or reapplication, more than double the share that receive SSDI after an initial denial for medical reasons. Data limitations make it difficult to identify the precise share of denied applicants who claim OASI prior to FRA, but our estimates imply that most initially denied applicants either receive SSDI or OASI prior to FRA.
- Relative to applicants initially denied at step 5, the characteristics and occupational profiles of applicants initially denied at step 4 indicate they are relatively lower-skilled workers in modest jobs; those denied at step 4 were more likely to be unmarried, female, and Hispanic, and less likely to have postsecondary education. Compared to applicants denied at step 5, applicants denied at step 4 earned a lower hourly wage before application and had lower average annual earnings between age 22 and 50. Those denied at step 4 were also more likely to work in occupations requiring high interpersonal skills and computer use, but less likely to work in jobs demanding continual skills updating, complex problem solving skills, and technical skills.

The policy implications of the findings are:

- Employment services and supports would help some older denied applicants return to work, or better, could assist older workers considering applying for SSDI in remaining in the labor force. These services could benefit denied applicants for whom the medical-vocational critieria are too stringent at the initial level, as well as applicants who had already permanently exited the labor force when they sought SSDI.
- SSDI and OASI benefits are an important part of the safety net for older workers who experience disability onset, as most initially denied SSDI applicants eventually receive benefits from one of the two programs. Yet, initially denied applicants must appeal the initial decision, reapply for SSDI, or wait to claim OASI after age 62, which leads to a potentially long period of financial and health-related vulnerability after early exit from the workforce.

Synopsis

In "The Benefit Receipt Patterns and Labor Market Experiences of Older Workers Who Were Denied SSDI on the Basis of Work Capacity," we use linked survey and administrative data to identify Social Security Disability Insurance (SSDI) applicants who received a denial at steps 4 and 5 of the Social Security Administration's (SSA) sequential evaluation process. We document their characteristics and the occupations they held before application and consider their post-denial benefit receipt, employment, and earnings patterns.

Abstract

This paper considers the experiences of SSDI applicants initially denied benefits because the examiner determines that they can perform past work or other work. To conduct our analysis, we use the Health and Retirement Study (HRS) linked both to SSA records on benefit application and receipt and to earnings records based on Internal Revenue Service (IRS) data. We find that few older SSDI applicants denied benefits for this reason work at a substantial level following denial. More commonly, those denied benefits at this stage continue to pursue benefit receipt, often successfully. Nearly two-thirds are ultimately allowed SSDI after appealing the initial decision or reapplying, and our estimates suggest that many of the rest claim Old Age and Survivors Insurance (OASI) prior to full retirement age (FRA).

JEL Classification

H55, J14

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I. INTRODUCTION

As workers approach retirement, they are more likely to experience a health condition that potentially limits their ability to remain employed. Among individuals between age 51 and 55 in 1992, one-quarter reported a health condition that, by age 62, limited their ability to work at least once (Johnson et al. 2007). If these new health conditions significantly limit the worker's ability to remain in the labor force, the worker may be eligible for benefits under the Social Security Disability Insurance (SSDI) program until they reach the Social Security Administration (SSA)'s's full retirement age (FRA; age 65 or 66 in our sample, depending on year of birth). Alternatively, workers age 62 or older may decide to claim Old Age and Survivors' Insurance (OASI), commonly referred to as Social Security retirement benefits, with an actuarial reduction for early claiming (a 30 percent reduction if claimed at age 62 among those whose FRA is 67). At the time of seeking early OASI benefits, SSA will consider whether the applicant qualifies for SSDI based on the alleged impairments; this consideration is relatively costless for those who have already stopped working, and if SSDI is awarded, results in a higher monthly benefit in all future months.

Yet, the award of benefits is far from certain; the findings presented in this report suggest that, among disabled worker applicants over age 50, about half are initially denied benefits.[2] Our study documents the post-denial employment, earnings, and benefits trajectory of older SSDI applicants after an initial denial, considering the difference in outcomes based on the reason for denial. SSA uses a five-step sequential evaluation process to determine whether an applicant meets the criteria for benefit award. Our focus is individuals denied for "work capacity" reasons,

[2] Throughout the report, we use the term initial denial to distinguish between the application reviewed by the DDS and subsequent appeals. In this initial review are both SSA's initial and reconsideration reviews.

or those who are denied at the fourth and fifth steps of the evaluation process.[3] These applicants have been found to have a condition that is severe, but not one that supports an award on the basis of SSA's Listing of Impairments alone. These applicants undergo an assessment that determines whether their residual functional capacity (RFC) allows them to perform past relevant work (step 4) or other work (step 5). In addition to the consideration of RFC at step 5, disability examiners take into account vocational factors—age, education, and work experience—using what are commonly known as the medical-vocational grids.

Our study sheds light on the extent to which applicants denied for work capacity reasons return to work. We find that relatively few older denied applicants return to work, and highlight reasons why they might not. In particular, we examine the share of initially denied applicants that appeal the denial or reapply for SSDI, and how many are ultimately awarded benefits. We also identify how many denied applicants claim OASI prior to FRA, an option not available to younger workers, but a particularly salient one for older workers. We find that employment outcomes for workers denied because of their capacity for past work different from those denied because of their capacity for other work. Our work cannot assess why older denied applicants do not return to work, but we conclude that the availability of employment-related services and supports would potentially help a non-trivial fraction of older denied applicants remain or reenter the labor force.

To conduct our analysis, we used the Health and Retirement Study (HRS) data linked to SSA records on benefit application and receipt. The linked sample includes 805 HRS respondents who applied for SSDI between 1992 and 2012, when they were between age 51 and

[3] For simplicity, we use "work capacity" throughout this paper to refer to step 4 and 5 determinations; it is not SSA's official nomenclature.

their FRA. Using information from the administrative records, we stratify SSDI applicants based on whether they were initially allowed or denied and the reason for the decision. We measure the employment and earnings of groups of denied applicants using data from linked IRS earnings records. Finally, we used the benefit data in the linked SSA records to measure the subsequent receipt of SSDI and OASI to better understand the post-denial employment patterns.

Before describing the specifics of our study, we outline the SSA disability determination process (Chapter II) and present existing evidence on the earnings of denied applicants (Chapter III). We then describe our approach to identifying SSDI applicants using the HRS data linked to administrative data and examine differences in characteristics of applicants based on their initial disability application outcomes (Chapter IV). We go on to highlight findings about the post-denial employment and earnings outcomes based on the reason for denial (Chapter V), then consider applicants' post-denial benefit trajectories (Chapter VI). We conclude with a discussion of our findings and implications for policy (Chapter VII).

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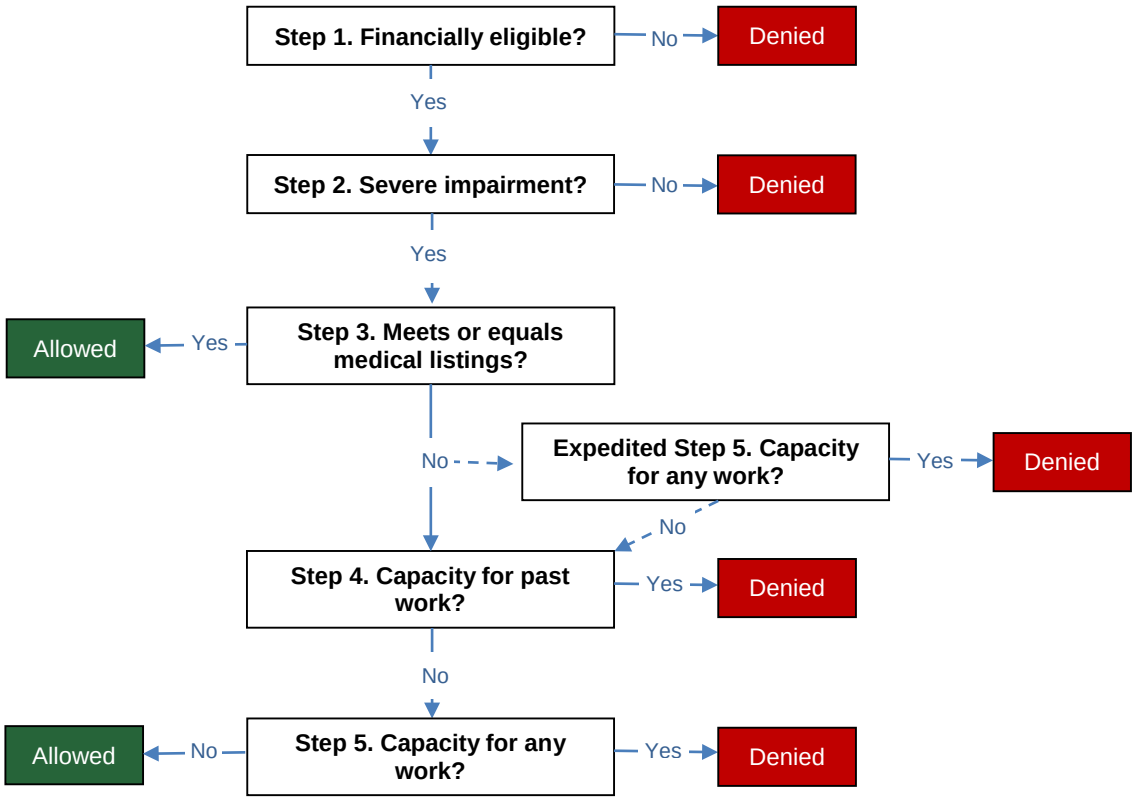
II. THE DISABILITY DETERMINATION PROCESS

An individual is eligible for SSDI benefits if he or she meets SSA's definition of disability; in other words the applicant is unable to engage in any substantial gainful activity (SGA) because of a medically determinable physical or mental impairment(s) that has lasted or is expected to last for a continuous period of at least 12 months or is expected to result in death (SSA POMS DI 00115.015). To make such a determination, SSA disability examiners follow a five-step, sequential evaluation (SE) process (SSA POMS 22001.001). We depict the process in Figure II.1, which we adapted from Wixon and Strand (2013).

Figure II.1. SSA's sequential evaluation process for disability determinations



Source: Wixon and Strand (2013).

Note: The consideration of an expedited step 5 before proceeding to step 4 did not affect applicants during our study period, although SSA currently uses the procedure (see footnote 4).

After determining whether an applicant is financially eligible (step 1), disability examiners assess whether the applicant has an impairment that meets the eligibility criteria in step 2. The examiner denies benefits to individuals whose conditions are determined to be not severe or to last for fewer than 12 months based on the provided medical evidence. We refer to these denials as denials for medical reasons.

After determining that an impairment is sufficiently severe in Step 2, the examiner goes on to determine whether any impairment satisfies the criteria for specific impairments in SSA's Listing of Impairments, at Step 3. The Listing of Impairments includes hundreds of conditions that result in a benefit award if sufficiently severe. The examiner may also find that the applicant's impairments "equal the listings" if the constellation of documented impairments is found to be equivalent to the listings. The adjudicator allows the application if the applicant's impairments are determined to meet or equal the listings. We refer to awards based on an allowance at Step 3 as allowances for medical reasons.

