The Labor Market Consequences of Receiving Disability Benefits During Childhood

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Abstract

I estimate the labor market effects of gaining eligibility for Supplemental Security Income disability benefits during childhood. A Supreme Court decision eased the criteria to be considered disabled, disproportionately affecting child applicants with mental disorders. For individuals with mental disorders, each additional year of exposure to eased standards during childhood increased their SSI receipt by 0.3 years. The additional benefit receipt reduced cumulative labor market earnings through age 30 by $1,600 for each additional year of exposure for those with mental disorders. Importantly, this does not address the full range of outcomes that may be affected by receiving benefits.

Keywords: disability, Supplemental Security Income, childhood, employment, earnings

JEL codes: H5, I3, J1

Michael Levere is an economist at Mathematica (mlevere@mathematica-mpr.com). I am grateful to Julie Cullen, Gordon Dahl, and Craig McIntosh for being so generous with their time and for many helpful discussions. I am extremely thankful to Jeffrey Hemmeter and John Jones at the Social Security Administration (SSA), who helped run programs and set me up with data access at SSA, and without whom this paper would not have been possible. Susan Kalasunas, Molly

Costanzo, Nitin Jagdish, Emily Roessel, Tom Solomon, and Jim Twist were also helpful in answering questions and providing general help during my time at SSA. I also thank Jeff Clemens, Manasi Deshpande, Tim Kautz, David Mann, Gordon McCord, Lucie Schmidt, Dave Wittenburg, and April Wu for many insightful comments. I received access to the data used in this paper through a Gratuitous Service Agreement with SSA. The administrative and program data are confidential SSA data. Researchers seeking to replicate the study should apply to the SSA to obtain permission to access the data. SSA had the right to review this paper for factual accuracy and data non-disclosure prior to its circulation. The findings and conclusions expressed are solely those of the author and do not represent the views of SSA. The online appendix can be found at http://jhr.uwpress.org.

I. Introduction

Government programs that aim to alleviate poverty in youth have been shown to improve health and labor market outcomes in adulthood (Hoynes, Schanzenbach, and Almond 2016; Chetty, Hendren, and Katz 2016; Brown, Kowalski, and Lurie 2019). However, children in poverty with disabilities are further disadvantaged: once they reach adulthood, having a disability adversely affects their employment, and is associated with increased poverty (Houtenville et al. 2009; Livermore and Honeycutt 2015).

Supplemental Security Income (SSI), administered by the Social Security Administration (SSA), is one of the most prominent government programs that explicitly aims to help children with disabilities in poverty. In 2017, SSI paid out approximately $9.5 billion to 1.2 million child beneficiaries. Though research in economics has shown that there are long-term gains from mitigating poverty and addressing health issues in youth, as well as that having a disability in adulthood reduces labor market earnings, few studies have credibly assessed the long run impacts of targeting resources to disadvantaged youth with disabilities.

To analyze the causal effects of gaining eligibility for benefits on later life labor market outcomes, in this paper, I exploit a change in eligibility standards for child SSI benefits that was the result of a Supreme Court decision. I find that SSI benefit receipt in youth leads to lower cumulative labor market earnings through age 30: each additional year of exposure to the new, eased standards reduces cumulative labor market earnings by $1,600. Exposure to eased standards in youth increases benefit receipt in adulthood, though the increased benefit income does not fully replace the decreased earnings. I also show that increased adult SSI receipt cannot fully explain the decreases in earnings, based on estimates of the reduction in earnings for adult SSI beneficiaries from Deshpande (2016a). Importantly, changes in labor market outcomes do

not encapsulate the total impact of SSI. Other factors like health and living arrangements in adulthood seem especially important to consider, but cannot be examined with the data I have.

Sullivan v. Zebley, issued in 1990, led SSA to institute new, less stringent disability criteria. The class action lawsuit, filed on behalf of children who were denied SSI benefits, alleged that the disability criteria applied to children did not satisfy the requirement to accept children with a disability of "comparable severity" to adults who would be accepted. These changes in criteria disproportionately affected children with mental disorders. The policy change occurred earlier in some people's lives than in others', so the duration of exposure to new standards during childhood varied by a child's age at the time of the decision. This paper only examines individuals denied benefits prior to the *Zebley* decision to keep the composition of the sample constant. Eased standards likely led individuals with less severe disabilities, particularly those with mental disorders, to newly apply. Including new applicants would bias the results given their potential earnings are likely higher.

Using administrative data from SSA to track individuals from the initial denied SSI application through the present, I implement an age-based difference-in-differences strategy, grouping previously rejected individuals by diagnosis type and age when standards changed. Cohorts that were already adults at the time of the decision were unaffected by the change in standards. These untreated cohorts control for the inherent difference between those with mental and nonmental disorders. Cohorts that were children experienced the eased standards of the post-*Zebley* regime during childhood, with exposure inversely related to age at the time of the decision. Children with mental disorders[1] were more affected by the change in standards than those with nonmental disorders, leading younger cohorts diagnosed with mental disorders to be "treated" while other groups were all "untreated".[2]

The primary threats to my estimation framework are trends that differentially affect people with mental disorders of a particular age, such as changing employer attitudes. The Americans with Disabilities Act (ADA), passed in 1990, the same year as the *Zebley* decision, poses such a threat. In my primary estimation strategy, I consider only those rejected from SSI benefits and compare those with mental disorders to those with nonmental disorders by age. To isolate potential differential trends by diagnosis, I consider only those with mental disorders and compare those who were initially rejected to those who were initially accepted by age. This specification cannot be affected by differential treatment over time of those with mental disorders relative to those with nonmental disorders. This strategy yields similar results.[3] This suggests that broader economic trends differentially affecting those with mental and nonmental disorders likely do not drive the results.

My paper is related to a recent paper by Deshpande (2016a) that shows individuals removed from SSI at their 18th birthday experience modest gains in earnings, but these gains are substantially less than the value of the SSI benefits lost. However, the effects of gaining benefits in youth likely differ from losing benefits as one reaches adulthood. Behaviors such as parental investment and educational choices can still be influenced during childhood.

Deshpande exploits a policy change for the SSI program that required SSA to redetermine eligibility at age 18 under the adult standard for all individuals turning 18 after August 22, 1996. This affects some cohorts examined here. My main labor market estimates are the net result of both the easing of standards from the *Zebley* decision and the tightening of standards from this 1996 policy change, which led individuals with mental disorders to be more likely to lose benefits. I estimate the impact of additional years of SSI receipt, not the impact of the *Zebley* decision alone.

II. SSI Take-up and the *Zebley* Decision

In 1972, Congress passed legislation that created the Supplemental Security Income program. This program was designed as an additional means-tested component of the social safety net, providing an additional source of income for poor families. Those who are eligible for SSI include the elderly, blind, or disabled.[4] SSI is an extremely large program, paying out approximately $55 billion in benefits annually to its eight million recipients as of 2017.[5]

In this paper, I focus on the 1.2 million children whose families receive SSI because their children have disabilities.[6] SSI recipients get a monthly cash benefit, which in 2017 could be a maximum of $735. Some states also provide supplemental payments. Payments for youth are made to a representative payee, who is typically a parent. Nearly all SSI recipients get Medicaid coverage in addition to the cash payment.

The *Zebley* decision, issued in February 1990, changed the eligibility criteria for children applying to SSI. Prior to the decision, adults and children qualified for benefits if they both met the means test and had an impairment on the Listing of Impairments.[7] Adults, however, could additionally be deemed disabled if they demonstrated an inability to engage in substantial gainful activity, whereas no such criteria existed for children. The Supreme Court ruled this difference was inconsistent with the "comparable severity" standard for children's SSI; a child with a disability of comparable severity to one that an adult would qualify with might not himself qualify. In response, SSA did two things: first, it established a new Individualized Functional Assessment (IFA) that loosened the criteria required for a child to be classified as disabled; second, it revised its mental impairment listings to re-categorize certain mental impairments that had previously been listed, such as autism, and newly recognize some disorders, such as ADHD

(Duggan, Kearney, and Rennane 2016). These revisions made it easier for children with mental health impairments to qualify for benefits.

The new standards went into effect on February 22, 1991. SSA was required to mail a notice to all individuals denied for medical reasons after January 1, 1980. The notice informed them that their case had been rejected under obsolete standards and that they might newly qualify for benefits and retroactive payments. If a readjudication concluded that in addition to qualifying for benefits, the individual should have qualified for benefits prior to the *Zebley* decision given the new standards, he could receive retroactive payments. Such a readjudication was eligible to anyone denied after January 1, 1980, and led some new beneficiaries to receive substantial lump-sum payments.

Though many people denied benefits either appeal that decision or subsequently re-apply, the rate of re-application following the *Zebley* decision was substantially higher than is typical. About 80% of denied applicants reapplied in the four years following the *Zebley* decision. Though individuals can always re-apply for benefits if they have previously been denied, historical re-application rates were lower – as noted below, for those denied in 1986 or 1987, only 35% re-applied in the ensuing four years (before the implementation of the *Zebley* decision). Individuals denied SSI benefits can also appeal that decision; typically about 25% of denied applicants appeal, and about 30% of those appeals ultimately result in an award.

As a result of this change in criteria, there was a dramatic increase in the number of child SSI beneficiaries. Figure 1 shows the number of new awards over time, indicating that the primary increases came from individuals who had mental disorders excluding those with intellectual disabilities[8] – among new awards, the share going to children with mental disorders rose from less than 10% in 1989 to one-third in 1994, and has consistently been over one-half

since 2003. The Government Accountability Office (1994) estimated that 70 percent of new beneficiaries enrolled after the *Zebley* decision were allowed because of the change in the childhood mental impairments listings, rather than because of the IFA.

The number of child applicants to SSI also increased after the *Zebley* decision. The composition of applicants likely shifted, with children with less severe mental disabilities more likely to newly apply and qualify for benefits. An analysis using SSI applicants after the *Zebley* decision might be subject to selection bias given that there would be systematic unobservable differences between mental and nonmental applicants by age: 15-year-old applicants in 1993 with mental disorders might differ from 15-year-old applicants in 1988 with mental disorders in a different way than comparable children with nonmental disorders. To avoid selection bias, I restrict my sample to those who applied for, and were initially rejected from, SSI benefits between 1986 and 1989, the four years *before* the *Zebley* decision, when applications could not have been influenced by the future change in standards.[9] Note that *all* such rejected individuals are included in my sample, regardless of whether they subsequently re-apply or newly qualify for benefits. Re-application rates among rejected applicants increased following the *Zebley* decision. About 35% of individuals initially denied in 1986 and 1987 re-applied in the ensuing four years. Of individuals initially denied in 1988 and 1989, 62% re-applied in the ensuing four years, with this latter group subject to the eased criteria following the implementation of the new standards.[10]

Within the full sample of initially rejected applicants, those with mental disorders were differentially more likely to qualify for benefits after the *Zebley* decision than those with nonmental disorders given the change in standards. Figure 2 shows the share of individuals in the sample receiving SSI benefits in each year from 1986 to 2012, grouped by whether their primary

disorder was listed as mental or nonmental on their initial application. This share is mechanically equal to zero in 1986 because everyone in my sample was rejected in 1986 or after. Some people newly qualified for benefits prior to the *Zebley* decision, though the likelihood is the same regardless of disability type. Following the *Zebley* decision, about 40% of those with mental disorders were receiving benefits in 1993, compared to only about 25% of those with nonmental disorders. The relatively larger increase in SSI awards from those with mental disorders lends itself to a natural experiment.

