A Double Safety Net? Understanding Interactions between Disability Benefits, Formal Assistance, and the Role of the Family

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Abstract

Disabled individuals draw upon many types of support after the onset of a disability. I examine how formal and informal insurance evolve over the course of a disability and examine interactions between federal disability programs and these other insurance mechanisms. I use the Health and Retirement Study to examine trends in use of family assistance and other public and private insurance before and after the onset of disability. I identify the extent to which federal disability benefits change these patterns by comparing a propensity score-weighted sample of accepted and rejected disability applicants before and after receipt of benefits, using matched Social Security Administration records. I find that total household income declines by 20-40 percent following disability onset, while family transfers and other formal income transfers increase. Disability benefits have a minimal impact on use of other formal insurance mechanisms; however, receipt of disability benefits crowd in family assistance on the extensive and intensive margins, increasing the probability of a family transfer by 7 percent, and nearly doubling the amount of assistance provided. I find further evidence that family support is especially important for Supplemental Security Income (SSI) beneficiaries, and that SSI may be used offset the costs of provision of informal care, thus enabling families to increase the amount of assistance provided.

Keywords: disability, family transfers, crowd out, informal assistance

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1 Introduction

Chronic disability leads to significant health needs, limits an individual's ability to live independently, and lowers an individual's income and consumption over a long period of time (Ball and Low, 2014; Meyer and Mok, 2018). Prior research has shown that no one source of support completely compensates for this shock; instead, individuals facing disability draw upon a variety of sources of support (Dalton and LaFave, 2017; Meyer and Mok, 2018). While the main insurance sources for the disabled are broadly understood, less is known about the ways these support mechanisms interact and change over the evolution of the disability and in particular, how they interact with federal disability benefits. In this paper, I present a careful analysis of these interactions.

I examine how the use of formal and informal insurance evolves over the course of an individual's disability and explicitly examine interactions between the main federal disability programs, Social Security Disability Insurance (SSDI) and Supplemental Security Income (SSI), with other sources of support. I examine interactions with informal in-kind and monetary assistance provided by disabled individuals' children, changes in spousal work patterns, changes in other income transfers such as Unemployment Insurance, Workers' Compensation, Veterans' Benefits and other welfare, and assistance provided through long term care insurance and home care. Using a fixed-effects, difference in differences design, I use the longitudinal Health and Retirement Study (HRS) to examine trends in these sources of support before and after the onset of disability. Then, I identify the extent to which the receipt of federal disability benefits changes these patterns by comparing a propensity score-weighted sample of accepted and rejected disability applicants before and after receipt of disability benefits, using administrative earnings and benefit records from the Social Security Administration (SSA) that are matched to the HRS.

My analysis leads to several main findings. First of all, total household income declines significantly - by 20-40 percent on average - following the onset of disability. This is consistent with prior literature documenting the significant impact of health conditions on labor supply and earnings (e.g., Currie and Madrian 1999; Coile 2004; Smith 2005; Meyer and Mok 2018). This decline occurs for individuals of all earnings levels and in all family types and is driven by a decline in the disabled individual's own earnings. Other income sources, in particular spousal earnings, mitigate the extent of this decline, but not completely. I also analyze trends in receipt of other forms of assistance, including in-kind assistance from children and long term care, and find that in-kind assistance from children and use of home care both increase significantly after disability onset. Furthermore, disability insurance accounts for approximately 40 percent of household income for unmarried beneficiaries after disability onset.

I next examine the extent to which disability insurance crowds out other sources of formal and informal assistance. Overall, other income transfers typically account for only 5 percent of household income before or after disability onset, and I find little evidence that federal disability insurance crowds out other formal income transfers, with the exception that receipt of welfare declines after receipt of SSI benefits. Furthermore, I find that receipt of federal disability insurance in fact crowds *in* family assistance on the extensive and intensive margins, increasing the probability of receiving a family transfer by 3.5 percentage points, or 7 percent compared to the overall sample mean, and nearly doubling the days and hours of help provided per month. These effects tend to be larger for SSI beneficiaries, and I also find that SSI also leads to higher rates of home care use.