An application not allowed at step 3 proceeds to step 4, at which point the examiner assesses the applicant's RFC and compares it to the requirements of applicant's past relevant work (PRW) (SSA POMS 24510.001; SSA POMS 25005.001).[4] The examiner denies the application at step 4 if the examiner deems that the applicant is able to perform PRW. PRW includes not only the work performed in the job immediately preceding the disability application, but any work performed within the last 15 years. Examiners compare RFC to PRW on a function-by-function

[4] Since July 2012, SSA allows examiners to expedite an application from step 3 to step 5, conducting a step 5 determination immediately after step 3 for applicants whose past job requirements are not easy to determine based on the submitted information (*Federal Register*, July 25, 2012, vol. 77, no. 143). For applicants found unable to adjust to another job in the economy, the examiner may then go back to consider applicants at step 4 based on the information available about past work. This approach did not affect applicants during our period of study but may explain some of the difference in findings between our study and that of SSA's Office of the Inspector General, described in more detail below.

basis; in other words, they consider the requirements of the past work by using information provided by applicants and/or contained in the Dictionary of Occupational Titles to compare those requirements to applicants' RFC (SSA POMS 25005.020; POMS 25005.025). Importantly, at step 4, the assessment of the ability to perform PRW does not take into account either the availability of past work in the current economy or other demand-side considerations that might affect applicants' ability to find work (SSA POMS 25005.001).

The fifth and final step of the five-step process applies to applicants whose RFCs are deemed incompatible with the performance of PRW. Nearly half of SSDI applications that meet the financial eligibility criterion for SSDI reach this final step (Wixon and Strand 2013; Mann et al. 2014). The examiner assesses the applicant's ability to perform other work by comparing the applicants RFC to the exertional requirements of work, according to the medical-vocational guidelines established by SSA (SSA POMS 25025.005). Examiners perform the assessments by consulting what are typically called the medical-vocational guidelines, or grids (Warshawsky and Marchand 2015). Examiners deny benefits if applicants' RFCs indicate that they can perform substantially all of the exertional requirements of work, given the applicant's age, education, and work experience.

By law, SSA must consider vocational factors—age, education, and work experience—in determining whether an applicant can engage in substantial work. These factors are incorporated in the medical-vocational grids. A recent literature review found no rigorous evidence to support how they are used, however (Mann et al. 2014), and as the nature of work changes, SSA finds it very challenging to update the job requirement information that is instrumental use of the grids. For these reason, they have drawn policymaker attention and are the subject of reform proposals (Warshawsky and Marchand 2015). At present and during the period of our study, consideration

of age, education, and work experience in conjunction with RFC at step 5 is particularly salient for older workers. For example, a 54-year-old individual who would not receive an award based on the grid for 50- to 54-year-old individuals could receive an allowance a year later when the examiner consults the grid for 55- to 59-year-old individuals, holding the applicant's medical evidence, education and work experience constant.

III. EXISTING EVIDENCE ABOUT THE EARNINGS OF DENIED APPLICANTS

The overall earnings of denied SSDI applicants has been the subject of earlier research, though most previous studies have not assessed differences in earnings based on the reason for denial. In particular, work by Bound (1989), Parsons (1991) and Von Wachter et al. (2011) discussed the extent to which denied SSDI applicants could be thought of as a suitable counterfactual for those allowed SSDI. That work determined that denied applicants often appear more similar to allowed applicants than to non-applicants.

Other recent research has focused directly on applicants denied for their work capacity and therefore relates closely to our work. SSA's Office of the Inspector General (OIG) (2017) determined that, among applicants denied at steps 4 and 5 in 2013, fewer than half returned to work. Moreover, average earnings after denial among those with earnings were just under $9,400 per year, about 70 percent of average annual earnings of over $13,640 annually among those with earnings before application. The OIG findings align with those of Strand and Trenkamp (2015), who focus on step 5 SSDI denials, although not lending themselves to a direct comparison because of different study populations and periods of observation. The authors determined that employment fell by 22 percentage points (26 percent) from 2000 to 2008 among those who received an initial denial in 2005. The latter study documented important differences in outcomes based on earnings deciles before application, but the authors found that, across all groups, earnings (both median and maximum) remained persistently lower than pre-application earnings, at around 77 percent of the pre-application level.

Our work complements and extends the earlier work along two important dimensions. First, we disentangle step 4 versus step 5 denials and compare outcomes for those groups to each other and to other denied applicants as well as to those allowed benefits at steps 3 and 5 of the

determination process. In contrast, the study conducted by SSA's OIG (2017) combined step 4 and 5 denials, while Strand and Trenkamp (2015) considered only step 5 denials; in addition, neither study compared outcomes to other applicant groups. Second, we link SSA administrative data to longitudinal survey data, allowing us to measure attributes that include health status, household information and occupational characteristics—attributes that neither of the earlier studies was able to measure because they are not contained in administrative data. For example, Strand and Trenkamp had information on the primary disabling condition of denied applicants, but they did not have information on applicants beyond that collected to make a disability determination. By linking to the HRS, we are able to consider information including marital status, self-reported health conditions and functional status, household income and more detail on the occupations held by denied applicants, both application and after denial. This information provides a richer picture of who denied applicants are.

It is important to note, however, that the data limit us to consideration applicants age 51 or older, whereas earlier studies considered applicants of all ages. At older ages, the use of vocational factors at step 5 is more common. As a result, our findings do not extend to younger applicants and are not directly comparable to the findings from the earlier studies. Moreover, our understanding is that the OIG report considers applicants for Supplemental Security Income (SSI) in addition to those for SSDI. It is highly likely that the post-denial employment path for older SSDI applicants with substantial work histories will differ from that of SSI applicants of any age without such experience.

IV. DATA AND METHODS

Our study capitalizes on a significant linkage of longitudinal survey and administrative data. We use the HRS, a nationally representative, longitudinal survey of Americans collected by the Institute for Social Research at the University of Michigan. The HRS begins to interview respondents when they are between 51 and 61 years old then interviews them biennially thereafter on a range of subjects. We relied on data collected in the 1992 through 2014 waves of the HRS. In addition to survey responses, we linked the HRS to data from several SSA sources to measure SSDI applications and benefit receipt through the end of calendar year 2012, annual earnings data through 2012 reported to the Internal Revenue Service, and occupational data from the U.S. Department of Labor.[5] By linking the various data sources, we were able to combine detailed, self-reported data from the survey with information from administrative records and thereby avoid the reporting errors that are common with self-reports of benefit receipt and earnings.

Our estimates are weighted to account for the complex survey design as well as respondent's consent to having their survey responses linked to SSA administrative data, using the weights provided by the HRS.[6] The latter weights account for non-random selection into consenting to the linkage to SSA administrative data. Even though more than three-quarters of respondents during the time period of our analysis agreed to the linkage (Olson 1999),[7] evidence has shown

[5] These linkages were conducted with permission from the HRS to access its restricted data, after receiving study approval from an Institutional Review Board (IRB).

[6] The substance of our findings did not change in the weighted and unweighted version of our analysis; comparable unweighted results are available upon request.

[7] Through the 2004 wave of the HRS, respondents gave permission to access their records through the present. Starting in 2006, the HRS asks respondents for prospective permission to link their records for 30 years. The HRS has obtained prospective permission from most respondents who previously offered permission as well as from the

that the sample agreeing to the linkage differs from that in the full HRS. Specifically, consenters differed from the full sample on age, race, gender, income, and education (see, for example, Olson 1999; Gustman and Steinmeier 2001; Haider and Solon 2000; Kapteyn et al. 2006; Wu et al. 2016). Using the weights provided in the survey, we estimate that our sample represents approximately 5.4 million SSDI applicants who applied for SSDI between the ages of 51 and FRA in the years from 1992 through 2012.[8]

A. Identifying SSDI applicants by using the linked HRS-SSA files

Our analysis focuses on 805 HRS respondents who applied for SSDI based on their own work history (disabled worker claims) at least once between age 51 and FRA, following a first interview by the HRS.[9] We identified these applicants using SSA's 831 file, which records information about all applications that receive a medical determination. We used the date of initial application recorded in that file, then linked to the HRS and aligned with the timing of the survey interviews to identify the first application following the first HRS interview. It is important to note that a denial recorded in the 831 files does not mean that the applicant was not ultimately awarded benefits, because the file does not contain information about appeals to an Administrative Law Judge (ALJ) or a federal court. Thus, we have information only on the

majority of new sample members, with the exception of those in early cohorts who were not re-interviewed after 2004.

[8] Specifically, we applied the weight that was available at the first time a respondent was age-eligible for the HRS cohort and had an available weight. For age-eligible respondents in the HRS cohort, this was in 1992. For younger spouses of HRS respondents and age-eligible War Baby cohort respondents, this was in 1998. For younger spouses of those cohorts as well as age-eligible Early Baby Boomers, this was in 2004. More information on the files that account for differential consent to the SSA data linkage is available in HRS (2017).

[9] These respondents include 324 members of the HRS cohort (first interviewed by the HRS in 1992 and born between 1931 and 1941), 226 members of the War Baby cohort (first interviewed by the HRS in 1998 and born between 1942 and 1947), and 255 members of the Early Baby Boomer cohort (first interviewed by the HRS in 2004 and born between 1948 and 1953). For respondents in the HRS and War Baby cohorts, we are able to observe all SSDI applications through SSA's FRA (age 65 or 66, depending on birth year). For respondents in the Early Baby Boomer cohort, we are able to observe applications to SSDI only through 2012, when those sample members were between the ages of 59 and 64. For this latter cohort, we do not have complete information on OASI claiming, as none had reached FRA by the end of our observation period, and many have not reached age 62, the earliest age of eligibility.

outcomes adjudicated by the SSA's Disability Determination Services (DDS). If an application was initially denied but was reconsidered by the DDS at the request of the applicant, the result of the reconsideration is in the 831 file. In such cases we used the outcome and basis for the outcome from the reconsideration level to classify the case.

The fact that the first HRS interview is conducted no earlier than age 51 and as late as age 61 has two implications for the applicants we observe. First, the applications we observe do not necessarily reflect individuals' first application for SSDI benefits; of the 805 applicants in our sample, approximately 10 percent had applied for SSDI at least once between 1988 (when the SSA 831 began) and their first HRS interview.[10] Second, because the age at the first HRS interview varies, the first time we observe an SSDI applicant after being interviewed by the HRS is left censored. For instance, if a person participated in an HRS interview for the first time at age 56, we could not consider applications submitted for SSDI at age 52, whereas we could consider applications at age 52 for respondents first interviewed by the HRS at age 51.

B. Categorizing SSDI applicants based on the outcome of the initial determination

We used the 831 data to group applicants based on the outcome of their initial decision (Table IV.1). More than half of older SSDI applicants in our sample were initially allowed benefits, a substantially higher share than the allowance rate of just over 30 percent among all SSDI applicants (Wixon and Strand 2013).[11]

[10] We identified 242 respondents who applied for SSDI at least once before their first HRS interview but did not subsequently reapply; we did not include these respondents in our analysis.

[11] It was not clear to us whether Wixon and Strand included reconsideration determinations in their statistics. If the statistics exclude reconsiderations, the difference between our allowance rates and Wixon and Strand's rates would be smaller, but our older sample would still have a higher allowance rate.

In addition to categorizing applications based on whether their initial claim was allowed or denied, the 831 files provide the information necessary to determine the step at which the examiner made a decision. Specifically, we stratify applicants based on the scheme outlined in Wixon and Strand (2013). Among allowed applicants, about one-third were allowed benefits at step 3 because their impairment met or equaled the Listing of Impairments, while two-thirds received benefits at step 5 for reasons related to their work (in)capacity. Among those denied, the share was about the same, with two-thirds denied for work capacity reasons.