Figure A1 breaks out SSI benefit receipt by disability type. Individuals with disorders of the nervous system, in particular cerebral palsy, qualify at similar rates as those with mental disorders. Rejected individuals with neurological and musculoskeletal disorders, diabetes, and asthma – the most prevalent disorders that are neither neurological nor mental – have a much lower probability of qualifying for benefits after the *Zebley* decision.

As a result of welfare reform, SSA experienced another significant policy change in 1996. In response to the drastic increase in child SSI awards observed in Figure 1, Congress wrote new legislation that restricted the eligibility criteria for the SSI program. First, all individuals turning 18 after August 22, 1996 were required to have their eligibility redetermined at age 18 under the adult standard (Deshpande 2016a). Second, any individual who qualified under the IFA was required to undergo an immediate continuing disability review (CDR), and all individuals were newly subjected to CDRs at least once every three years. These programmatic changes reduced the child disability rolls by 100,000. Individuals with mental disorders were the most likely to lose benefits from these CDRs (Hemmeter, Kauff, and Wittenburg 2009): Figure 2 shows a larger share of those with mental disorders losing benefits after 1996. Children with mental disorders were thus both more likely to gain benefits as a result of the *Zebley* decision,

but also more likely to lose them as a result of welfare reform. The effects I find are the net result of both policies – children with mental disorders were more exposed to eased disability standards, albeit less exposed than they would have been in the absence of the second, more restrictive reform. I thus estimate the effect of an additional year receiving SSI benefits in childhood, not the effect of the *Zebley* decision.

III. Data

I use SSA's administrative data sets to establish my sample and gather outcome variables. SSA maintains a record of all individuals who ever applied for SSI benefits on the Supplemental Security Record (SSR). The SSR includes basic identifying information on an individual's application, including his or her Social Security number (SSN), date of birth, the date of application, whether the application was rejected or accepted, state in which the application was filed, and any parent SSNs. An individual's SSN can be used to link to the primary diagnosis at application, reported on the 831 form. The data on diagnosis for rejected applicants are only available starting in 1986. Given that I also exclude anyone who first applied after the *Zebley* decision, my sample consists of any individual denied between 1986 and 1989 and follows such individuals and their SSI application and benefit receipt history from their initial application through 2012. This produces a sample of 62,491 people.

Labor market earnings come from SSA's Master Earnings File (MEF). Earnings data include wage, salary, and tip income reported on W-2 forms for every year through 2012, deflated to be in real 2012 dollars. Earnings are characterized by the age the person turns in that year. For example, earnings at age 20 for someone born on December 4, 1981 would be her reported earnings for calendar year 2001. This hypothetical individual would be grouped into the age 9 cohort because she was 9 on February 22, 1991, the date of *Zebley* implementation.

Someone born six years earlier would be in the age 15 cohort, and have reached age 20 in 1995. Given that the economy was in a recession in 2001, but was booming in 1995, I also include two variables to control for the state of the local economy each individual faced – the per capita income in her state of residence (from the Bureau of Economic Analysis) and the national age/gender unemployment rate (from the Bureau of Labor Statistics). Such variables are not necessary to include because individuals with nonmental disorders of the same age faced the same economy as individuals with mental disorders, but they should add precision without influencing the estimates.[11] Additionally, I gather parental earnings in the years preceding an individual's initial application by linking the parent SSN to the MEF. SSA records identify if and when an individual died.

IV. Empirical Strategy

I estimate the long-run causal effects on adult labor market outcomes from receiving SSI benefits for more time in childhood. A simple regression model linking SSI receipt to outcomes is likely to suffer from myriad selection issues. For example, among a sample of applicants to SSI, accepted individuals with more years receiving benefits probably have more severe disabilities. Even estimated among a sample of individuals who were all initially denied, such an estimate would still be endogenous because those who ultimately receive benefits for the longest time likely have the most severe disabilities. In order to generate an unbiased estimate of the effect of longer receipt of SSI benefits on labor market outcomes, the econometrician would need to compare two people with equal disability severity, one who happens to receive benefits for a longer time than the other.

One option is to first limit the sample to all individuals initially denied SSI benefits, and then directly control for a host of observable variables. Factors like type of disability, age of first

application, and their interaction are important indicators that could be used to attempt to equate disability severity. Table 1 shows basic summary statistics splitting people by age at the time of the *Zebley* decision and diagnosis type. Applicants with mental disorders are different from those with nonmental disorders. Those who have mental disorders are more likely to be male, older, and first apply at an older age and less likely to have parents at the time of initial application. They also have lower earnings as adults compared to those with nonmental disorders, consistent with findings in Mann, Mamun, and Hemmeter (2015). Controlling for these variables in a regression model would lead the estimate to be identified from variation in time receiving benefits for individuals with a similar diagnosis denied at the same age. Additional control variables, such as parental earnings at the time of initial application, could not create truly "random" variation in the time receiving benefits – such variables cannot fully account for all unobservable characteristics that influence the likelihood of a successful reapplication.

The change in standards stemming from the *Zebley* decision creates a natural experiment that affects the probability of benefit receipt based on diagnosis type and age. As Figure 2 shows, individuals with mental disorders were disproportionately affected by the change in standards from the *Zebley* decision. Age at the time of the *Zebley* decision also influenced the likelihood of receiving benefits during childhood – individuals who were 13 at the time of the decision were subject to eased standards from the ages of 14 to 17, whereas individuals who were 19 should not have been affected by the policy change given that it did not affect adult standards. Figure 3 shows that an individual's age at the time of the *Zebley* decision and initial diagnosis type are good predictors of the number of years receiving benefits during childhood: younger individuals with a mental disorder spent a longer period receiving SSI. Though younger cohorts with nonmental disorders received benefits for slightly longer, the difference between mental and

nonmental cohorts grows as age decreases. Crucially, years of SSI receipt does not differ by disability type for those who were already adults.

I therefore use these two variables to proxy for the number of years receiving benefits in an event study framework. I group individuals into age cohorts at the time of the *Zebley* decision. Such an age-based difference-in-differences, or event-study, strategy, as in Duflo (2001) and Persson (2019), allows the duration of exposure to benefits to vary by age group. If the primary impacts are due to an increased exposure to benefits, the trends should be more pronounced for younger age cohorts who spent a longer time in childhood exposed to the eased standards of the post-*Zebley* regime. Thus, I use the following equation to estimate the effects of receiving SSI benefits in youth:

$$(1)\quad y_i = \alpha + \beta_1 MENTAL_i + \sum_{c=8}^{21} \beta_{2c}\, 1(AGE_i = c) + \sum_{c=8}^{21} \beta_{3c}\, MENTAL_i 1(AGE_i = c) + \delta \boldsymbol{X_i} + \varepsilon_i$$

Equation 1 is estimated among the sample of individuals who applied for, and were denied, SSI benefits between 1986 and 1989.[12] In order to eventually receive benefits, an individual must therefore have reapplied for SSI. Not all individuals in my sample reapply or eventually receive SSI benefits – Table 1 shows that about one-fifth of these initially rejected applicants do not reapply for benefits following the *Zebley* decision, and about half never have a successful SSI application.

Individuals are grouped by primary diagnosis on the initial application, with the variable $MENTAL_i$ indicating a mental diagnosis. Comparing individuals only by diagnosis type would yield biased estimates given the differences between those with mental and nonmental disorders shown in Table 1. I therefore include age as a second source of variation, grouping people by age cohort at the time of the *Zebley* decision. Including multiple age cohorts in a difference-in-

differences approach controls for the overall difference between diagnosis types, identifying any additional difference in outcomes for younger cohorts with mental disorders. The age-18 cohort serves as the omitted cohort, given that such individuals were already adults when standards changed and thus should have been unaffected by the change in standards. This strategy controls for cohorts entering the job market in different calendar years by having multiple diagnosis groups at each age.

The outcome variable y_i can include the number of years receiving benefits or labor market earnings at a given age for person *i*. The coefficient of interest, β_3, captures the differential effect on y_i of having a longer exposure to eased standards and a mental disorder.[13] This proxies for SSI receipt, given that those with mental disorders are more likely to receive benefits in response to the policy change, and those who were younger when eased standards are implemented are more likely to receive benefits *at an earlier age*. Standard errors are clustered by an individual's age at *Zebley* implementation by the state in which the initial application was filed. Control variables in $\boldsymbol{X_i}$ include dummies for the age at which an individual was initially denied SSI benefits, interactions between the age of application dummies and having a mental diagnosis, as well as gender and state fixed effects.

Controlling for age of application dummies and the interaction with having a mental diagnosis is particularly important. Diagnoses of mental and nonmental disorders evolve differently over a child's lifetime, likely leading the difference in outcomes between mental and nonmental cohorts among those who applied at different ages (for example, age 13 and age 10) to not be constant.[14] Age of application dummies and the interaction between these dummies and an indicator for having a mental diagnosis ensure that identification comes from comparisons of people who all applied at the same stage in life. Comparing individuals who applied at the same

age but are different ages at the time of the *Zebley* decision means that the individuals initially applied in different years.

In order for Equation 1 to estimate the causal impact of SSI receipt in youth on labor market outcomes, two key assumptions must be satisfied. First, I must assume that there are parallel trends in outcomes, namely, that the difference in outcomes between younger cohorts with mental disorders and nonmental disorders would have remained constant relative to older cohorts in the absence of the *Zebley* decision.[15] If true, then any differential trends in outcome variables across age cohorts can be attributed to differential exposure to eased SSI standards. Second, because controlling for age at application means that variation comes from individuals applying in different years, disability diagnoses must be stable over time.

The parallel trends assumption would normally be empirically testable by comparing trajectories of outcome variables by age and diagnosis prior to the *Zebley* decision. However, there are no earnings trajectories prior to the decision because everyone is necessarily a child. Thus, I must assume that there are parallel trends. I also perform an indirect test of the parallel trends assumption using parental labor market outcomes at the time of the initial rejected application. To test the second assumption about the stability of disability diagnoses over time, I examine how diagnosis types of youth SSI applicants evolved between 1986 and 1989. The results of these tests are discussed further in Section V.C.