The lack of crowd out provides further evidence that federal disability insurance plays a key role in insuring the disabled against the health and income shock of disability, but still only partially compensates the shock of a disability (Low and Pistaferri 2015; Meyer and Mok 2018).

Furthermore, these findings suggest that informal insurance in fact complements federal disability benefits. The complementarity could come through several channels: families may assist in applying for and managing disability benefits, federal assistance may enable respondents to purchase additional care through formal means (home care) or offset some costs of informal assistance provided by family members, allowing these family members to increase the level of support provided. Or, federal assistance could serve as a signal to families of the severity of their family member's condition and the need for support. Additional analyses reveal that receipt of disability benefits, in particular, SSI, increases the probability that children are paid for the help they provide, and that children are more likely to work after their parent receives SSI. While these finding suggest that disability benefits may be exchanged to offset some of the children's cost of providing care, they also highlight the increased burden on grown children of providing this care, resulting in an increased need to work.

This work brings together several perspectives on household adjustments in response to a major health shock. Prior work has examined spousal responses to a health or income shock (e.g., Cullen and Gruber 2000; Coile 2004; Fadlon and Nielsen 2018; Dalton and LaFave 2017), and recent work has examined how spousal behavior interacts with disability insurance outside of the U.S. (Ball and Low, 2014; Autor et al., 2017). This literature is coming to a growing consensus that the family plays a key role in insuring against significant health shocks (e.g., Low and Pistaferri 2015; Blundell et al. 2016; McGarry 2016), and that informal and formal assistance are likely imperfect substitutes for one another (Ball and Low, 2014). Another body of work examines the role of the extended family as an insurance network in developing country settings (e.g., Gertler and Gruber 2002; Liu 2016; Jeon and Pohl 2017). Yet relatively little is known in the U.S. setting about how assistance from children interacts with federal disability insurance. The work in this paper aims to fill this gap. Furthermore, given that the children of disability beneficiaries are

grown and live in a separate household from their parents, this research also sheds light on the potential for the impact of disability - and potential benefits of federal assistance - to spill over from one household to another.

The size of the caregiver population is large and growing in the U.S., meaning the need to understand these potential spillovers is growing as well. In 2011, nearly 15 million caregivers in the United States cared for nearly 8 million older adults, and these caregivers were found more likely to experience emotional, physical and financial difficulties compared to non-caregivers (Wolff et al., 2016). The expected aging of the population implies that the number of caregivers, and their commensurate unmet needs, is likely to grow in the coming years. A robust body of literature examines how the role of the family interacts with long term care insurance (e.g., McGarry 1998; Stabile et al. 2006; Pezzin et al. 2006; McKnight 2006; Mommaerts 2018), but tends to focus on the population over 65. I provide evidence of the importance of the family's role in caring for individuals who experience health shocks earlier in life - prior to the full retirement age. Disability beneficiaries are at a different stage in the life cycle with a different family structure, less time to accumulate assets and savings prior to disability, and eligibility for different public benefits. Because these beneficiaries are younger, they will likely draw upon these various support mechanisms - including assistance from families - for a longer period of time relative to their older counterparts, putting additional strain on the families and services that support them.

My results provide evidence that family is an important informal insurance network for disability beneficiaries, and suggest that federal disability benefits can in fact reinforce that role. These impacts are particularly large for SSI beneficiaries, highlighting that interactions between family and government support are of particular importance for lower income individuals who are more likely to utilize both forms of insurance. My findings suggest that this interaction may operate through an exchange, with disability benefits being used to offset the costs of the child

providing care. However, this offset is not complete, and children also increase work to accommodate their family's needs. While the value of these federal benefits may offset some of the family's costs of providing this additional support, more attention needs to be paid to the role of the family in shouldering the burden of significant health shocks. At the same time, these findings highlight the crucial role that federal disability benefits play in insuring individuals who cannot draw upon a family network for alternative sources of support.