Table IV.1. Initial outcomes of SSDI applications filed by HRS respondents after their first HRS interview

Initial application outcome	Step in SSA's SE process	Number (unweighted)/ number (weighted)/ share of total (weighted percent)
Allowed		**421** **3,030,869** **(55.4)**
Medical reasons (impairment meets or equals the Listing of Impairments)	Step 3	133 1,021,886 (18.7)
Medical-vocational reasons	Step 5	288 2,008,983 (36.7)
Denied		**384** **2,441,639** **(44.6)**
Medical reasons (impairment not severe or not expected to last 12 months)[1]	Step 2	125 780,144 (14.3)
Medical-vocational reasons		
Ability to perform past work	Step 4	184 1,130,297 (20.6)
Ability to perform other work	Step 5	75 531,198 (9.7)

Source: Authors' calculations using the HRS data linked to SSA's 831 file, using the determination made at either the initial or reconsideration level (whichever was the highest level of review for the application). Regulation Basis codes assigned to each group follow the scheme identified in Wixon and Strand (2013).

Note: Weighted estimates account for complex survey design of the HRS as well as the differential likelihood of consenting to having records matched to SSA administrative data, as described in HRS (2017).

[1]The majority of denials in this group were because the impairment was not severe or not expected to last 12 months. We also included in this group fewer than 10 cases that could reasonably be considered to be closer to technical denials (those who did not meet eligibility requirements before step 3): those who failed to follow the prescribed treatment or failed to submit to a consultative examination or who provided insufficient evidence to complete the claim.

Compared to our finding of over two-thirds of work capacity denials occurring at step 4, SSA's OIG found that only one-quarter occurred at step 4, with three-quarters occurring at step 5. There are several reasons that could explain the difference, though we cannot determine the relative importance of each factor in isolation. First, the OIG considered applicants of all ages in a cross-sectional context, but we focused on applicants over age 51 in a longitudinal framework. The vocational factors are less stringent among the older applicants, which likely led to fewer denials at Step 5 within our sample than within the OIG's sample. Second, our understanding is that the OIG report included SSI-only applicants, but we included only those applying for SSDI (including applicants concurrently seeking SSI); presumably, SSI applicants with limited work history would be less likely to be denied on the basis of their ability to perform past work than those with the work history requirements for SSDI eligibility; this would lead to fewer step 4 denials in the OIG sample. Finally, the OIG study focused on applications denied in 2013 after SSA implemented an expedited step 5 review, whereas we had data on applications only through 2012.

C. Tracing post-denial benefits and earnings in administrative data

To assess the applicants' subsequent benefits trajectory after the initial SSDI denial, we linked SSA's 831 files to information contained in its Cross-Year Benefits File (CYBF). The CYBF contains administrative data from the Master Beneficiary Record (MBR) and Payment History Update System (PHUS), both of which have monthly information about the receipt of SSDI and OASI.

Linking to the CYBF was necessary to determine whether denied applicants appealed the initial denial, because the 831 file does not contain information on allowances and denials at higher levels of appeal. If a denied applicant received SSDI (as recorded in the CYBF) after the initial denial and we observed no later SSDI applications (in the 831 file), we assume that the

applicant appealed the initial decision. If we observe SSDI benefit receipt in the CYBF along with another SSDI application in the 831 file, we assume that applicant reapplied and was awarded benefits, although we do not know the level at which the allowance was made. For those with a later SSDI application and no record of benefit receipt, we assume that applicants applied again and were denied, though it is possible that they received an allowance after the end of 2012, the last date in the CYBF. We categorize one final group: those who never applied again. This group includes those who did not have a subsequent application in the 831 file. In this group are applicants who unsuccessfully appealed their initial denial as well as those who did not appeal their denial; the data do not allow us to distinguish between the two groups.

There is one limitation of data elements in the CYBF that limits our ability to correctly categorize post-denial SSDI benefit receipt.[12] To the extent it introduces errors in our results, it underestimates the share of denied applicants who received SSDI before FRA. In particular, until May 2009, the variable indicating the type of benefit (disability or retirement) was overwritten as beneficiaries' status changed. After May 2009, this information was recorded historically, allowing identification of original status and track subsequent changes. The implication is that we cannot determine if initially denied SSDI applicants who became Social Security beneficiaries between age 62 and the FRA and attained the FRA before May 2009 received OASI only, or were first awarded SSDI. Hence, denied initial applicants who attained the FRA before May 2009 that we have classified as entering OASI before the FRA may have actually entered SSDI, albeit after age 62.

[12] This issue is not exclusive to the CYBF; it applies to the Type of Claim field in the Master Beneficiary Record (MBR) from which the CYBF is derived.

We measured earnings using the Summary Earnings File, a linkage available with permission through the HRS. The file contains information on taxable annual earnings as reported to the IRS. [13] We consider earnings in the years surrounding application by using the application filing and decision dates. Virtually all respondents linked to SSA administrative data also had a record in the Summary Earnings File, though not in every year (perhaps reflecting the absence of earnings reportable to the IRS in a year). In cases in which we align earnings to household income as reported by the respondent in the HRS, we follow the HRS convention of using the calendar year preceding the interview date. Using the Consumer Price Index, we adjust all income and earnings measures to 2012 dollars.

[13] Earnings in the Summary Earnings File are top-coded at the taxable maximum for Social Security benefits in each year. More than 95 percent of our sample members had at least one year of earnings in the Summary Earnings File. In years that the individual did not have data, we assumed that the individual did not have taxable earnings in those years. The share of individuals with earnings is then taken across all sample members with at least one year of earnings data.

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V. FINDINGS

A. Characteristics and pre-application occupational attributes of denied SSDI applicants

The mean age at application across all applicants in our sample was just under 58 years, ranging from as low as 51.2 years to as high as 65.2 years. Most of the applicants we observe sought SSDI prior to the age at which they could claim OASI; 11.8 percent of applicants were at least age 62 and thus eligible for OASI when they applied for SSDI.

Relative to applicants denied for medical reasons, applicants denied on the basis of work capacity were younger on average, had higher educational attainment and were less likely to be married or Hispanic. They also had longer job tenure on the last job held before application, and had higher average annual earnings between ages 22 and 50. They were also more likely to work on occupations requiring the ability to withstand stress and dealing with unpleasant or angry people.

The characteristics and occupations of applicants initially denied at step 4 show a group of lower-skilled workers in modest jobs relative to those denied at step 5 (Appendix A presents findings related to the individual characteristics of each group while Appendix B focuses on their occupational attributes). Those denied at step 4 were more likely to be female or Hispanic, less likely to be married, and less likely to have completed postsecondary education. They were more likely than applicants denied at step 5 to work in an occupation requiring a high level of interpersonal skills and using a computer, but in jobs less likely to demand the continual updating of skills and knowledge, complexing problem-solving skills, or system or technical skills.

Applicants initially denied at step 5 appear to be relatively more skilled workers and may face fewer challenges in transitioning to other work. Relative to applicants denied at step 4, those

denied at step 5 were about two years younger on average and more likely to have received some post-secondary education. The differences in age and education among those denied at step 5 mirror the role of those factors in the medical-vocational grids. In addition, we found that, before application, step 5 denials earned a higher hourly wage and had higher average annual earnings between ages 22 and 50.

B. The employment and earnings trajectories of Denied Applicants

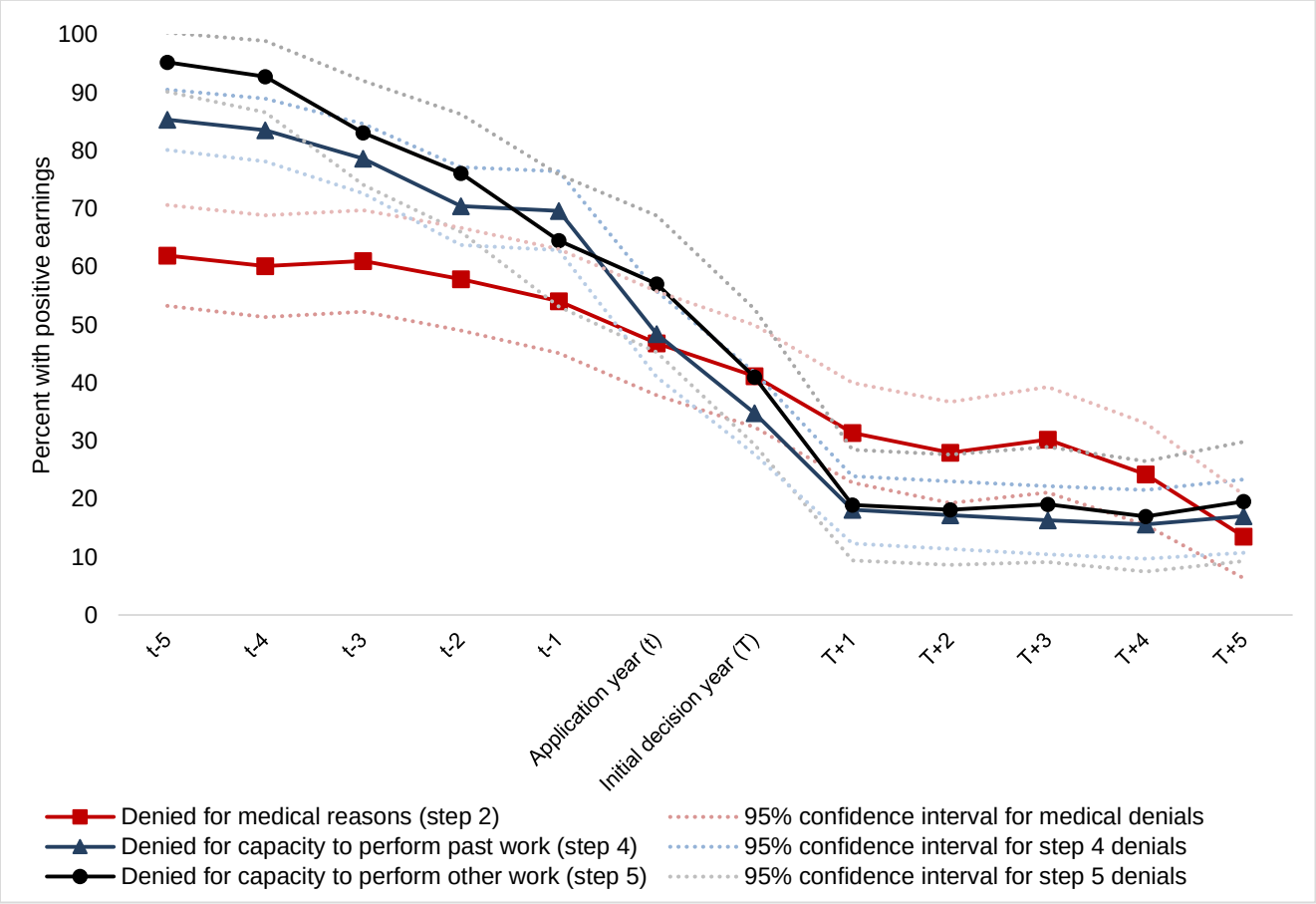
We begin by considering the employment and earnings trajectories of denied applicants to explore whether we see those denied for work capacity reasons have substantially different post-denial employment outcomes than those denied for medical reasons. We traced earnings outcomes in the five calendar years before application and the five calendar years following the initial decision.[14] It is important to note that we are unable to trace the outcomes for all applicants for five years following application given right-censored data; a table with the information contained in the figures and sample size information appears in Appendix C.