To estimate the impact of an additional year of childhood exposed to eased SSI standards, I further assume that there is a linear relationship between years of exposure in childhood and SSI receipt or earnings. As will be shown in Section V.A, this is a reasonable assumption. Such an equation is given as:

$$(2)\quad y_i = \theta + \gamma_1 MENTAL_i + \gamma_2 YEARS\ EXPOSURE_i + \gamma_3 MENTAL_i * YEARS\ EXPOSURE_i + \varphi \boldsymbol{X_i} + \omega_i$$

The variable *YEARS EXPOSURE*$_i$ measures the number of years until age 18 that person *i* was exposed to eased standards. For cohorts younger than age 18 when the new standards were implemented, this measure is simply equal to 18 - *c*, where *c* measures the age at *Zebley* implementation. For all cohorts age 18 and older at the time of *Zebley* implementation, the measure equals zero (they had no exposure during their childhood). The coefficient γ_3 measures the differential impact of an additional year in childhood spent under the post-*Zebley* regime. Equation 2 produces an intent-to-treat estimate and evaluates the changes in the policy as is. To estimate the causal effects of an additional year of benefit receipt, or the treatment-on-the-treated, one could scale the estimate of γ_3 by the average additional years of benefit receipt from each year of exposure to eased standards for individuals with mental disorders.[16]

V. Results

In this section, I first show that individuals rejected from SSI benefits who had a mental disorder and spent a longer time during their youth exposed to eased standards after the *Zebley* decision spent a longer time during their youth receiving benefits. Second, I present the primary labor market earnings estimates, which show that increased enrollment in SSI leads children with the longest exposure to eased standards to earn less money in their early 20s and to be less likely to have positive earnings. Third, I perform several robustness checks.

A. SSI Receipt

Figure 4 shows the results of estimating Equation 1 on years of benefit receipt, clustering standard errors by an individual's age at *Zebley* implementation by the state in which the initial application was filed. The difference in years of benefit receipt between those with mental and nonmental disorders who are 18 at *Zebley* implementation is normalized to zero, though this

difference is approximately zero (Figure 3) because these adult cohorts had no exposure to eased standards during childhood. As expected, individuals who are younger at the time of the *Zebley* decision receive SSI benefits for a longer time. Individuals with mental disorders who were 10 at the time of the decision spent 2.5 years longer receiving benefits than did their counterparts with nonmental disorders.

The number of years of benefit receipt is linearly decreasing as age at *Zebley* increases until the age-18 cohort. For cohorts older than age 18 when new standards were implemented, there is no difference in years of benefit receipt. This motivates my use of Equation 2, which estimates a linear function in age that is equal to 18 - *c* for cohorts *c* younger than 18, and equal to zero for cohorts older than 18. The resulting coefficient yields the inverse of the slope of the line in Figure 4, or the estimated additional years of benefit receipt from an additional year during childhood exposed to eased standards for those with mental disorders.

Each additional year of exposure increases SSI benefit receipt by 0.3 years, as shown in the top row in Column 1 of Table 2. Individuals who were age 10 at the time of the decision had 8 years of exposure to benefits, implying that this cohort spent an additional 2.5 years receiving benefits, as in Figure 4. This is a 223% increase relative to those who were adults when new standards were implemented and were thus unaffected by the change in standards.

The remaining columns of Table 2 show the impacts of an additional year of exposure, or being one year younger at the time of the decision, on other measures of SSI receipt for individuals with mental disorders. Column 2 shows that total cumulative SSI payments through age 24 increased by $1,762 for each additional year of exposure. This means the age-10 cohort received an additional $14,000 in SSI benefits, an increase of 140% relative to unaffected cohorts. Column 3 shows that for each year younger a child is, the likelihood of receiving a new

award in the three years following the implementation of new regulations increased by 2.6 percentage points. The final two columns show that there were differences in retroactive payments, which could be paid after a previously denied applicant newly qualified for benefits after the *Zebley* decision. In the online appendix, I discuss an alternative strategy that shows these differences likely do not drive the primary labor market results.

Figure 5 plots the probability of benefit receipt at specific ages, using Equation 1. The top two panels show that children with mental disorders who were younger than the given age at the time of the *Zebley* decision are much more likely to receive benefits, demonstrating the impact of eased standards on benefit receipt for youths with mental disorders. Children who spent longer in youth receiving benefits are also significantly more likely to receive benefits in adulthood, though the magnitude is lower.

Figure 6 plots the trajectory of SSI benefit receipt for different age cohorts, with each point representing the point estimate from a graph like Figure 5 at a given age for the particular age cohort. For each of the cohorts that were children at the time of the *Zebley* decision, SSI receipt immediately increases after reaching that age. SSI receipt reduced for the youngest cohorts by age 20, with all about equally likely to be on SSI; many younger children with mental disorders likely lost benefits from an age-18 redetermination, required as part of welfare reform. After age 23 appears a rank ordering in SSI receipt, with the youngest cohorts most likely to have received benefits. This suggests that receiving benefits for a longer time in childhood increases the likelihood of benefit receipt during adulthood. Higher SSI receipt in adulthood likely reduces adult labor market earnings. However, I provide suggestive evidence that this difference does not drive the earnings impacts below.

B. Labor Market Outcomes

A longer exposure to eased standards, and thus a longer time receiving SSI benefits in youth, is associated with reduced earnings as individuals transition to the labor force in their early 20s (Figure 7). Similar to Figure 5, the figure plots estimates of β_{3c} from Equation 1 for each age cohort, showing the differential change in earnings from ages 20 to 22 for cohorts with mental disorders. The top two panels show average earnings and log earnings (conditional on being positive) from ages 20 through 22, whereas the bottom two panels show indicator variables for two earnings thresholds.[17] The decrease in earnings due to a longer duration of SSI receipt is present at all levels of the earnings distribution.[18] I also estimate results using income from ages 20 through 22, which I define as labor market earnings plus SSI payments. Though not pictured, such a figure would remain mostly unchanged with one notable exception – the bottom-left panel in Figure 7 shows that younger cohorts with mental disorders were less likely to have any positive earnings, but such cohorts were equally likely to have any positive income. This implies that SSI benefits serve as insurance against zero income.

The most compelling evidence that a longer time receiving SSI benefits in childhood leads to bigger reductions in earnings is presented in Figure 8, which plots cumulative labor market earnings starting from age 18. Each point is a regression estimate of total earnings up until that age for a given cohort. For example, the black line shows a regression estimate of β_{3c} for the age-10 cohort estimated for total earnings at ages 18 through 32.[19] The value at age 25 of -$15,000 means that individuals who were age 10 at the time of the *Zebley* decision and had a mental disorder have cumulative earnings through age 25 that are $15,000 lower than those with nonmental disorders have, normalizing the difference to be zero for the age-18 cohort. The figure shows that for those with minimal exposure to eased standards in childhood (ages 16 and 20),

there is essentially no effect on total cumulative earnings. The reduction in earnings is bigger for younger cohorts, consistent with longer exposure to eased standards enhancing effects. Because the policy led to increased SSI receipt in childhood (Figure 4), these effects are likely the causal estimate of a longer duration receiving SSI benefits.

The interpretation of the reduction in earnings would differ if it was driven by increased SSI receipt in adulthood. Figure 6 demonstrated that the youngest cohorts, who had the longest exposure to eased standards after the *Zebley* decision, were more likely to receive benefits at ages 22 and 28, with similar patterns holding true at different ages. In order to receive SSI benefits, one must have sufficiently low income. Increased benefit receipt therefore mechanically reduces earnings, meaning that the effects of childhood SSI eligibility on adult earnings are operating partially through effects of adult SSI receipt on adult earnings.

Based on estimates from Deshpande (2016a) that adult SSI receipt reduces earnings by $3,000 annually,[20] I estimate that reductions in earnings from SSI receipt would only reduce the estimated impacts on labor market earnings by 15 to 25 percent. I first calculated the expected earnings reduction at a given age due to increased SSI receipt by multiplying the estimated additional likelihood of the cohort being on SSI benefits at that age by $3,000. I then cumulate the estimated reductions in earnings due to SSI receipt as of each age to produce a value that is directly comparable to the estimated total reduction in cumulative earnings depicted in Figure 8. For the youngest cohorts with the biggest reductions in earnings, only approximately 15 to 25 percent of the reduction in earnings can be explained by increased SSI receipt; for example, earnings through age 29 for the age-10 cohort would still be $13,000 lower even after accounting for expected reductions in earnings due to SSI receipt through age 29. The estimated reduction in earnings accounting for this adjustment for SSI receipt in adulthood is not statistically

significantly different from the primary estimates. Factors other than current SSI receipt must therefore drive the reductions in earnings due to additional SSI receipt in childhood.

Assuming that there is a linear relationship between years of exposure to eased standards and earnings, as in Equation 2, earnings through age 30 are reduced by $1,600 for every additional year of exposure to eased standards.[21] Including SSI benefits to estimate the impacts on total income decreases this estimate to $1,100, showing the insurance role that SSI provides, while demonstrating that SSI benefits do not make up for reductions in earnings.

Table 3 presents the results assuming such a linear relationship. The estimate in Column 1 implies that an additional year of exposure to eased standards leads to a $227 reduction in labor market earnings in each year between the ages of 20 and 22 for individuals with mental disorders. This estimate is statistically significant at the 1% level, and is also economically significant – for the age-10 cohort, the implied reduction of $1,812 is a 26% reduction in average earnings compared to those who were already adults at the time of the *Zebley* decision. To measure the treatment-on-the-treated, or the estimated reduction in earnings from an additional year of SSI receipt, one could scale the estimates by the first stage estimate of 0.3 from Column 1 of Table 2. This implies an additional year of benefit receipt leads to a $742 reduction in annual earnings for individuals with mental disorders.

Each additional year of exposure reduces the likelihood of having both any positive earnings and earnings at the high end of the distribution (greater than $15,000). Adding in SSI benefits received to create total income, as in Column 4, reduces the estimated decline but the effect is still significantly negative. However, in Column 5, the estimate shows that SSI benefits serve as insurance against zero income, with no relationship between years of exposure and an indicator for positive income.

Though receipt of SSI in childhood significantly reduces earnings in the early 20s, effects on earnings at ages in the mid-20s are not statistically significant (Columns 6 and 7 of Table 3). The point estimates are still negative, but the magnitude has fallen substantially. Estimates at ages through 30 are similarly imprecise (not shown). The decrease in earnings early in working-life does not persist. Given that accumulated human capital presumably plays a large role in one's labor market potential, one would expect lower earnings early in adulthood for those with mental disorders to lead to even lower earnings later in life. Earnings in the early 20s are not as predictive of lifetime earnings as those later in adulthood; the ideal ages to study earnings are between 34 and 40 (Haider and Solon 2006). Because estimates become more imprecise at older ages, these results should be considered cautiously.