2 Conceptual Framework

Crowd out of private insurance means that some individuals who had access to private insurance shift from those private alternatives to public insurance once public insurance becomes available. If the alternative sources of support can be provided at a lower cost to society, complete crowd out would imply that rather than increasing the total extent of insurance coverage, social insurance instead increases the costs of insuring the population. However, when crowd out does not occur, this implies that existing private insurance mechanisms are not sufficient to meet the population's need, and the public insurance increases the overall level of insurance coverage. Furthermore, crowd in could occur if public and private insurance mechanisms are complements instead of substitutes. For example, public benefits may free up funds for individuals to purchase supplementary private care, such as in-home assistance.

In some cases, receipt of federal benefits may also result in individuals being eligible for other types support that they were unable to access before, such as in the case of Medicaid and some long term care services. Importantly, while a lack of crowd out of social insurance is efficient from a government perspective, this efficiency may not completely take into account all of the costs of private sources of care, including the family's costs.

The implications of crowd out and crowd in of family assistance are more nuanced. In a classic model of altruism, families increase provision of transfers in times of need, and when this need is offset by other sources (e.g., public benefits), transfers should fall (Becker, 1974; Cox, 1987). On the other hand, crowd in of family assistance may occur if these transfers are motivated by exchange motives between family members (Cox, 1987; Cox and Rank, 1992). Informal and public transfers may be even more likely to reinforce each other when there are no perfect substitutes for the type of care provided by the family (Cox, 1987). While benefits may enable the purchase of some in- home care, families may be able to provide assistance more quickly, or help with tasks that may not be suitable for professional help, such as managing finances or providing emotional support.

Prior work has found evidence that public insurance crowds out use of private health insurance (e.g., Cutler and Gruber 1996; LoSasso and Buchmueller 2004; Gruber and Simon 2008), and that unemployment insurance crowds out family insurance through spousal labor supply (Cullen and Gruber, 2000) and family assistance (Schoeni, 2002). While Autor et al. (2017) and Ball and Low (2014) find evidence of substitutions between other social benefits, spousal labor supply and disability insurance in Europe, this empirical analysis is the first to my knowledge that identifies the extent to which disability insurance crowds out other public benefits or family transfers in the U.S. setting.

3 Data

I use the HRS matched to administrative records from SSA to conduct the analysis. The HRS is a longitudinal panel of adults over the age of 50 in the United States, tracking data on five (as of 2014) cohorts of older adults since 1992. Respondents are surveyed every two years about work, health, income and family composition, among other topics. Importantly, the HRS also asks

about transfers of time and income to respondents from their children.[1] These questions form the basis of my main definition of family transfers in the analysis.

The HRS has also been matched to numerous administrative SSA records including the Master Beneficiary Record (MBR), the Supplemental Security Record (SSR), the Master Earnings Files (MEF), and the 831 file. Before conducting the match, respondents were first asked for permission to match their records to the SSA files. In the early waves of the survey, permissions for different files were collected piecemeal for specific cohorts and specific administrative files. These files were matched slowly over time, and respondents were not asked permission to have all of their benefit and earnings records included until 2004. In 2004, all active respondents were asked to provide one-time consent to have their prior records matched. Beginning in 2006, respondents were asked to provide prospective consent to have their future records continually collected going forward. As a result, records are not collected consistently for individuals who had exited the HRS prior to 2004, and records are only provided on retroactive SSA data for respondents who were still in the survey in 2004 but exited prior to 2006. While the 831 file contains more detailed information about disability applications, permissions to match administrative 831 records to the HRS began only in 2006 and there is no reoccurring extract as for the MBR file, leading to a more incomplete match overall (HRS, 2016).

For this project, I utilize data on earnings, SSDI and SSI application, receipt, and benefit values from the MBR, SSR and MEF. These files have the most complete histories for the highest number of respondents in the survey. In total, 17,189 respondents in the HRS have a match in the SSA administrative records. I use weights provided by the HRS to account for the fact that those who are matched to the administrative data are not representative of the entire HRS, particularly

[1] See https://hrs.isr.umich.edu/ for more details on the HRS.

accounting for the fact that the matched records tend to come from more recent HRS cohorts due to the permissions structure described above.[2] For my main sample, I include all respondents observed to have received or applied for SSDI or SSI benefits in the SSA administrative records, and who are under the full retirement age at the time of their participation in the HRS. These restrictions yield approximately 3,000 respondents, with just over 1,900 receiving disability benefits and the remainder having applied, but not receiving benefits. The self-reports of disability information in the HRS are broadly consistent with the disability records in the SSA administrative data: approximately 75 percent of respondents with SSA administrative data on disability applications also report a disability application in the HRS. However, the overlap is not perfect, likely due to concerns of recall bias or confusion over type of Social Security benefits received (e.g., SSDI vs. OASI benefits) in the self-reported data in the HRS.