Five years prior to application, a nontrivial share of SSDI applicants is not working, measured by having positive earnings in the calendar year (Figure V.1). In that year, 85.3 percent of step 4 denials and 95.2 percent of step 5 denials were working compared with 61.9 percent of those denied for insufficiently severe impairments as step 2 (that is, for medical reasons). While the confidence intervals around the estimates show that they are imprecise, the general pattern prior to application is that fewer applicants who are ultimately denied at step 2 are working than applicants denied at steps 4 and 5. There is little difference in the likelihood of employment during that period between those denied at steps 4 and 5. The pre-application employment rates

[14] Given that the time period between application date and the initial decision can be months or longer, the time period between application and decision is not the same for all applicants and may fall in the same or different calendar years. In the figures in this section, we call the application year t and the initial decision year T for ease of presentation.

for our sample are similar to those in similar studies, despite differences in study population age and timing before application (SSA OIG 2017; Strand and Trenkamp 2016).

Figure V.1. The share of initially denied applicants with positive earnings in the calendar years surrounding SSDI application, by reason for denial



Source: Authors' calculations using the HRS linked to SSA's 831 file and the Summary Earnings File.

Notes: Percent with non-zero earnings limited to the number of individuals with data available in the calendar year from the Summary Earnings File; this number falls in the years following the initial decision due to right censoring. Table C1 shows the sample size used in each year for computing these values.

Around the time of application, the likelihood of working declines more abruptly among those denied for work capacity reasons than it does among those denied at step 2 (Figure V.1). Those denied for medical reasons have a higher likelihood of earning in the first few post-denial years than those denied for work capacity reasons, though again our estimates are imprecise due to the small number of denied applicants in the HRS. After the initial denial, the share with

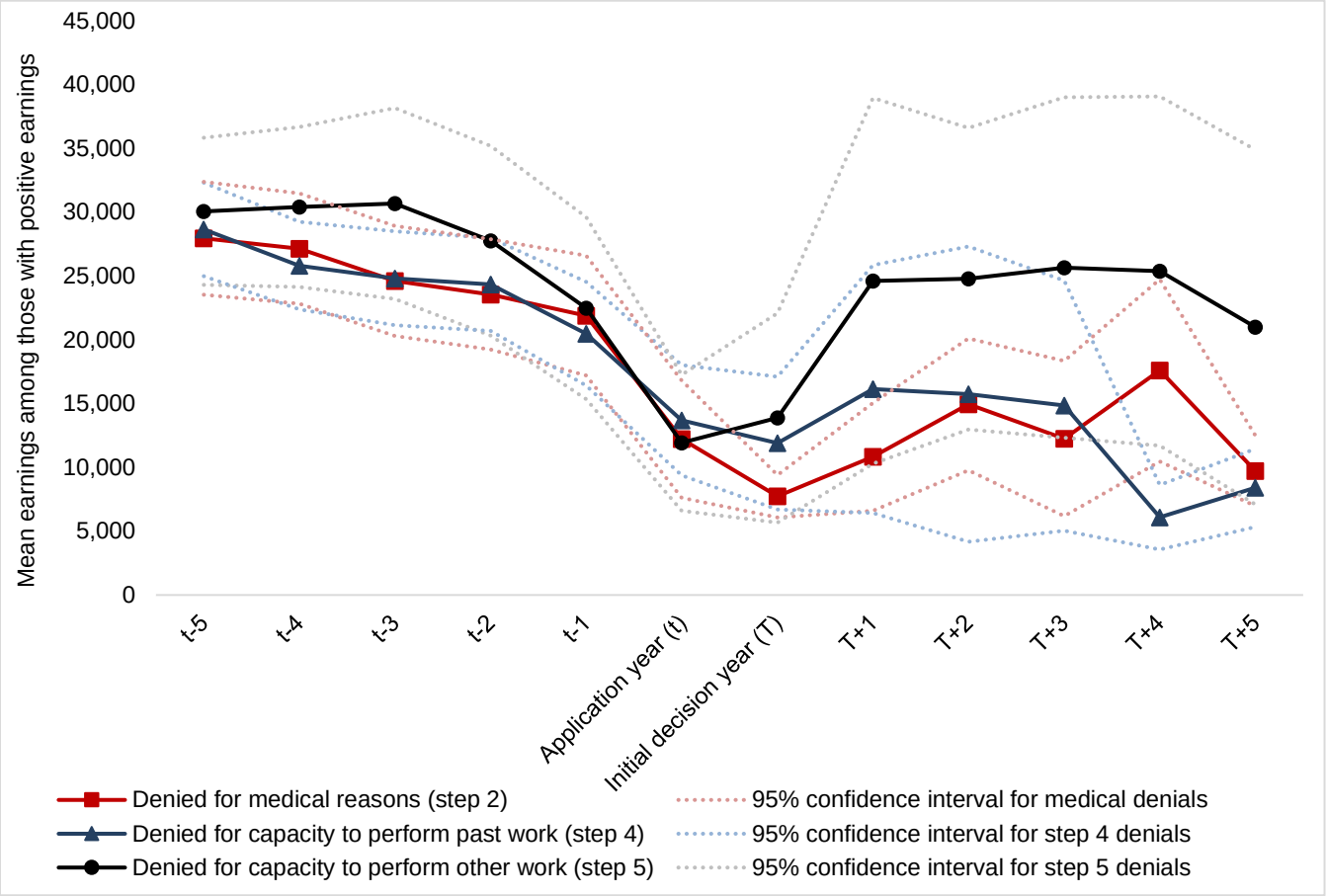
positive earnings continues to decline across all groups, though the year-over-year changes are not large. By the fifth calendar year after application—when the average denied applicant in our study is between ages 61 and 63, between 10 and 20 percent have positive earnings.

In the absence of statistics directly comparable to ours, we have compiled suggestive evidence that older denied applicants work less than their younger peers and less than older adults overall. The likelihood of positive earnings post-denial was 41 percent about a year after denial in SSA's OIG study and at 63 percent about three years after denial in Strand and Trenkamp. Moreover, Strand and Trenkamp documented that the likelihood of having earnings increased over time in the years after denial. We used self-reported data in the HRS (not shown) to explore whether the lower employment rates might just reflect reduced work activity with age. We conclude that denied applicants are less likely to work than their non-applicant peers. While not directly comparable to the measures in Figure V.1, we found that 57 percent of all adults reported working for pay at ages 61 and 42 percent are working for pay at age 63, the age that roughly corresponds to five years after the age at decision for denied applicants in our sample.

Among the relatively few denied applicants who return to work, average earnings in the years after denial are lower than average earnings in the pre-application period, increasing in the years following denial from their low around the time of application (Figure V.2). When comparing average earnings among earners in the five years before application to the five years after decision, we find that earnings fall by about half for those denied for medical reasons and those denied at step 4. For those denied at step 5, average earnings among earners fall by about 15 percent in the five years after denial relative to the five years before application. This pattern is consistent with the earlier findings that applicants denied at step 5 are younger on average, tend to have higher education levels, and work in more highly skilled jobs than other denied

applicants; these attributes may also make them more likely to find higher paying jobs if they return to work after denial. Of course, there may be selection in who returns to work; it is possible that those who continue to work after denial had above-average earnings prior to application and experience a greater than average decline in earnings. The opposite could also be true.

Figure V.2. Mean earnings among initially denied applicants with earnings in the calendar years surrounding SSDI application, by reason for denial



Source: Authors' calculations using the HRS linked to SSA's 831 file and the Summary Earnings File.

Note: Mean earnings are calculated among those with non-zero earnings in the year, as shown in Figure V.2. As noted in that figure, earnings statistics are limited to the number of individuals with data available in the calendar year from the Summary Earnings File; this number falls in the years following the initial decision due to right censoring. Table C1 shows the sample size used in each year for computing these values. Earnings adjusted for inflation and reported in 2012 dollars. Earnings in the Summary Earnings File are top-coded to the taxable maximum for Social Security in each year.

Though post-denial estimates of earnings do not evolve smoothly in the five years after the decision, the observed trajectory is similar to that traced in Strand and Trenkamp. That study found that average earnings increased with time after denial (2016). The decline in average earnings of 15 percent after denial among those who were denied at step 5, while not statistically significant given the small sample of earners after denial, is in line with the earnings declines at the median reported in that study as of three years after initial denial.

In addition to average earnings, we also calculated the share of denied applicants who earned above SGA in the years after denial (not shown). This threshold is important because being denied benefits was in part based on the ability to engage in past work or other work at or above the SGA level. In each year, we compared earnings to annualized SGA, or twelve times the monthly SGA level during the year ($1,010 per month in 2012).[15] In the five years prior to application, about two-thirds of those with earnings earned above SGA, with relatively little difference based on the reason for denial. In the five years following denial, we found that far fewer of those with earnings engaged in SGA; approximately 25 percent of step 2 denials with earnings, 35 percent of step 4 denials with earnings, and 55 percent of step 5 denials with earnings. We caution that the small number of cases with earnings in the post-denial years combined with the small sample size in each group makes it difficult to conclude that the likelihood of earnings above SGA varies across these groups. We can, however, conclude that a smaller share of denied applicants who work after denial earn above SGA than those who had earnings above that level in the period before application.

[15] HRS disclosure guidelines and relatively small numbers of cases with earnings above SGA mean that we cannot disclose the exactly numbers by year. Moreover, as a result of the small sample size with earnings, the estimates across groups are not significantly different from each other.

C. Differences in the Post-Denial Application and Benefit Receipt Trajectories Based on Reason for Denial

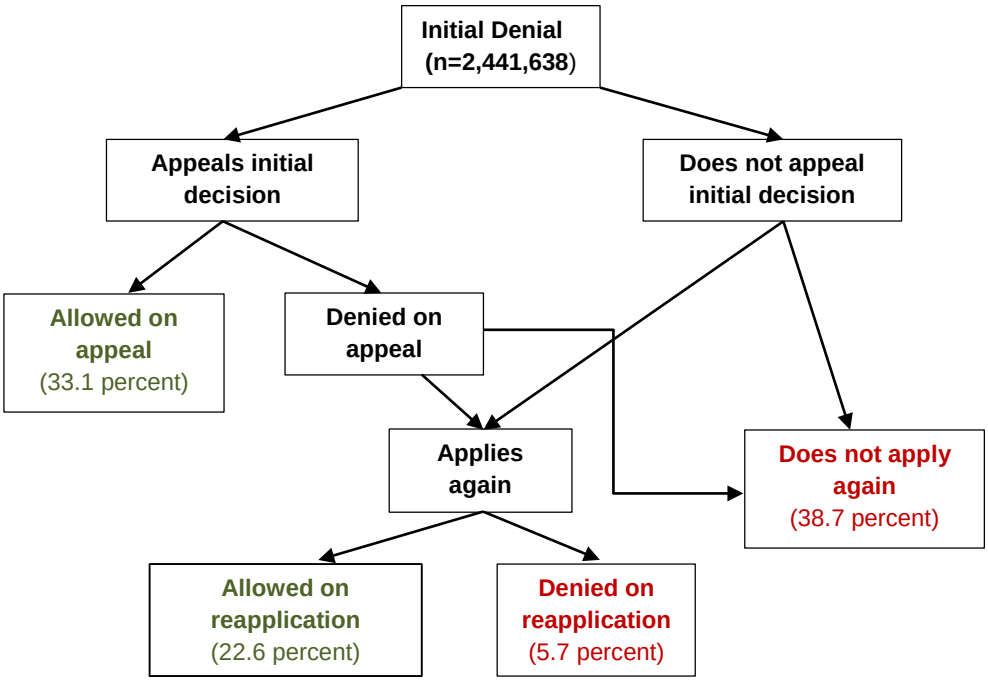
1. Denied applicants who appeal or reapply for SSDI after initial denial

After the initial denial, applicants have several possible options for continuing to seek SSDI, and Figure V.3 shows that many older applicants do so. The first choice is whether to appeal the initial decision. For applicants who do not appeal or who are denied after appealing the initial decision, the subsequent decision is whether to reapply for benefits, perhaps several years after the initial decision. The data do not allow us to identify the exact number in each of the options along the way, but Figure V.1 shows that overall, 55.7 percent of denied applicants in our sample received an award, of whom a majority received an award after appealing the first denial observed. Almost one-third of denied applicants (28.3 percent) apply again, either after they appealed and were denied, or simply began a new application without appealing. Just over one-third (38.7 percent) never apply again. It is important to note that due to limitations of the 831 data, the group that we do not observe applying again includes those who appealed the initial decision but were denied, and also includes applicants who appealed, were awarded SSDI, but converted to OASI at FRA prior to May 2009 (related to the overwriting of the MBR discussed previously).