One possible explanation is that SSI receipt may prolong schooling. In this case, earnings from ages 20 through 22 would be suppressed because of education enrollment, but would likely increase more rapidly after completing program of study. Prior studies of the EITC and SNAP show that providing income transfers to families with poor children leads to increased education (Dahl and Lochner 2012; Hoynes, Schanzenbach, and Almond 2016). However, as shown in Figure A2, the earnings growth does not persist over time. The figure plots the estimate of an additional year of exposure to eased standards on earnings at each age from 18 through 30, as in Column 1 of Table 3. The initial catch-up in earnings experienced when individuals are in their mid-twenties reverts back to a somewhat random path as individuals approach age 30. Though there is a clear trend established early in adulthood, other factors not measured by SSI benefit receipt in youth likely begin to play a larger role as time goes on.

Table 4 estimates heterogeneous earnings effects by whether an individual lived with her parents at the time of the initial rejected application. The main results from Table 3 are driven by

individuals who lived with their parents – there is no linear relationship between years of exposure and earnings from ages 20 through 22 for those who did not live with their parents, and the estimate is also small in magnitude. This is surprising, particularly because children who did not live with their parents have somewhat higher total years and amount of SSI benefit receipt. It is possible that parents still provide for their children with disabilities as they transition into adulthood, enabling them to remain out of the workforce, whereas people who did not live with their parents must work to support themselves. It is also possible that parents do not spend all of the SSI income received on their child with a disability, whereas the SSI income is directly invested in children not living with their parents. Further research is needed into exactly how SSI income is spent, and the role of parental involvement.[22]

C. Robustness Checks

To perform an indirect test of the parallel trends assumption, I compare parental labor market outcomes at the time of the initial rejected application to provide suggestive evidence that any changes in outcomes after the *Zebley* decision are not due to pre-existing differences in family earnings (Figure A3). The comparison shows small differences in parent earnings at the time of initial application. Younger cohorts with mental disorders come from families with slightly more household resources, which would likely bias results upwards.[23]

The primary threat to validity of the identification strategy, as discussed in Section IV, is a differential trend affecting particular age cohorts with mental disorders. For example, if employers' attitudes toward hiring people with mental disorders relative to nonmental disorders changed over time, this would lead to biased results. If true, younger cohorts with mental disorders would be more likely to be employed at a given age (say 25) because the older mental disorder cohorts would not have had this differential treatment when they were that same age.

This would lead me to spuriously attribute increases in employment to a longer time receiving SSI benefits. The Americans with Disabilities Act (ADA) was passed in 1990, so some of the older cohorts may have experienced work environments unprotected by the ADA in early adulthood. Studies of the ADA find reductions in employment due to the increased accommodation costs for employers to hire individuals with disabilities (Acemoglu and Angrist 2001; Moss and Burris 2007). However, DeLeire (2000) and Hotchkiss (2004) show that the reductions in employment are approximately equal regardless of disorder type.

To provide further evidence that differential trends by disability type do not drive the results, I estimate results using initially *accepted* applicants with mental diagnoses as the counterfactual group, rather than rejected applicants with nonmental diagnoses. This specification cannot be influenced by differential treatment of disability types because it only includes those with mental disorders. It also similarly controls for differences in earnings potential by age because the initially accepted and rejected cohorts both had mental disorders. Figure A4 shows that an additional year of exposure to eased standards for SSI benefits for denied cohorts similarly increases the number of years receiving benefits. Using accepted applicants as a counterfactual should yield a similar result – all accepted applicants with mental disorders should have been unaffected by the *Zebley* decision because they were already receiving benefits, whereas of denied applicants with mental disorders, only those who were children had increased benefit receipt. This strategy has a similar identification assumption – outcomes between accepted and rejected applicants would have remained constant for younger cohorts in the absence of the *Zebley* decision. Figure A5 shows the analogous version of cumulative labor market earnings, with results approximately similar regardless of the counterfactual group. This implies that broader economic trends differentially affecting those

with mental and nonmental disorders likely do not drive the results because they are not dependent on using individuals rejected from benefits with nonmental disorders as a counterfactual.[24]

It is also possible that labor market outcomes are influenced by the economy faced at varying times in life, such as entering the job market during a recession, which would affect particular age cohorts.[25] However, individuals of the same age cohort with nonmental disorders serve as a control for those with mental disorders. I also control for macroeconomic conditions at the time of earnings measurements.

I also consider a type of "placebo" test, where I limit the sample to those who were adults when the *Zebley* decision occurred and therefore had no difference in childhood exposure to eased standards. For these individuals, I define the years of exposure by the number of years of exposure to eased standards by age 21. There is no relationship between this false measure of "exposure" and earnings from ages 20 through 22. This suggests that the main results are likely driven by SSI receipt itself, rather than younger cohorts with mental disorders generally faring worse in the labor market.

As discussed in Section IV, for the results to be causal, a second key assumption required that disability diagnoses remained stable over time. Controlling for age of application dummies means that the regression compares outcomes for people applying in different years. If the composition of applicants diagnosed with mental disorders changed between 1986 and 1989, perhaps because of an increased overall likelihood to diagnose mental disorders over time, then my estimates would be invalid. Broader trends in the economy have led to increased diagnosis of mental disorders in the past 20 to 30 years, particularly for ADHD.[26] However, because my sample is defined over a narrow window, time trends in diagnoses do not pose a threat to

identification; approximately 20% of individuals in my sample have mental disorders in each of the four possible years of application. Additionally, the share of applicants with mental and nonmental disorders who are rejected stays constant over time, suggesting that the disability severity of rejected applicants does not change.[27]

I also estimate results removing individuals diagnosed with cerebral palsy and any neurological disorder. Figure A1 shows that those with neurological disorders, particularly cerebral palsy, had a similar likelihood of qualifying for SSI benefits following the *Zebley* decision as did those with mental disorders. Even though sample sizes decrease, removing these individuals does not affect the significance of the results, with the point estimates essentially unchanged.[28]

VI. Conclusion

I provide some of the first causal estimates of receiving SSI benefits as a child on later life outcomes. I show that increased exposure to eased standards in childhood, and thus higher receipt of SSI benefits, reduces cumulative labor market earnings through age 30 for cohorts with the longest duration of exposure. SSI benefits insure against experiencing zero income as an adult, though they do not fully replace the loss in labor market earnings. Higher benefit receipt also cannot explain the majority of the reduction in earnings.

Though labor market earnings decreased as a result of the policy changes associated with the *Zebley* decision, it is not clear that this means giving children SSI benefits for a longer time should be viewed as counterproductive. Particularly because these people likely suffer from adverse health stemming from their disability, it is important to consider the impacts of SSI receipt on long-term outcomes other than earnings, such as health and the ability to live independently as an adult. To better capture gains in total social welfare, existing studies

analyzing the long-term impact of programs that aim to alleviate poverty consider other outcomes, such as college attendance, family formation and long-term health (Chetty, Friedman, and Rockoff 2014; van den Berg et al. 2014; Chetty, Hendren, and Katz 2016; Brown, Kowalski, and Lurie 2019). Qualifying for SSI benefits almost always includes eligibility for Medicaid, which can lead to better health (Finkelstein et al. 2012). Although this paper evaluates the impacts of receiving SSI benefits on labor market outcomes, it is not an analysis of the entire program. Future research could look into the effects of SSI receipt on other outcomes like health and participation in other government benefit programs.

Finally, it is important to get a better understanding as to exactly *why* SSI receipt leads these youth to have a harder time successfully transitioning into the labor force. Future research could further explore the mechanisms behind these findings. In the online appendix, I rule out that large lump-sum payments made after the *Zebley* decision affect earnings using a different sample and a regression discontinuity-type design. Other possible mechanisms through which receipt of SSI could affect earnings include education, Medicaid coverage, and information about SSI. Although these mechanisms are important to understand, more rigorously exploring their effects is beyond the scope of this paper.

The age when individuals transition into the labor force is a particularly sensitive time because many services provided through school become unavailable. SSA has developed several pilot programs, such as the Youth Transition Demonstration and Promoting Readiness of Minors in SSI, that aim to provide additional services to youth during this crucial transitionary time (Hemmeter 2014; Mamun et al. 2019). These programs may eventually yield more insights into the results I find throughout this paper.

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Table 1

Summary Statistics

	Mental (≤ 17)	Nonmental (≤ 17)	Mental (> 17)	Nonmental (> 17)
Male	0.73	0.57	0.60	0.53
Age at *Zebley* implementation	12.44	10.12	19.19	19.23
Age at initial application	9.50	6.87	15.70	15.70
Year of initial application	1987.69	1987.41	1987.19	1987.19
Reapplied post-*Zebley*	0.78	0.83	0.59	0.80
Received a *Zebley* award	0.38	0.24	0.20	0.16
Ever had successful SSI application	0.57	0.44	0.44	0.40
Years until age 24 receiving benefits	3.91	3.49	1.28	1.02
Number of SSI applications	2.94	2.96	2.69	3.01
Died by age 24	0.02	0.03	0.02	0.03
Has mom at application	0.76	0.91	0.52	0.79
Has dad at application	0.22	0.38	0.17	0.34
Household earnings at application	7,501.84	11,558.19	5,657.54	10,011.07
Labor earnings, age 20–22	7,223.93	9,730.03	5,655.89	7,544.13
Total income, age 20–22	8,844.65	11,017.28	8,195.69	9,509.78
Labor earnings, age 24–26	9,442.31	12,556.89	8,865.47	11,942.86
Total income, age 24–26	10,678.04	13,646.67	10,435.28	13,262.83
Observations	11,499	59,051	4,077	10,630

Notes: The sample includes all individuals who applied for SSI benefits and were rejected for medical reasons between the years of 1986 and 1989, given a diagnosis that is considered mental or nonmental, excluding intellectual disabilities. Individuals are additionally grouped by if they were younger or older than 17 on February 22, 1991, the date the new standards were implemented.

Table 2

Estimated Impact on SSI Receipt

	(1) Years on benefits	(2) Cumulative payments	(3) Received *Zebley* award	(4) On benefits at age 14	(5) On benefits at age 20	(6) Back pay amount	(7) Received back pay
Years Exposure x Mental	0.306	1,762	0.026	0.035	0.007	-176	0.024
	(0.038)	(342)	(0.005)	(0.005)	(0.004)	(84)	(0.004)
Unexposed mean	1.075	10,034	0.170	0.001	0.141	2,596	0.168
Observations	62,491	62,433	62,491	62,268	61,504	62,491	62,491
R^2	0.086	0.077	0.038	0.175	0.017	0.037	0.046

Notes: The sample includes all individuals who applied for SSI benefits and were rejected for medical reasons between the years of 1986 and 1989, given a diagnosis that is considered mental or nonmental, excluding intellectual disabilities. Years Exposure measures the number of years prior to age 18 occurring after the *Zebley* decision in 1991 and is thus equal to zero for all cohorts age 18 and older at the time of the *Zebley* decision. The number of years on SSI benefits, Column (1), and total cumulative payments, Column (2), are through age 24. A *Zebley* award, shown in Column (3), is a new SSI award made between February 22, 1991 and December 31, 1994. Total cumulative payments are deflated to be in real 2012 dollars. Standard errors are clustered by the individual's age at *Zebley* implementation by the state in which the initial application was filed. Controls for age at application and age at application interacted with diagnosis type.

Table 3

Estimated Impact on Earnings

	(1) Average earnings age 20–22	(2) Earnings > 0 age 20–22	(3) Earnings ≥ $15k age 20–22	(4) Average income age 20–22	(5) Income > 0 age 20–22	(6) Average earnings age 24–26	(7) Average income age 24–26	(8) Five-year earnings growth	(9) Age of entry to labor force
Years Exposure x Mental	-227 (87)	-0.006 (0.004)	-0.009 (0.003)	-216 (87)	0.000 (0.004)	-69 (122)	-15 (118)	61 (99)	-0.01 (0.02)
Unexposed mean	6,993	0.535	0.188	8,983	0.676	10,942	12,340	4,729	17.86
Observations	183,700	183,700	183,700	183,700	183,700	181,374	181,374	181,374	58,114
R^2	0.050	0.029	0.039	0.042	0.020	0.039	0.036	0.013	0.052

Notes: The sample includes all individuals who applied for SSI benefits and were rejected for medical reasons between the years of 1986 and 1989, given a diagnosis that is considered mental or nonmental, excluding intellectual disabilities. Years Exposure measures the number of years prior to age 18 occurring after the *Zebley* decision in 1991, and is thus equal to zero for all cohorts age 18 and older at the time of the *Zebley* decision. For Columns (1) through (8), there is one observation per year per individual. Earnings are an individual's wage, salary, and tip income reported on W-2 forms. Income is earnings plus SSI benefits received. Columns (2), (3) and (5) are indicator variables. Five-year earnings growth is measured as the numerical change in income from age 20, 21, and 22 to age 25, 26, and 27, respectively. Age of entry to labor force is the first age at which an individual has positive labor market earnings. Standard errors are clustered by the individual's age at *Zebley* implementation by the state in which the initial application was filed. Controls for age at application and age at application interacted with diagnosis type.

Table 4

Estimated Impact on Earnings, by Living Status at Initial Application

	(1) Years on benefits	(2) Total SSI payments	(3) Average earnings age 20–22	(4) Earnings > 0 age 20–22	(5) Earnings ≥ $15k age 20–22	(6) Average income age 20–22	(7) Income > 0 age 20–22	(8) Average earnings age 24–26	(9) Average income age 24–26
Lived with parents									
Years Exposure x Mental	0.313	1,740	-197	-0.007	-0.009	-228	-0.003	-79	-59
	(0.046)	(408)	(101)	(0.004)	(0.004)	(98)	(0.004)	(142)	(135)
Unexposed mean	1.106	10,750	7,349	0.548	0.202	9,453	0.693	11,516	12,970
Observations	50,515	50,500	148,513	148,513	148,513	148,513	148,513	146,684	146,684
Did not live with parents									
Years Exposure x Mental	0.320	2,243	-129	0.003	-0.006	22	0.017	143	306
	(0.073)	(680)	(207)	(0.009)	(0.007)	(203)	(0.008)	(277)	(272)
Unexposed mean	1.010	8,507	6,236	0.507	0.158	7,980	0.641	9,715	10,996
Observations	11,976	11,933	35,187	35,187	35,187	35,187	35,187	34,690	34,690

Notes: The sample includes all individuals who applied for SSI benefits and were rejected for medical reasons between the years of 1986 and 1989, given a diagnosis that is considered mental or nonmental, excluding intellectual disabilities. The top panel runs all regressions separately for individuals who lived with their parents at the time of initial application, while the bottom panel runs all regressions separately for individuals who did not live with their parents. Years Exposure measures the number of years prior to age 18 occurring after the *Zebley* decision in 1991, and is thus equal to zero for all cohorts age 18 and older at the time of the *Zebley* decision. The number of years on SSI benefits, Column (1), and total cumulative payments, Column (2), are through age 24. For Columns (3)-(9), there is one observation per year per individual. Earnings are an individual's wage, salary, and tip income reported on W-2 forms. Income is earnings plus SSI benefits received. Columns (4), (5) and (7) are indicator variables. Standard errors are clustered by the individual's age at *Zebley* implementation by the state in which the initial application was filed. Controls for age at application and age at application interacted with diagnosis type.

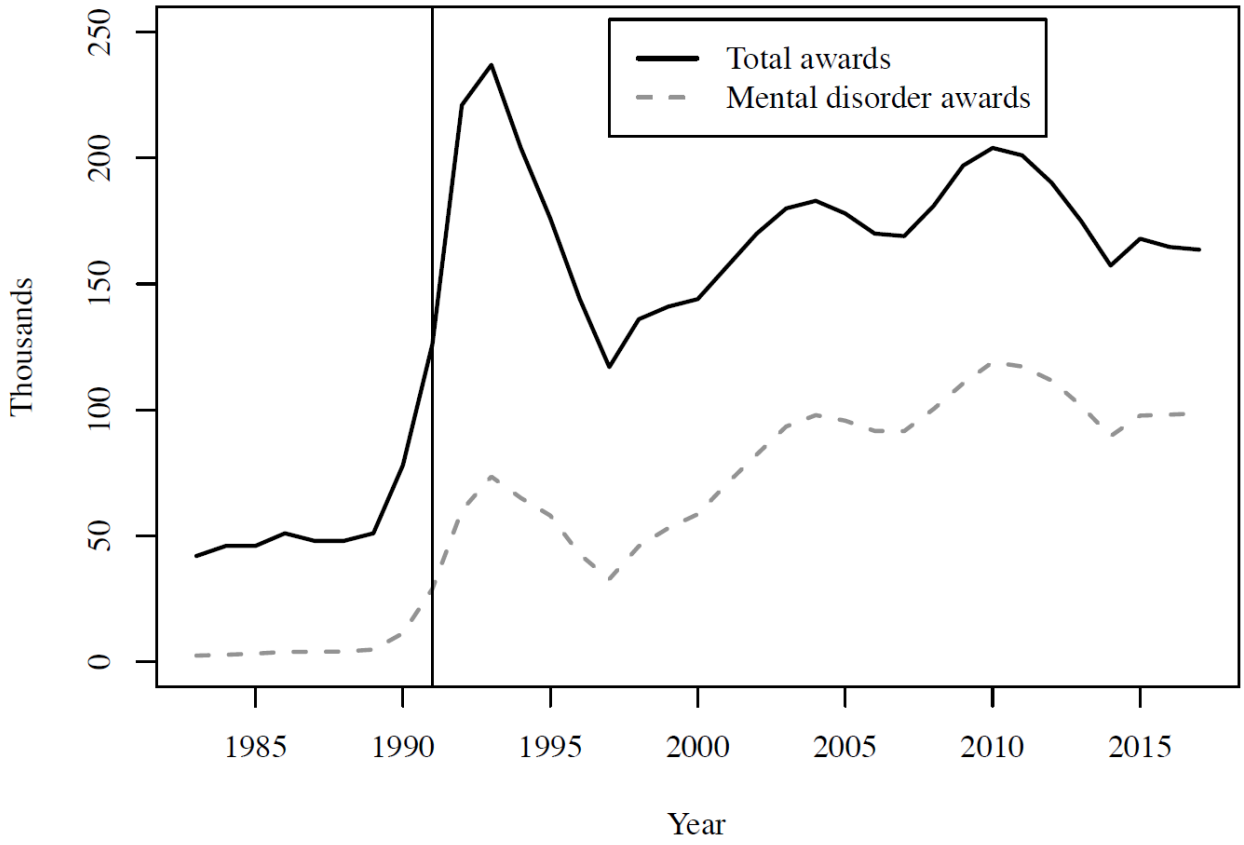

Figure 1

Children's SSI Awards

Source: SSI Annual Statistical Reports. The vertical line in 1991 represents the year new standards from the *Zebley* decision were implemented.

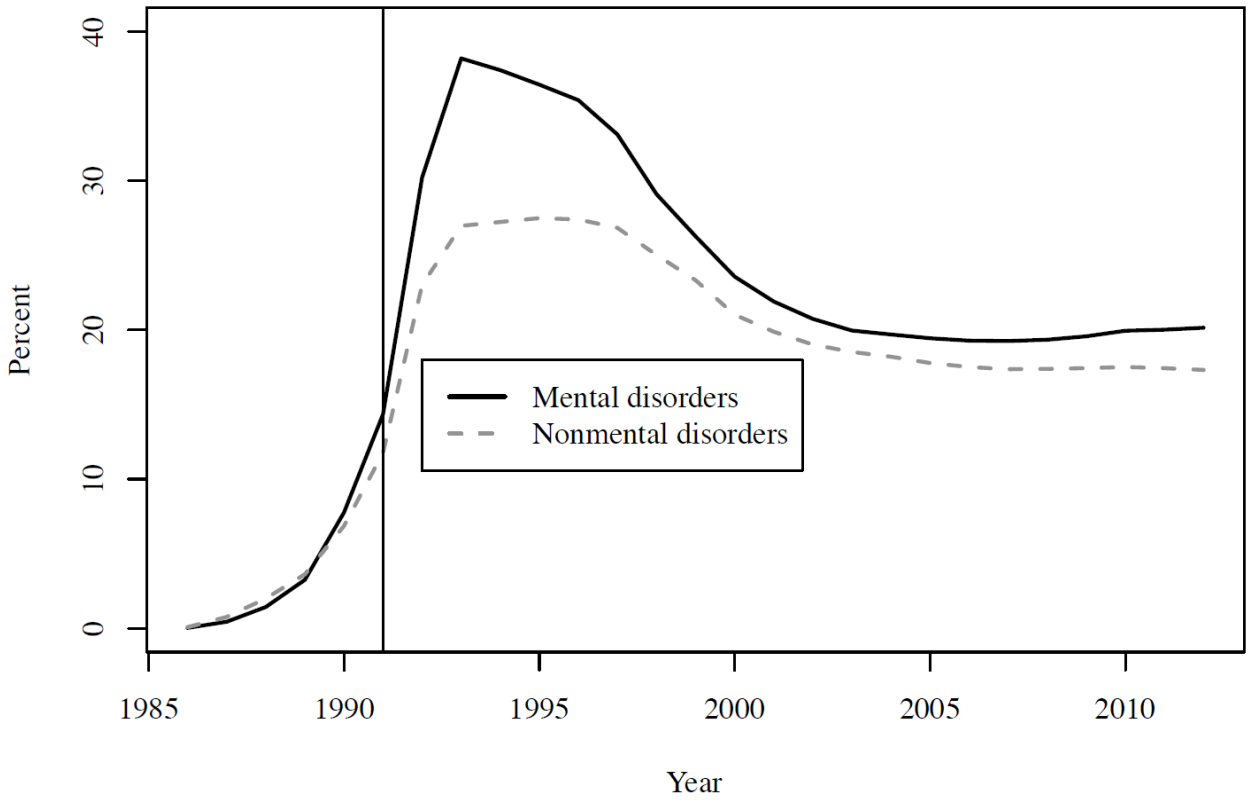

Figure 2

Percent of Initially Rejected Applicants Receiving SSI Benefits

Notes: Author's calculations using SSA administrative data. Includes individuals who applied for SSI benefits as children between 1986 and 1989 and were rejected for medical reasons. Individuals are grouped by diagnosis at time of initial application. The vertical line in 1991 represents the year new standards from the *Zebley* decision were implemented.