The overall pattern of appeals and reapplications among older denied applicants results in important differences in paths for those denied for medical reasons compared to those denied for work capacity reasons (Table V.1). In particular, 67 percent of work capacity denials were allowed after appeal or reapplication, more than twice the 31 percent of those denied for medical reasons who were ultimately allowed. The higher ultimate SSDI allowance rates among initial work capacity denials compared with initial medical denials is because a much higher share of the former successfully appeal the initial decision. Compared with the 19.8 percent of medical

denials appealing the initial decision and subsequently receiving benefits, 42.8 percent of those denied at step 4 and 32.0 percent of those denied at step 5 filed an appeal and received an award (Table V.1). The higher allowance rates for those initially denied for work capacity relative to rate for those initially denied for medical reasons reflects higher appeal rates and higher allowance rates for those who appeal.

Figure V.3 Appeals and reapplications to SSDI following initial denial



Source: Authors' calculations using the HRS linked to SSA's 831 file and CYBF.

Note: To avoid disclosing potentially identifiable information, we have rounded numbers in a way to maintain the qualitative findings without revealing the exact number of observations in each category, per the disclosure requirements for using the restricted HRS-SSA data.

Table V.1. Post-denial SSDI benefit trajectory of denied SSDI applicants

	All denied applicants[1]	Denied for medical reasons (step 2)	Work capacity denials (steps 4 and 5)[1]	Denied due to ability to perform past work (step 4)	Denied due to ability to perform other work (step 5)[1]
Total (weighted n)	2,441,638	780,144	1,661,494	1,130,296	531,198
Appeals, allowed (percent)	33.12	19.77	39.39	42.86	32.00
	(2.44)	(3.62)	(3.09)	(3.69)	(5.60)
Applies again, allowed (percent)	22.61	11.21	27.96	26.53	31.00
	(2.17)	(2.87)	(2.84)	(3.29)	(5.56)
Applies again, denied (percent)	5.66	8.10	4.51	4.52	4.50
	(1.20)	(2.48)	(1.31)	(1.55)	(2.49)
Never applies again[2] (percent)	38.72	60.92	28.30	26.09	33.00
	(2.53)	(4.44)	(2.85)	(3.27)	(5.66)

Source: Authors' calculations using the HRS linked to SSA's 831 file and CYBF.

Note: Standard errors appear in parentheses. Chi-squared tests determined that the difference in the distribution of post-denial benefits trajectories between denials for medical reasons and work capacity reasons was significantly at less than the 1 percent level, as was the difference in the distribution of post-denial benefits trajectories between those denied at steps 4 compared to those denied at step 5.

[1]To avoid disclosing potentially identifiable information, we have rounded percentages in a way to maintain the qualitative findings without revealing the exact number of observations in each category, per the disclosure requirements for using the restricted HRS-SSA data.

[2]The group includes applicants who appealed the initial denial but did not receive an allowance on appeal; the data do not allow us to distinguish this group from those who do not appeal but never reapply. Cases were determined to have appealed and been allowed if we do not see a subsequent application in the 831 data but observe the individual receiving SSDI in the CYBF.

Compared with the sample of applicants considered in SSA's OIG (2017) report, a significantly higher share in our sample received an allowance for benefits after an initial denial. Among the OIG sample, 37 percent of those denied for work capacity reasons received an allowance, 41 percent applied again and were denied, and 22 percent never applied again. Our hypothesis is that the difference in outcomes largely reflects the age of the study sample; again, we focus on applicants over age 50, while OIG considers applicants across the working years.[16]

[16] The OIG report does not separately distinguish work capacity denials by steps 4 and 5, so we are unable to assess whether consideration of vocational factors (which primarily affect older applicants) accounts for any of the difference.

2. Denied applicants who claim OASI before FRA

In addition to seeking SSDI benefits through appeal or reapplication, another possibility available to denied applicants is the availability of OASI benefits as early as age 62. Pursuing an SSDI application after age 62 is less costly than at younger ages, as those who apply for OASI are considered for SSDI eligibility by SSA if they report a health condition or impairment that might meet the eligibility criteria. Other work has shown that actuarially reduced OASI benefits claimed before FRA are an important component of the safety net for older adults with work-limiting health conditions (Bound and Waidmann 2010; Wu and Schimmel Hyde 2017). Even though individuals receiving OASI prior to FRA are able to earn above SGA,[17] we hypothesize that denied applicants who ultimately claim OASI before FRA are unlikely to reenter the workforce.

Among applicants initially denied SSDI benefits, we find that the majority receive SSDI or OASI before FRA (results not shown). Table V.1 showed that approximately one-third of those denied for medical reasons and two-thirds of those denied for work capacity reasons were observed to receive SSDI by FRA. Among the cases for whom we did not observe an SSDI award, more than 70 percent begin to receive OASDI (either OASI or SSDI) between the ages of 62 and FRA, with little difference across the groups of denied applicants.[18] But, we see that among those who begin to receive benefits between 62 and FRA, three-quarters receive their first

[17] If an individual collects OASI benefits before FRA, his or her benefits are reduced by $1 for every $2 earned in excess of an annual limit (Song and Manchester 2007). In 2017, that limit is $16,920 annually. Any such benefit reductions result in increases in benefits paid to the beneficiary after attaining the FRA by an actuarially fair amount.

[18] As we have discussed, the data in the CYBF do not allow us to identify whether those who receive an OASDI payment after age 62 ultimately were awarded SSDI or claimed OASI at an actuarially reduced amount. In addition to not separating OASI from SSDI, these statistics should be interpreted with caution, as 15 percent of our sample did not have data through age 62 (members of the early boomer cohort) and an additional 5 percent had data beyond age 62 but not all the way through FRA. Exclusion of those cases from consideration suggests that virtually all whom we observe as able to claim OASDI did so before FRA.

payment at age 62, suggesting that most of the benefit receipt among this group is OASI at the first possible age.

Most of the applicants in our sample were younger than the earliest eligibility age for OASI when they applied for SSDI, perhaps viewing SSDI as their main option for income support following disability onset. Even still, the ability to claim OASI at age 62 is relevant to applicants who initially applied at ages just prior to 62, as the initial decision takes months and appeals may take many months or years. Comparing step 4 and 5 denials reveals that 68.1 percent of applicants denied at step 4 were between the ages of 57 and 61 when they applied for SSDI, compared with 45.0 percent of applicants denied at step 5. Our earlier findings indicated that many of these denied applicants appealed that decision, but for others, the decision not to appeal may have been driven in part by the ability to claim OASI instead after reaching age 62.

A minority of applicants (11.8 percent) in our sample were age 62 or older when they initially applied for SSDI (not shown). Thus, relatively few of the denied SSDI applicants we observe would have been among the group that contacted SSA seeking OASI but were then considered for SSDI as a result of their limitations. There were slight, though not statistically significant differences, in the share of denied applicants who were above age 62 at application relative to allowed applicants.

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VI. CONCLUSIONS AND IMPLICATIONS FOR POLICY

Our findings show that few older applicants initially denied SSDI returned to work and that those who did return to work earned less on average than in the years before application. These employment patterns apply to all denied applicants, with modest differences across groups defined by the step in the sequential evaluation at which the initial denial occurred. We find suggestive evidence that applicants denied at step 5 were slightly more successful in post-denial employment than other denied applicants, but even among that group, few engaged in SGA. Comparing the patterns from our study sample to other populations, we conclude that the likelihood of returning to work is lower among older denied applicants than among younger ones. We also find that older denied applicants exit from the labor force earlier than their non-applicant peers.

Low employment post-denial is tied to post-denial claiming for SSDI and OASI. By FRA, virtually all initially denied SSDI applicants over age 50 who sought benefits are receiving benefits from either SSDI or OASI. Just under two-thirds of applicants in our sample initially denied benefits for reasons of work capacity were ultimately awarded SSDI benefits, either after appealing the initial decision or reapplying. That rate is twice as high as the rate for those who appealed or reapplied following a denial for medical reasons. As applicants continue to pursue SSDI benefits, they have an incentive to avoid working at a level that would make them ineligible. Among denied applicants who do not receive SSDI, most claim OASI benefits between the earliest age of eligibility (age 62) and SSA's FRA. OASI beneficiaries in this age range have much more modest work disincentives than SSDI beneficiaries, but few work.

Thus, among the many older SSDI applicants who are initially denied benefits, few go back to work and most become Social Security beneficiaries before attaining the FRA. Other research

has found low levels of economic security among older workers with medical problems, including those claiming OASI before the FRA (see, for example, Wu et al. 2017). Two recent studies have demonstrated the negative consequences of premature retirement and the importance of benefit income for workers with medical conditions. Fitzpatrick and Moore (2017) found that mortality at age 62 increased after the earliest eligibility age for OASI was introduced. Gelber et al. (2017) found that exogenous increases in the size of SSDI benefits reduce mortality among beneficiaries.

Policy changes could potentially reduce the financial stress experienced by such workers. One policy option is to make the medical-vocational guidelines less stringent, at least relative to how they are currently applied at the initial level. For those who eventually receive an SSDI award after an initial denial, this option would presumably bring the initial decision more in line with the Social Security Act's medical eligibility criterion. Thus, it seems the obvious option for those denied applicants who meet the Act's criterion, avoiding the delay in ultimately receiving an award after significant delays resulting from appeals and reapplications. Of course, changes in stringency would need to be evaluated in light of increases in false positives that potentially might offset the reduction in false negatives.

For many denied SSDI applicants, a better option might be to help them return to the labor force. This option might be better for the health and economic wellbeing of many denied applicants, and might also be less costly to the government. Some applicants may need services that would help them manage their medical condition and/or work despite their condition, while others might only need a stronger incentive to work. One option is a modest stipend to cover disability-related costs accompanied by a special disability income tax credit design to increase the incentive to work as well as to increase household income. On a per worker base, such a

policy could potentially cost the government far less than eventually awarding SSDI benefits and, after 24 more months, Medicare (Stapleton and Schimmel Hyde 2017).

Ideally, it would be better to deliver services and supports while the worker is still attached to an employer, and before application to SSDI and initial denial. Under that scenario, the employer could potentially be engaged in the return-to-work effort, and the worker could avoid loss of human capital due to labor force withdrawal during the SSDI application process. The only reason to withhold support until the worker becomes an initially denied SSDI applicant is that it is not feasible to precisely identify which employed workers will ultimately reach denied applicant status in the absence of support. The SSDI application and initial decision serve as a screening process. This process is unlikely to be the optimal screening process for efficiently providing such services and supports, however. It would be worthwhile to consider screening options that might deliver services and supports to more workers, including some who would stay in the workforce without them, but would also divert some from applying for SSDI in the first place. Such a screening process might ultimately have much larger impacts on workforce retention as well as on the economic security of older workers with medical problems.