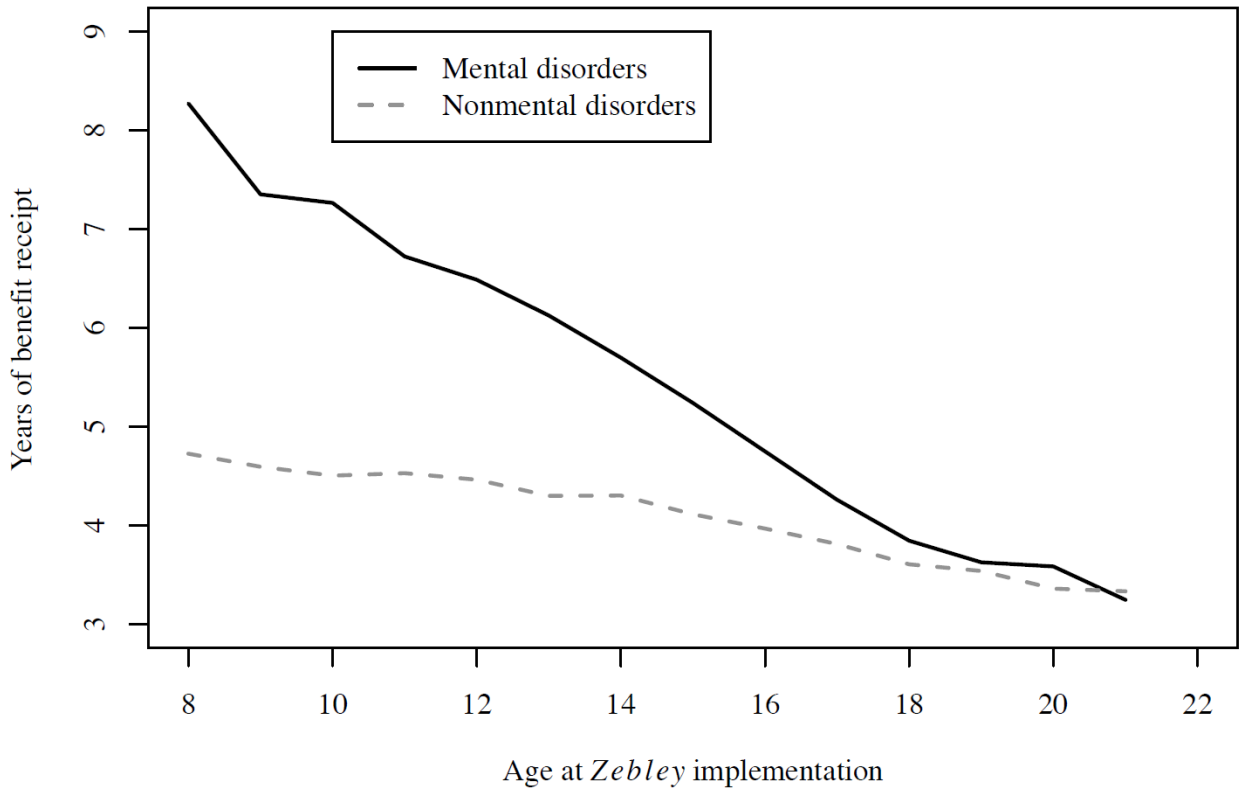

Figure 3

Number of Years Receiving Benefits Through Age 24

Notes: Author's calculations using SSA administrative data. Includes all individuals who applied for SSI benefits as children between 1986 and 1989 and were rejected for medical reasons. Individuals are grouped by diagnosis at time of initial application. Individuals are grouped into age cohorts by their age on February 22, 1991, the date of implementation of new standards. Averages are purged of age of application effects.

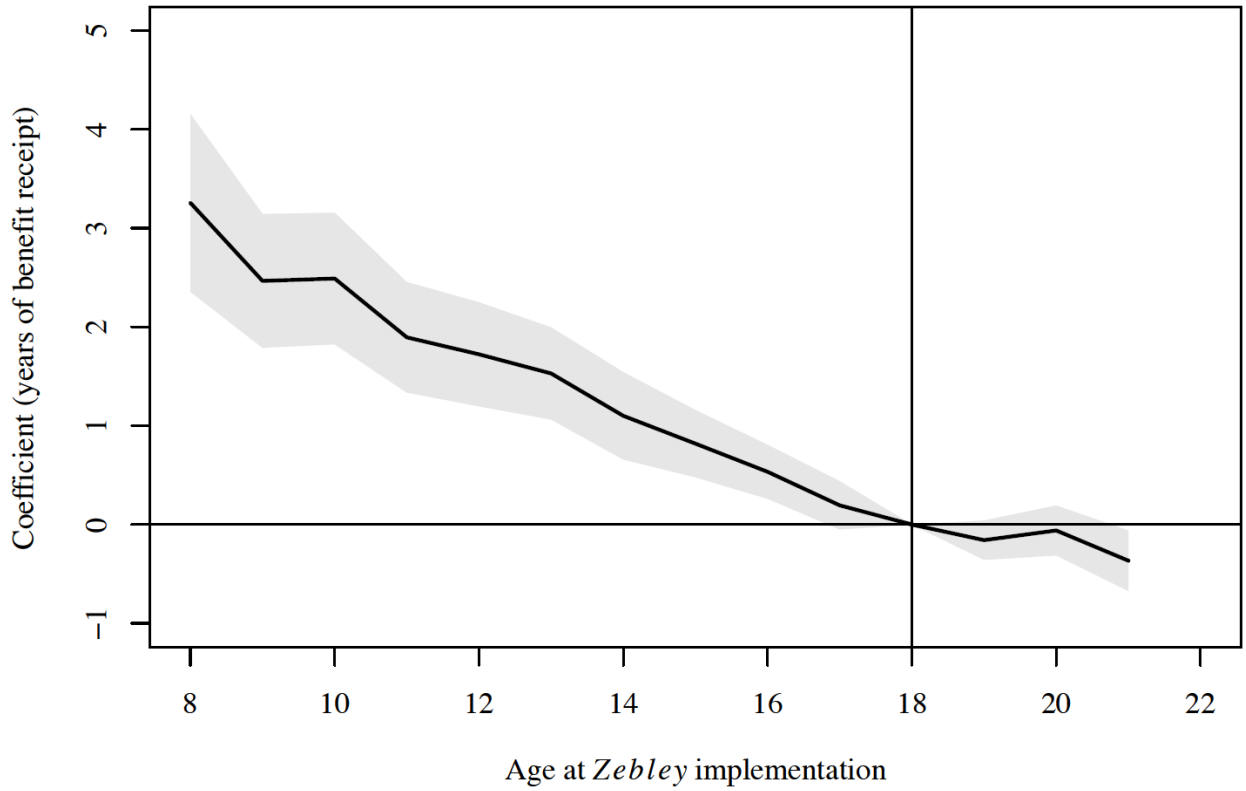

Figure 4

Number of Years Receiving Benefits Through Age 24, Regression Based

Notes: Individuals are grouped into age cohorts by their age on February 22, 1991, the date of implementation of new standards. Plots the coefficient on the interaction of age cohort with having a mental disorder using Equation 1, controlling for age at application and age at application interacted with diagnosis type. Standard errors are clustered by the individual's age at *Zebley* implementation by the state in which the initial application was filed. The shaded region shows the 95% confidence interval. The vertical line at age 18 represents the omitted cohort, where the estimate is mechanically equal to zero.

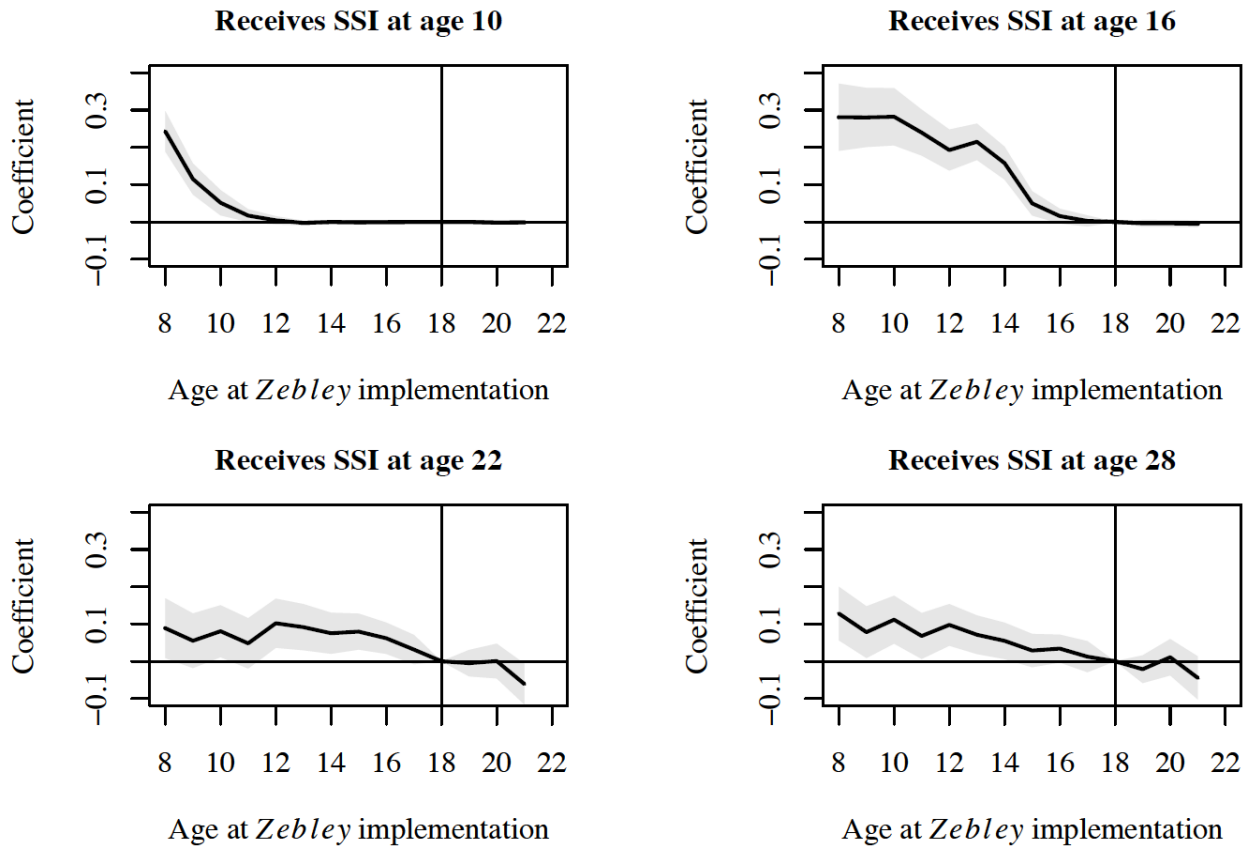

Figure 5

SSI Receipt at Particular Ages

Notes: Indicates if an individual receives SSI benefits at a given age. Individuals are grouped into age cohorts by their age on February 22, 1991, the date of implementation of new standards. Plots the coefficient on the interaction of age cohort with having a mental disorder using Equation 1, controlling for age at application and age at application interacted with diagnosis type. Standard errors are clustered by the individual's age at *Zebley* implementation by the state in which the initial application was filed. The shaded region shows the 95% confidence interval. The vertical line at age 18 represents the omitted cohort, where the estimate is mechanically equal to zero.

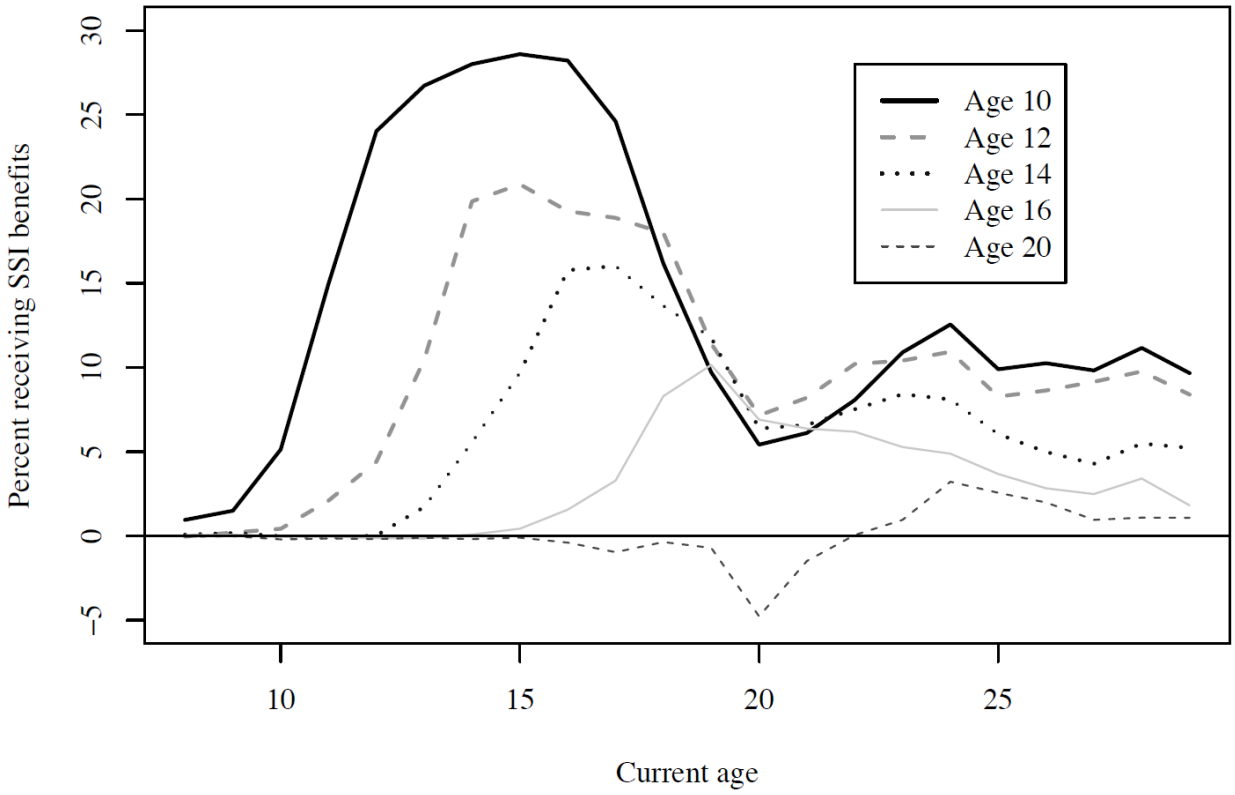

Figure 6

SSI Receipt Over Time

Notes: Indicates if an individual receives SSI benefits at a given age. Individuals are grouped into age cohorts by their age on February 22, 1991, the date of implementation of new standards. Each line depicts the regression estimated benefits trajectory for a given age cohort. Each point plots the coefficient on the interaction of age cohort with having a mental disorder using Equation 1 on SSI receipt at that age, controlling for age at application and age at application interacted with diagnosis type.

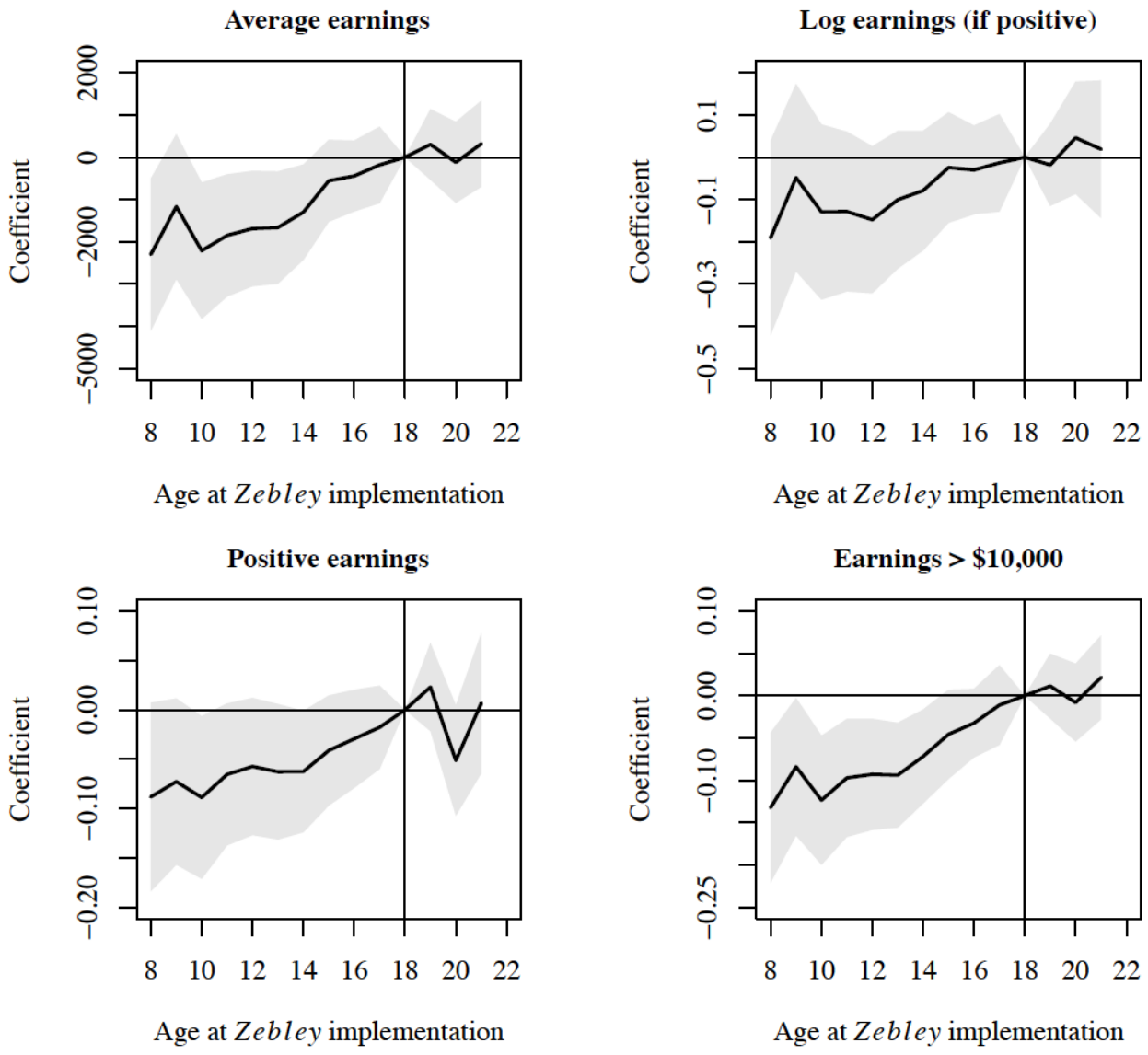

Figure 7

Average Earnings from Ages 20 through 22

Notes: Earnings are an individual's wage, salary, and tip income reported on W-2 forms in the year he turned ages 20-22. Individuals are grouped into age cohorts by their age on February 22, 1991, the date of implementation of new standards. Plots the coefficient on the interaction of age cohort with having a mental disorder using Equation 1, controlling for age at application and age at application interacted with diagnosis type. Standard errors are clustered by the individual's age at *Zebley* implementation by the state in which the initial application was filed. The shaded region shows the 95% confidence interval. The vertical line at age 18 represents the omitted cohort, where the estimate is mechanically equal to zero.