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APPENDIX A

DIFFERENCES IN THE CHARACTERISTICS OF INITIALLY DENIED APPLICANTS, BY REASON FOR DENIAL

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This appendix documents the characteristics of applicants before application, with the aim of shedding light on the reasons that applicants may or may not return to work after the initial decision. We maintain a narrow focus by considering only denied applicants, though we present similar measures for allowed applicants at the end of the appendix (Table A4).

A. The timing of HRS surveys and implications for the measurement of applicant characteristics

The source of each data element affects the point at which we are able to measure individual outcomes. For variables derived from data collected directly from HRS respondents, we use characteristics from the interview just preceding the application filing date, or about a year before filing on average. For ease of reference, we refer to the time period as the "application wave."[19] In some instances, we also use data collected in the interview that took place about three years on average before application; we refer to that time period as the "wave prior to application." Importantly, we consider employment status measures at this time, recognizing that, in the year before SSDI application, applicants might have already left the labor market or made other adjustments in response to disability onset. By considering employment status three years earlier, we likely observe more applicants in their career jobs and less affected by their disability. We also used data collected in the wave prior to application when we consider health status measures in order to assess the change in health status among applications in the years before application.

B. Demographic characteristics

Compared to applicants denied at step 5 because of their ability to perform other work, applicants denied at step 4 because of their ability to perform past work are more likely to be

[19] When the individual was not interviewed during the application wave interview, we used data collected in the preceding interview wave, which was approximately three years before the application.

female (60 percent versus 41 percent) and Hispanic (10 percent versus 1 percent), but less likely to be White (69 percent versus 83 percent) (Table A1). They were also marginal significantly less likely to be married than those denied at step 5 (54 versus 66 percent).

On the other hand, applicants denied at step 5 for their ability to perform other work—those for whom vocational factors including age, education, and work experience are factors in making a determination—stand out because they are about two years younger on average than those denied at step 4 (56 versus 58 years old) and they are significantly more educated. The Chi-square test shows that the educational distribution of applicants denied because of their ability to perform other work were significantly different from those who denied because of their ability to perform past work, with the former group were more likely to be high school graduates or have completed more than a high school education. The statistics suggest that denied applicants' younger age and higher educational attainment may mean that they are believed to be more readily able to return to another job than those with less education or those closer to FRA.

We also compared applicants who denied on the basis of work capacity reason to those denied for medical reasons and found that as a whole group, those denied on the basis of work capacity reason are relatively younger (57 versus 58 years old), and less likely to be married (58 versus 75 percent) or Hispanic (7 percent versus 21 percent). The educational distributions are also significantly different based on the reasons for denial, with those denied for work capacity reasons were less likely to be high-school dropouts.

Table A1. Demographic characteristics of initially denied SSDI applicants, by reason for denial

	All denied	Denied for medical reasons (step 2)	Denied for work capacity reasons (steps 4 and 5)	Denied due to ability to perform past work (step 4)	Denied due to ability to perform other work (step 5)
Age (years)	57.63	58.17	57.36**	58.19	55.72***
	(0.16)	(0.26)	(0.19)	(0.19)	(0.37)
Female (percent)	55.06	58.12	53.62	59.69	40.70***
	(2.58)	(4.49)	(3.15)	(3.66)	(5.91)
Married (percent)	63.60	74.69	58.24***	54.25	66.10*
	(2.54)	(4.00)	(3.18)	(3.82)	(5.70)
White (percent)	71.96	68.59	73.55	69.09	83.03**
	(2.33)	(4.22)	(2.79)	(3.44)	(4.52)
Black (percent)	19.48	18.04	20.16	22.52	15.13
	(2.05)	(3.50)	(2.54)	(3.11)	(4.31)
Hispanic (percent)	11.65	20.51	7.48***	10.43	1.22**
	(1.66)	(3.67)	(1.66)	(2.28)	(1.32)
Less than high school (percent)	21.46	27.07	18.83*	17.94	20.71
	(2.13)	(4.04)	(2.47)	(2.86)	(4.88)
High school graduate (percent)	39.49	39.21	39.62	47.69	22.45***
	(2.53)	(4.44)	(3.09)	(3.72)	(5.02)
More than high school (percent)	39.05	33.71	41.55	34.37	56.84***
	(2.53)	(4.30)	(3.12)	(3.54)	(5.96)

Source: Authors' calculations using the HRS linked to SSA's 831 file.

Notes: All results weighted to account for the probability of matching to SSA administrative data as well as the complex survey design. Standard errors appear in parentheses. Indications of statistically significant differences in the work capacity column compare all work capacity denials to medical denials, indications of significance in the step 5 column indicate compare step 4 and step 5 denials. Chi-square tests compare the distribution of multinomial outcomes across groups, while t-tests were used to compare binomial outcomes. *** denotes that the difference is significant at the 1 percent level, ** at the 5 percent level, and * at the 10 percent level. We measured age in the month of SSDI application and measured all other characteristics by using information collected during the HRS interview immediately preceding the application (approximately one year earlier, on average).

C. Health and functional status

No clear pattern of differences in health and functional status emerges for applicants denied at step 4 versus those denied at step 5 (Table A2). While those denied for their ability to perform other work were more likely to report excellent or very good health compared to those denied because of their ability to perform past work, there is no significant difference in

Table A2. Pre-application health and functional status of initially denied SSDI applicants, by reason for denial

	All denied	Denied for medical reasons (step 2)	Denied for work capacity reasons (steps 4 and 5)	Denied due to ability to perform past work (step 4)	Denied due to ability to perform other work (step 5)
Reports excellent or very good health (percent)	18.76 (2.06)	19.42 (3.64)	18.43 (2.50)	15.41 (2.76)	24.41* (5.17)
Reports good health (percent)	26.78 (2.33)	21.36 (3.77)	29.40 (2.93)	29.36 (3.48)	29.46 (5.49)
Reports fair or poor health (percent)	54.46 (2.62)	59.22 (4.52)	52.17 (3.22)	55.22 (3.80)	46.13 (6.00)
Obese (Body Mass Index> 30; percent)	43.24 (2.62)	45.42 (4.62)	42.21 (3.18)	46.02 (3.81)	34.69 (5.73)
Reports difficulty with any of 6 ADLs (percent)[1]	29.11 (2.39)	26.06 (4.04)	30.58 (2.97)	32.76 (3.59)	26.26 (5.30)
Average number of ADL difficulties (0–6)[2]	1.64 (0.08)	1.70 (0.12)	1.62 (0.11)	1.61 (0.12)	1.65 (0.23)
Reports difficulties with any of 7 IADLs[3]	9.81 (1.57)	13.29 (3.12)	8.13 (1.76)	7.60 (2.03)	9.18 (3.48)
Average number of IADLs[2]	1.21 (0.09)	1.24 (0.14)	1.22 (0.12)	1.23 (0.17)	1.20 (0.18)
Average CESD score (0–8)[4]	2.61 (0.13)	2.56 (0.24)	2.63 (0.16)	2.61 (0.19)	2.67 (0.27)
Reports health condition limiting work	55.30 (2.63)	50.02 (4.64)	57.81 (3.18)	56.39 (3.79)	60.60 (5.88)
Doctor has ever diagnosed respondent with: (percent)					
Arthritis	59.65 (2.59)	59.33 (4.52)	59.80 (3.16)	63.25 (3.69)	52.99 (6.01)
Cancer	5.68 (1.22)	3.35 (1.66)	6.81 (1.63)	8.01 (2.08)	4.45 (2.48)
Diabetes	27.52 (2.35)	25.92 (4.03)	28.30 (2.90)	26.30 (3.37)	32.25 (5.63)
Heart condition	21.49 (2.16)	20.53 (3.72)	21.96 (2.67)	22.68 (3.20)	20.53 (4.86)
Lung condition	10.19 (1.60)	7.65 (2.45)	11.43 (2.05)	9.54 (2.25)	15.11 (4.31)
Psychiatric problem	25.70 (2.31)	27.66 (4.14)	24.75 (2.79)	23.62 (3.27)	26.97 (5.34)
Stroke	5.54 (1.21)	5.94 (2.18)	5.34 (1.45)	3.87 (1.48)	8.25 (3.31)

Table A2 (*continued*)

Source: Authors' calculations using the HRS linked to SSA's 831 file.

Notes: All results weighted to account for the probability of matching to SSA administrative data as well as the complex survey design. Standard errors appear in parentheses. Indications of statistically significant differences in the work capacity column compare all work capacity denials to medical denials, indications of significance in the step 5 column indicate compare step 4 and step 5 denials. Chi-square tests compare the distribution of multinomial outcomes across groups, while t-tests were used to compare binomial outcomes. *** denotes that the difference is significant at the 1 percent level, ** at the 5 percent level, and * at the 10 percent level. We measured health and functional status by using information collected during the HRS interview immediately preceding the application (approximately one year earlier, on average) when available or the wave before that one in the small share of cases when the application wave data were not available.

[1]The ADLs included in the summary measure are walking across a room, dressing, bathing, eating, getting in/out of bed, and using the toilet.

[2]Average among those reporting any difficulties on the same measure.

[3]The IADLs included in the summary measure include using a map, a calculator, and a telephone; managing money; taking medications; shopping for groceries; and preparing hot meals.

[4]The CESD score is based on responses to questions about mental health, including whether the respondent felt depressed, felt that activities took considerable effort, experienced restless sleep, felt lonely, felt sad, felt unmotivated, or was happy and enjoyed life.

doctor-diagnosed health problems, in reporting difficulty with any ADLs or IADLs, or reporting experiencing health conditions limiting work. We also consider differences in the health trajectory between the wave prior to application and the application wave. All applicants denied for the work capacity saw a decline in health and functioning over the period, but no notably different change between the two groups (not shown).

We further compared work capacity denials to applicants denied for medical reasons. In theory, those denied on the basis of medical reasons have less significant conditions than those whose medical conditions required an evaluation at steps 4 and 5. Yet, no clear pattern of differences in health and functional status based on the reasons for denial.

D. Employment status, earnings, and income

We find relatively little difference across the groups of denied applicants in the share working, working full-time, or self-employed (Table A3). Regardless of the reasons for denials, about one-third of rejected SSDI applicants were not working at the time of the application wave, to some extent reflecting those who were interviewed in the five-month period between disability

onset and application. Among the two-thirds who were working, about three-quarters were working full-time, again with little difference across groups.

Applicants denied for work capacity reasons had higher wages, earnings, and household income than applicants denied for medical reasons, though we cannot identify a convincing reason for the difference (Table A3). They also had longer job tenure with their current employer, more years of positive earnings between age 22 and 50, and were more likely to work with big size firms.

Applicants denied because they could perform past work were more likely to work with big size firms than those denied for their ability to perform other work, with the distributions of the firms size of the job they held before the disability onset are significantly different between two groups. On the other hand, applicants denied because of their ability to perform other work appear to have higher hourly wages, and higher average annual earnings between age 22 and 55. This likely reflects their relatively higher educational attainment, as shown in Table A1.

Table A3. Pre-application employment status, earnings, and income of initially denied SSDI applicants, by reason for denial

	All denied	Denied for medical reasons (step 2)	Denied for work capacity reasons (steps 4 and 5)	Denied due to ability to perform past work (step 4)	Denied due to ability to perform other work (step 5)
Employment status and work experience					
Employed	64.76	62.46	65.81	66.20	64.93
	(2.58)	(4.62)	(3.11)	(3.66)	(5.96)
Full-time (percent)	72.97	71.83	73.47	74.76	70.58
	(2.93)	(5.38)	(3.51)	(4.05)	(7.03)
Self-employed (percent)	12.59	13.17	12.34	10.33	16.90
	(2.19)	(4.04)	(2.61)	(2.83)	(5.78)
Works for a firm with more than 500 employees (percent)	16.33	11.76	18.54	25.85	4.60***
	(2.73)	(4.16)	(3.52)	(4.78)	(3.44)
Works for a firm with fewer than 100 employees (percent)	64.61	67.78	63.08	61.86	65.40
	(3.53)	(6.03)	(4.37)	(5.30)	(7.82)
Tenure in current job (years)	9.18	6.49	10.34***	10.78	9.33
	(0.70)	(0.85)	(0.93)	(1.08)	(1.83)
Years of positive earnings (age 22–50)	20.78	19.79	21.24*	21.23	21.26
	(0.29)	(0.52)	(0.35)	(0.42)	(0.64)
Earnings and income					
Hourly wage (dollars)	15.71	14.03	16.42	15.11	19.27**
	(0.71)	(0.84)	(0.96)	(1.07)	(1.93)
Annual earnings, self-reported (dollars)	19,392	18,025	20,019	21,033	17,760
	(1,307)	(2,512)	(1,519)	(1,800)	(2,835)
Total household income (dollars)	52,931	45,652	56,266*	55,134	58,789
	(2,668)	(3,879)	(3,453)	(4,094)	(6,472)
Average annual earnings (age 22–50) (dollars)	25,114	19,638	27,696***	26,317	30,577*
	(832)	(1,066)	(1,083)	(1,199)	(2,258)

Source: Authors' calculations using the HRS linked to SSA's 831 file; earnings history derived from linking analysis file to Summary Earnings File.

Notes: All results weighted to account for the probability of matching to SSA administrative data as well as the complex survey design. Standard errors appear in parentheses. Indications of statistically significant differences in the work capacity column compare all work capacity denials to medical denials, indications of significance in the step 5 column indicate compare step 4 and step 5 denials. Chi-square tests compare the distribution of multinomial outcomes across groups, while t-tests were used to compare binomial outcomes. *** denotes that the difference is significant at the 1 percent level, ** at the 5 percent level, and * at the 10 percent level. We adjusted earnings and income for inflation to 2012 dollars. We drew annual self-reported earnings from the HRS; we derived information about earnings for age 22 through 50 from the Summary Earnings File.

Table A4. Pre-application and post-allowance characteristics of allowed applicants, by reason for allowance

	All allowed	Allowed for medical reasons (step 3)	Allowed for vocational reasons (step 5)
Demographic characteristics			
Age (years)	57.47	57.05	57.69
	(0.16)	(0.33)	(0.19)
Female (percent)	49.26	52.99	47.36
	(2.52)	(4.48)	(3.04)
Married (percent)	68.34	74.06	65.43
	(2.39)	(4.04)	(2.94)
White (percent)	78.79	81.73	77.29
	(2.06)	(3.47)	(2.55)
Black (percent)	12.71	10.93	13.61
	(1.68)	(2.80)	(2.09)
Hispanic (percent)	6.12	8.42	4.96
	(1.21)	(2.49)	(1.32)
Less than high school (percent)	18.63	13.16	21.41
	(1.96)	(3.04)	(2.50)
High school graduate (percent)	41.59	36.55	44.16
	(2.48)	(4.32)	(3.03)
More than high school (percent)	39.77	50.29	34.43
	(2.47)	(4.49)	(2.90)
Health and functional status			
Reports excellent or very good health (percent)	18.99	21.74	17.59
	(2.01)	(3.80)	(2.36)
Reports good health (percent)	30.29	24.31	33.33
	(2.36)	(3.95)	(2.92)
Reports fair or poor health (percent)	50.72	53.95	49.08
	(2.56)	(4.59)	(3.09)
Obese (Body Mass Index > 30; percent)	47.88	44.80	49.45
	(2.57)	(4.60)	(3.11)
Reports difficulty with any of 6 ADLs (percent)[1]	25.64	19.14	28.93
	(2.24)	(3.64)	(2.81)
Average number of ADL difficulties (0–6)[2]	2.00	2.23	1.92
	(0.12)	(0.24)	(0.14)
Reports difficulties with any of 7 IADLs[3]	9.03	8.47	9.31
	(1.47)	(2.57)	(1.80)
Average number of IADLs[2]	1.18	1.32	1.11
	(0.07)	(0.13)	(0.07)
Average CESD score (0–8)[4]	2.34	2.12	2.45
	(0.13)	(0.22)	(0.15)
Reports health condition limiting work	52.09	45.46	55.47
	(2.57)	(4.58)	(3.08)

	All allowed	Allowed for medical reasons (step 3)	Allowed for vocational reasons (step 5)
Doctor has ever diagnosed respondent with: (percent)			
Arthritis	62.75 (2.48)	60.60 (4.50)	63.84 (2.97)
Cancer	9.27 (1.49)	12.81 (3.09)	7.49 (1.63)
Diabetes	22.33 (2.14)	26.49 (4.06)	20.22 (2.49)
Heart condition	23.12 (2.16)	18.67 (3.59)	25.38 (2.69)
Lung condition	12.55 (1.70)	14.84 (3.27)	11.38 (1.97)
Psychiatric problem	27.26 (2.28)	30.64 (4.24)	25.54 (2.70)
Stroke	6.79 (1.29)	9.14 (2.65)	5.59 (1.42)
Employment status and work experience			
Employed	87.99 (1.70)	85.38 (3.32)	89.23 (1.96)
Full-time (percent)	79.60 (2.30)	74.12 (4.59)	82.04 (2.61)
Self-employed (percent)	10.39 (1.73)	10.00 (3.11)	10.56 (2.09)
Works for firm with more than 500 employees (percent)	15.10 (2.22)	11.98 (3.63)	16.48 (2.78)
Works for a firm with fewer than 100 employees (percent)	58.66 (3.06)	57.04 (5.53)	59.37 (3.68)
Tenure in current job (years)	12.34 (0.62)	10.49 (1.01)	13.16 (0.77)
Years of positive earnings (age 22 –50)	21.92 (0.26)	21.52 (0.48)	22.11 (0.30)
Earnings and income			
Hourly wage (dollars)	18.46 (0.64)	19.55 (1.21)	17.96 (0.75)
Annual earnings, self-reported (dollars)	36,682 (1,600)	36,036 (2,759)	36,990 (1,966)
Total household income (dollars)	68,114 (2,787)	77,403 (5,346)	63,692 (3,209)
Average annual earnings (age 22 –50) (dollars)	32,124 (956)	31,587 (1,769)	32,389 (1,135)

Source: Authors' calculations using the HRS linked to SSA's 831 file; we derived earnings history by linking the analysis file to the Summary Earnings File.

Notes: All results weighted to account for the probability of matching to SSA administrative data as well as the complex survey design. Standard errors appear in parentheses; we did not test whether the observed means were significantly different among groups of allowed applicants. . We measured age in the month of SSDI application and measured all other characteristics by using information collected during the HRS interview immediately preceding the application (approximately one year earlier, on average). We

measured health and functional status in the application wave if available or in the wave before application if unavailable. We adjusted earnings and income for inflation to 2012 dollars. We drew annual self-reported earnings from the HRS; we derived information about earnings from age 22 through 50 from the Summary Earnings File.

[1]The ADLs included in the summary measure include walking across a room, dressing, bathing, eating, getting in/out of bed, and using the toilet.

[2]Average among those reporting any difficulties on the same measure.

[3]The IADLs included in the summary measure include using a map, a calculator, and a telephone; managing money; taking medications; shopping for groceries; and preparing hot meals.

[4]The CESD score is based on responses to questions about mental health, including whether the respondent felt depressed, felt activities took considerable effort, experienced restless sleep, felt lonely, felt sad, felt unmotivated, or was happy and enjoyed life.

APPENDIX B

OCCUPATIONAL ATTRIBUTES OF THE JOBS HELD BEFORE APPLICATION AMONG DENIED APPLICANTS

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In this appendix, we present our findings related to the occupational attributes of the jobs held by denied applicants immediately before applying for SSDI.[20] Our analysis links occupation data provided by HRS respondents to the U.S. Department of Labor's O*NET, a comprehensive database of job characteristics produced by the U.S. Department of Labor's Employment and Training Administration. Using information collected from employees, occupational analysts, and occupational experts, O*NET categorizes 974 occupations based on the relevance of a given attribute to job performance. Results in this appendix continue to weight to national estimates using the HRS sampling weights and the probability of matching to SSA administrative data. It is important to note that our occupational findings pertain to only about 60 percent of the sample members who were working at the time of the HRS interview before application and for whom linked occupational data are available.

We considered the attributes of the occupation reported by denied applicants as a way to identify whether certain occupational features are associated with step 4 or 5 denials. Identification of such features might suggest a strategy for targeting early interventions to potential SSDI applicants as they think about leaving the labor force and applying for SSDI. It is important to note that, when a disability examiner considers an individual's ability to perform past relevant work, a much longer period of time comes into play than we are able to consider.

A. Linking HRS to occupational data

We began with information provided by HRS respondents about the occupations in which they worked at the time of the interview wave prior to application, which was on average about

[20] Our original intent was to consider the types of jobs to which denied applicants returned, assessing whether they worked full- or part-time, the types of firms in which they found work, and the occupations in which they worked. In particular, we were interested in assessing whether denied applicants deemed able to return to their past job continued to work in the same occupation and whether applicants denied because of their ability to work in another job found work in a substantially different occupation. Yet, because our sample was relatively small and so few returned to work, we were unable to make meaningful comparisons along these dimensions.

one year before application. We requested permission from the HRS to access the unmasked occupational codes, which provide more detail than that available through the publicly available survey data.[21] Among our sample of 805 applicants, not all were working in the year prior to application; of the 560 who were employed at that time, we obtained occupation data on 553.[22]

O*NET contains a score for determining the importance of a particular attribute to an occupation. We used the score to identify the attributes critical to job performance. We then constructed three summary groups of attributes:

- Ability requirements: Following Johnson (2014), we considered 14 summary job ability attribute measures in three categories: physical demands, nonphysical demands, and difficult workplace conditions.
- Skill requirements: We used the six skill groups developed by O*NET to indicate whether a job requires basic, comprehensive problem-solving, resource management, social, system, or technical skills.
- Job "zones": O*NET stratifies jobs into five groups, or "zones," that range from jobs that require little or no preparation (job zone 1) to jobs that need extensive preparation (job zone 5). In other words, job zones may indicate the specialization required to hold a job. We aggregated across job zones for reasons of sample size, as shown below.

B. Differences in occupational attributes among denied applicants, by reason for denial

We found a few significant occupational differences across groups of denied applicants (Table B1). We highlighted the differences that we observed, but the constellation of observed

[21] Reflecting the long period of data collection, the scheme under which HRS collected occupation data has changed over time (Nolte, Turf, and Servais 2014). We first had to map Census occupation codes from 1980, 2000, and 2010 to a consistent Census scheme (using 2000 occupation codes). We then crosswalked those codes to the 2000 Standard Occupational Codes (SOC) used by O*NET. In some cases, O*NET occupation codes are more specific than SOC codes. In such cases, we followed Johnson (2004) and randomly assigned HRS workers with a given SOC code to the detailed suboccupation categories used by O*NET.