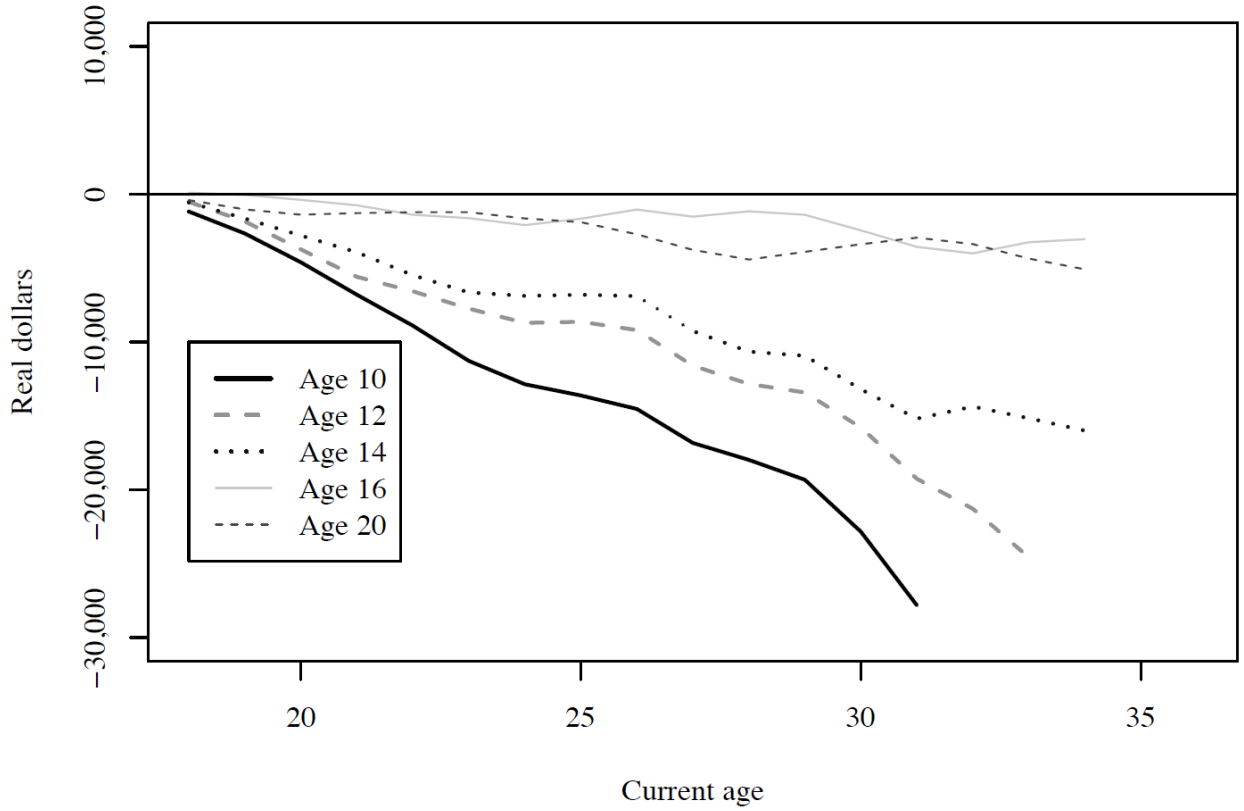

Figure 8

Cumulative Earnings by Age

Notes: Earnings are reported from an individual's wage, salary, and tip income reported on W-2 forms in the year he turned a given age. Cumulative earnings are the total lifetime earnings from age 18 up until the current age. Individuals are grouped into age cohorts by their age on February 22, 1991, the date of implementation of new standards. Each line depicts the regression estimated earnings trajectory for a given age cohort. Each point plots the coefficient on the interaction of age cohort with having a mental disorder using Equation 1 on cumulative earnings at that age, controlling for age at application and age at application interacted with diagnosis type.

[1] Throughout the paper, I will routinely refer to individuals with mental disorders and individuals with nonmental disorders. It is important to keep in mind that I refer only to the subset of individuals with mental disorders and nonmental disorders who applied for SSI benefits in childhood, and thus are part of my sample.

[2] All cohorts were in some sense treated in that they could still re-apply and potentially qualify, as discussed in Section II. Variation in treatment stems from differences in the likelihood of receiving a new award, with younger cohorts with mental disorders the *most likely* to newly get benefits after the *Zebley* decision.

[3] Though accepted applicants are not an ideal control group for rejected applicants, a strategy adopted in von Wachter, Song, and Manchester (2011) and Bound (1989), the "untreated" cohorts that were already adults at the time of the decision control for the inherent difference between accepted and rejected applicants. Accepted applicants that are younger are untreated (because they already receive SSI benefits) and rejected applicants that are younger are treated as they are newly exposed to eased standards.

[4] Individuals with disabilities are also potentially eligible for the Social Security Disability Insurance (DI) program, which has the same disability criteria as SSI. It is only available for adults with a work history, except for disabled widows or disabled adult children. There is also no means test like the one associated with SSI receipt, meaning that not all recipients are poor. Most papers about DI have focused on the labor market disincentives of the program, for example showing that those with lower disability severity see drastic reductions in employment because of benefit receipt (Maestas, Mullen, and Strand 2013). Additionally, see Autor et al. (2017), French and Song (2014), Moore (2014), and von Wachter, Song, and Manchester (2011).

Autor et al. (2016) and Coile, Duggan, and Guo (2015) also examine the labor market effects of the VA's separate disability insurance program for veterans.

[5] For comparison, the Temporary Assistance for Needy Families program has an annual budget of just under $20 billion. See U.S. Congressional Budget Office, "Growth in Means-Tested Programs and Tax Credits for Low-Income Households", February 2013.

[6] For an excellent review of the SSI program and related research on many aspects of the program, see Duggan, Kearney, and Rennane (2016). For children, who are unlikely to have any income themselves, the means test is based on a deeming formula that considers part of a parent's earnings as "deemed" to the child.

[7] The SSA website notes "The Listing of Impairments describes, for each major body system, impairments considered severe enough to prevent an individual from doing any gainful activity (or in the case of children younger than age 18 applying for SSI, severe enough to cause marked and severe functional limitations). Most of the listed impairments are permanent or expected to result in death, or the listing includes a specific statement of duration." Having a disability on this list means that one automatically qualifies for benefits upon also meeting income criteria.

[8] Intellectual disabilities are inherently different from other mental disorders in their diagnosis. An intellectual disability diagnosis requires an IQ of less than 70 in addition to severely impaired functioning, and is thus more persistent than something like a mood disorder which may sometimes be active and sometimes not. There are also many distinct services and advocacy for people with intellectual disabilities that mean individuals with intellectual disabilities differ substantially from individuals with other mental disorders.

[9] The sample of initially rejected applicants includes those denied benefits between 1986 and 1989 after accounting for appeals. Individuals must have been rejected for medical reasons. Individuals rejected because of excess income and resources are excluded given that the change in disability standards likely did not affect their probability of newly qualifying for benefits.

[10] There were also differential changes in the primary diagnosis codes of the reappliers. About 7% of early appliers with a nonmental disorder who reapplied within four years changed to having a mental disorder and about 48% with a mental disorder changed to a nonmental disorder. Among late appliers, 9% changed into a mental disorder and only 38% changed out of a mental disorder. Re-appliers are more likely to end up with a mental diagnosis after the *Zebley* decision, and this allows them to take advantage of the relatively easier disability criteria for those with mental disorders. I thus consider an individual's diagnosis at the time of initial application because considering an individual's most recent diagnosis would potentially lead to biased results.

[11] Using NLSY97 data, I also confirm that general earnings trajectories for low-income youth without disabilities are similar for cohorts age 8 to 11, the only available overlap.

[12] Individuals age seven and younger at the time of the *Zebley* decision are dropped because fewer than 10% of applicants in each cohort have mental diagnoses, too small a proportion to accurately identify any effects.

[13] The age at application dummies (and the interaction with an indicator for mental diagnosis) mean estimates of β_3 are identified by variation within a particular age of application. Because diagnosis data are only available from 1986, this means that for each age of application, there are only six possible age at *Zebley* cohorts. For example, among those who applied at age 12, individuals can be between 13 and 18 at the time of *Zebley* implementation. The oldest

person would have applied at 12 on January 1, 1986, turned 13 on January 2, 1986, and then been 18 on February 22, 1991, the date that individuals are grouped into age cohorts. The youngest person would have applied at 12 on December 31, 1989, but not turned 13 until December 30, 1990, and thus have been 13 on February 22, 1991.

[14] An inherent assumption here is that age of application proxies for age of onset of a disability.

[15] Table 1 shows that this assumption likely fails without the age at application controls – individuals with nonmental disorders tend to be younger than those with mental disorders in the subgroup age 17 and younger, whereas the age difference is constant in the subgroup age 18 and older, consistent with evidence from Duggan, Kearney, and Rennane (2016) that nonmental disabilities are relatively more prevalent among younger children. Mental disorders tend to be diagnosed later in life – in addition to simply being older, individuals with mental disorders typically applied at later ages.

[16] I focus on the intent-to-treat estimates rather than the treatment-on-the-treated because the impacts of changes in SSI standards may operate through other channels in addition to the number of years receiving benefits. For example, the dollar amount of benefits, Medicaid receipt, backpayments, or a host of other factors could be important drivers. By focusing on the intent-to-treat estimate, I remain agnostic as to the exact channel that increased overall exposure to SSI influences long-term labor market outcomes.

[17] I do not estimate a specification with unconditional log earnings given that there are so many people with zero earnings – about half of the population from age 20 through 22.

[18] I also run quantile regressions to precisely estimate effects at different ends of the earnings distribution, rather than assigning arbitrary earnings thresholds. Results are similar at each quantile.

[19] The line for the age-10 cohort ends prior to the other ages because data only goes through 2012. Individuals who were 10 at the time of the *Zebley* decision were just 32 in 2012, so there are no data for ages older than 32.

[20] Deshpande (2016a) uses a regression discontinuity that led people to be more likely to lose benefits in adulthood based on their birth date to compare earnings between those remaining on SSI and those losing SSI. She finds that those who lose SSI benefits have $3,000 more in annual earnings than those who remain on SSI.

[21] These findings are in stark contrast to Coe and Rutledge (2013), who use the same differential change in standards by comparing individuals who qualified for benefits with mental and nonmental disorders before and after the *Zebley* decision to estimate the long-run labor market impacts of SSI receipt. They find that increases in benefit receipt for those with mental disorders lead to improved employment outcomes. However, because of the compositional shift in applicants, people who qualified with mental disorders after *Zebley* likely have less severe disabilities than those who qualified with mental disorders pre-*Zebley*, which could explain the positive findings. By restricting my sample to those who applied and were denied SSI benefits prior to the *Zebley* decision, I avoid such selection bias issues.

[22] Though not reported, I estimate the impacts of a similar framework on parental earnings over time to see how a change in child eligibility affects parent outcomes. Such results are mostly imprecise. Deshpande (2016b) finds that parents of children who lose SSI respond by

increasing labor market earnings. However, she finds evidence of an asymmetric response between losing and gaining benefits.

[23] These pre-existing differences likely work against the negative impacts found on earnings. I also include parental earnings at the time of initial application as control variables in an additional specification, which does not affect the results. However, the presence of a difference raises concerns that there could be unobservable differences in age cohorts.

[24] A natural placebo test would be to compare earnings for individuals initially accepted with mental and nonmental disorders because neither group was affected by the *Zebley* decision. However, individuals with mental disorders are disproportionately more likely to lose benefits as a result of the 1996 policy change, as is shown in Figure 2. This leads to a difference between accepted mental and nonmental applicants in the number of years receiving benefits, which is the primary channel that I explore. Thus, this "placebo" test would not in fact be a "placebo" test because there is a non-zero "first-stage".

[25] The state of the economy may also affect adult SSI receipt – looking at the period from 1996-2010, Nichols, Schmidt, and Sevak (2017) show that applications increase as the economy worsens. They do not study the relative effects by disorder type.

[26] See http://www.cdc.gov/nchs/data/databriefs/db70.htm.

[27] Precise data and figures are available on request.

[28] Tables showing the results of the robustness checks discussed in this section that are not presented in the online appendix are available on request.