[22] In addition to 553 applicants who were working at the wave of application and had occupation data, there are 654 individuals in our sample who had occupation data from the HRS at some point before their SSDI application (based on the last occupation data available). We also constructed the skills and abilities profiles among those who worked at some point. We did not find significant differences in job attributes between those who worked at some point prior to application and those who were working at the wave of application.

job attributes does not paint a consistent picture of the types of occupations that might lend themselves to targeted services following disability onset.

Relative to those denied on the basis of work capacity, those denied because of medical reasons appear more likely to work in occupations that demand less computer use but more social skills. At the same time, they were also more likely to work on occupations required more system skills. While a higher share of applicants denied at step 2 employed in zone 1 jobs, which require little or no preparation, we also observe a higher share of applicants denied at step 2 employed in zone 4 and 5 jobs, which need extensive preparation. Our review of the occupational categories (not shown) found that individuals denied at step 2 were most commonly employed in installation, maintenance, and repair occupations.[23]

On the other hand, compared to medical denials, those who denied on the basis of work capacity were more likely to work on occupations requiring the ability to withstand stress and dealing with unpleasant or angry people (Table B1).

Looking closely within the group of denied for work capacity reason, applicants denied at step 4, on the basis of their ability to perform past work, were more likely than those denied on the basis of their ability to perform other work applicants to work in occupations requiring high levels of interpersonal skills and using a computer, albeit in jobs less likely to demand the continual updating of skills and knowledge, complexing problem-solving skills or system or technical skills. A close look at the occupational information shows that the most common occupational groups among applicants denied at step 4 were building cleaning and pest control; retail sales; office and administrative support ; and information and record-keeping.

[23] We do not want to place too much significance on the occupational categories, as there was not a single job category that captured a large share of any applicant group. In general, fewer than 10 percent of applicants were concentrated in any group, even those that were most commonly reported.

On the other hand, those denied at step 5 on the basis of their ability to perform other work were more likely than step 4 denials to work in jobs requiring continual updating of skills and knowledge, complex problem-solving skills, system skills, and technical skills—but limited interpersonal skills. The occupations held by those denied at step 5 also were more likely to require flexibility and dexterity and tended to involve difficult workplace conditions. Given the group's modest sample size, we are unable to report the most commonly held occupations.

Table B1. Pre-application job attributes of denied applicants, by reason for denial

	Denied for medical reasons (step 2)	Work capacity denials (steps 4 and 5)	Denied due to ability to perform past work (step 4)	Denied due to ability to perform other work (step 5)
Number of applicants with O*NET data (weighted)	581,770	1,252,512	890,475	362,037
Percent of total applicants (weighted)	13.07	28.13	20.00	8.13
O*NET occupational ability demands				
Any general physical demands	38.52 (5.82)	43.13 (3.98)	36.07 (4.54)	58.21 (7.61)
High general physical demands	3.78 (2.28)	2.89 (1.34)	3.23 (1.67)	2.15 (2.24)
Any flexibility and dexterity	32.42 (5.59)	28.64 (3.63)	23.63 (4.01)	39.33 (7.54)
High flexibility and dexterity	4.33 (2.43)	12.80 (2.68)	9.16 (2.73)	20.57** (6.24)
Vision	10.37 (3.64)	15.17 (2.88)	17.31 (3.58)	10.60 (4.75)
Some cognitive ability demands	46.55 (5.96)	48.08 (4.01)	49.79 (4.72)	44.43 (7.67)
High cognitive ability demands	30.38 (5.50)	18.00 (3.11)	15.09 (3.38)	25.15 (6.69)
Computer use	15.44 (4.32)	23.38** (3.40)	25.66 (4.13)	18.51** (5.99)
Interpersonal skills	35.36 (5.71)	26.80 (3.56)	37.52 (4.58)	3.91*** (2.99)
Any stress	19.85 (4.77)	27.76** (3.60)	32.26 (4.42)	18.15 (5.95)
High stress	6.55 (2.96)	8.85 (2.28)	10.22 (2.86)	5.94 (3.65)
Dealing with unpleasant or angry people	3.18 (2.10)	14.30*** (2.81)	10.77 (2.93)	21.84* (6.37)
Updating and using relevant knowledge	8.32 (3.30)	8.88 (2.28)	4.34 (1.92)	18.57*** (6.00)
Difficult working conditions	13.18 (4.04)	23.03 (3.38)	17.02 (3.55)	35.86** (7.40)
O*NET occupational skill demands				
Basic skills	48.66 (5.97)	58.86* (3.95)	61.51 (4.60)	53.22 (7.70)
Complex problem-solving skills	2.69 (1.93)	4.26 (1.62)	0.26 (0.48)	12.82*** (5.16)

	Denied for medical reasons (step 2)	Work capacity denials (steps 4 and 5)	Denied due to ability to perform past work (step 4)	Denied due to ability to perform other work (step 5)
Resource management skills	21.80 (4.93)	14.64 (2.84)	12.59 (3.13)	19.02 (6.06)
Social skills	43.87 (5.93)	20.56** (3.25)	22.78 (3.96)	15.82 (5.63)
System skills	17.13 (4.50)	5.72** (1.87)	2.42 (1.45)	12.77* (5.15)
Technical skills	13.24 (4.05)	17.28 (3.04)	10.95 (2.95)	30.80** (7.12)
O*NET job zone				
Job zone 1	35.19 (5.71)	21.65** (3.31)	23.20 (3.99)	18.34 (5.97)
Job zones 2 and 3	44.40 (5.94)	69.61** (3.69)	69.23 (4.36)	70.40 (7.04)
Job zones 4 and 5	20.41 (4.82)	8.74* (2.27)	7.57 (2.50)	11.25 (4.88)

Source: Authors' calculations using the HRS linked to SSA administrative data and the U.S. Department of Labor's O*NET.

Notes: All results weighted to account for the probability of matching to SSA administrative data as well as the complex survey design. Standard errors appear in parentheses. Indications of statistically significant differences in the work capacity column compare all work capacity denials to medical denials, indications of significance in the step 5 column indicate compare step 4 and step 5 denials. Chi-square tests compare the distribution of multinomial outcomes across groups, while t-tests were used to compare binomial outcomes. *** denotes that the difference is significant at the 1 percent level, ** at the 5 percent level, and * at the 10 percent level. We measured occupational information by using the occupation reported in the HRS interview before SSDI application, or about a year before application on average. More detailed information on the development of summary measures derived from O*NET is available from the authors on request.

APPENDIX C

EARNINGS AND EMPLOYMENT STATISTICS USED IN THE FIGURES IN CHAPTER V

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Table C1 contains the statistics used to populate the employment and earnings figures in Chapter V.

Table C1. Employment and earnings in the years around SSDI application, by initial decision

	Unweighted n	Percent with positive earnings	Std. error	Mean earnings if earnings>0	Std. error
Allowed for medical reasons					
5 years before application	122	94.05	2.15	41,231	2,611
4 years before application	122	93.65	2.22	41,038	2,739
3 years before application	122	89.07	2.84	39,677	2,713
2 years before application	122	84.14	3.32	39,949	2,532
1 years before application	120	83.07	3.44	34,727	2,330
Application year	120	72.74	4.08	22,162	2,334
Initial decision year	121	57.34	4.51	19,042	2,654
1 year after initial decision	115	17.59	3.57	13,405	3,445
2 years after initial decision	112	13.46	3.24	15,553	3,604
3 years after initial decision	106	14.42	3.43	14,355	3,896
4 years after initial decision	99	12.69	3.36	4,848	1,222
5 years after initial decision	90	8.43	2.94	5,928	1,593
Allowed for medical-vocational reasons					
5 years before application	266	96.91	1.06	38,524	1,562
4 years before application	268	96.71	1.09	37,927	1,604
3 years before application	268	93.67	1.49	35,477	1,624
2 years before application	267	88.66	1.94	33,227	1,605
1 years before application	267	83.26	2.29	28,890	1,634
Application year	267	67.43	2.87	17,145	1,612
Initial decision year	264	51.81	3.08	13,014	1,568
1 year after initial decision	247	18.81	2.49	10,140	2,946
2 years after initial decision	236	12.63	2.17	5,074	1,149
3 years after initial decision	222	12.75	2.24	5,355	1,260
4 years after initial decision	205	10.92	2.18	6,201	1,483
5 years after initial decision	197	9.31	2.08	10,432	2,022
Denied for medical reasons					
5 years before application	266	61.94	4.43	27,946	2,256
4 years before application	268	60.10	4.47	27,137	2,202
3 years before application	268	60.98	4.45	24,611	2,199
2 years before application	267	57.86	4.51	23,551	2,200
1 years before application	267	54.06	4.57	21,892	2,393
Application year	267	46.81	4.56	12,219	2,343
Initial decision year	264	41.16	4.49	7,737	847
1 year after initial decision	247	31.40	4.39	10,828	2,151
2 years after initial decision	236	28.00	4.45	14,934	2,640
3 years after initial decision	222	30.21	4.64	12,250	3,101
4 years after initial decision	205	24.25	4.47	17,601	3,641
5 years after initial decision	197	13.54	3.67	9,731	1,411
Denied for capacity to perform past work (step 4)					
5 years before application	179	85.30	2.65	28,642	1,869
4 years before application	180	83.53	2.77	25,796	1,748
3 years before application	180	78.62	3.06	24,806	1,876
2 years before application	180	70.43	3.41	24,331	1,862
1 years before application	178	69.64	3.46	20,469	2,067
Application year	177	48.40	3.77	13,694	2,210

	Unweighted n	Percent with positive earnings	Std. error	Mean earnings if earnings>0	Std. error
Initial decision year	176	34.77	3.60	11,892	2,652
1 year after initial decision	170	18.13	2.96	16,140	4,956
2 years after initial decision	161	17.20	2.98	15,744	5,899
3 years after initial decision	152	16.33	3.01	14,844	4,996
4 years after initial decision	146	15.62	3.02	6,093	1,291
5 years after initial decision	137	17.05	3.22	8,399	1,561
Denied for capacity to perform other work (step 5)					
5 years before application	68	95.23	2.60	30,061	2,940
4 years before application	69	92.75	3.14	30,400	3,199
3 years before application	68	83.07	4.58	30,668	3,812
2 years before application	69	76.12	5.17	27,738	3,790
1 years before application	69	64.48	5.80	22,470	3,641
Application year	69	57.02	6.00	11,931	2,713
Initial decision year	69	41.02	5.96	13,873	4,183
1 year after initial decision	66	18.95	4.86	24,607	7,308
2 years after initial decision	64	18.13	4.85	24,780	6,030
3 years after initial decision	61	19.05	5.07	25,653	6,806
4 years after initial decision	61	16.99	4.85	25,380	6,977
5 years after initial decision	58	19.57	5.25	20,985	7,084

Source: Authors' calculations using the HRS linked to SSA's 831 file and the Summary Earnings File.

Note: Percent with non-zero earnings limited to the number of individuals with data available in the calendar year from the Summary Earnings File; this number falls in the years following the initial decision due to right censoring. Mean earnings are calculated among those with non-zero earnings in the year. Earnings adjusted for inflation and reported in 2012 dollars. Earnings in the Summary Earnings File are top- coded to the taxable maximum for Social Security in each year.

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