The MBR and SSR provide data on individuals who applied for SSDI or SSI, and for those who were accepted, provides information on when benefits began, and the amount of benefits received. While the HRS does provide information about SSDI or SSI applications and benefit receipt, it does not ask respondents to distinguish between SSDI or SSI benefits prior to 2000. Additionally, as noted above, self-reported income and transfer data in surveys is often measured with error or underreported (Meyer et al., 2009). The SSA administrative data thus provides additional richness to the analysis by allowing for separate analyses by SSI and SSDI recipients, and additional verification of income amounts over time.

[2] These weights are included in the propensity score estimation process discussed below.

3.1 Summary Statistics

Table 1 shows weighted summary statistics for the main disability applicant sample, measuring demographic characteristics, health conditions and income in respondents' first and last interview. At the time of the first interview, accepted and rejected applicants are broadly similar in terms of age, marital status, and health. Over 60 percent of both groups report that health limits their ability to work in their first interview. Nearly two-thirds of each group reports some degree of mobility problem, and over half of respondents report back problems and arthritis. Approximately one third of the sample reports psychological problems or reports being hospitalized in the past year. These health problems become more prevalent by the time of the respondents' last survey. Notably, however, the degree of work limitation, mobility limitation, issues with activities of daily living (ADLs) and instrumental activities of daily living (IADLs) are all significantly lower for rejected applicants than for accepted applicants at the time of the last survey. I control for these characteristics in the regression analysis described below.

Respondents also have similar earnings and asset levels at baseline, with unconditional mean earnings at approximately $12,000-$13,000 at baseline, and unconditional mean assets just over $80,000 for each group. While assets grow by a similar amount for both groups over time, there are significant differences in earnings for accepted and rejected applicants by the time of the last interview. While disability beneficiaries earn less than $1,000 per year on average at the time of the last interview, earnings for rejected applicants are approximately $6,000 per year. This difference is consistent with other literature finding that SSDI reduces labor supply (e.g., Bound 1989; Von Wachter et al. 2011; Maestas et al. 2013) and could reflect a combination of rejected applicants' need to work (i.e., if an applicant is rejected, they may be forced to work), the behavioral response to receipt of benefits (i.e., beneficiaries lose benefits if their earnings exceed the substantial gainful activity level), and perhaps differences in the degree of functional limitation.

Table A1 shows that time-invariant characteristics are also broadly balanced between accepted and rejected applicants: approximately 60 percent of both groups are female, 40 percent are minorities, and both have slightly less than a high school education on average. Notably, non-beneficiaries are less likely to ever have received a transfer from their children.

4 Methods

To analyze the impact of the onset of disability and receipt of disability benefits on other transfers, I take advantage of the panel dimension of the HRS and implement a fixed-effects, difference in differences estimation strategy. The fixed effects allow me to analyze changes in family transfers, income sources, and other types of assistance before and after the onset of disability while controlling for time-invariant factors likely to affect the levels of these variables. I identify the extent to which disability benefits affects the receipt of other transfers by comparing transfer receipt before and after disability benefit receipt for beneficiaries (the treatment group) and observationally similar rejected applicants (the control group), using following equation:

$$y_{it} = \beta_1 H_{it} + \beta_2 H_{it} * D_{it} + X_{it}\delta + \alpha_i + \lambda_i + \varepsilon_{it} \qquad (1)$$

y_{it} represents the outcome of interest (family transfers, income sources or other assistance and transfers); $H_{it} = 1$ in years after individual i first reports experiencing a disability that limited his or her ability to work; and $D_{it} = 1$ once an individual begins to receive disability benefits. The individual-level fixed effect α_i controls for time-invariant unobservable characteristics that may affect transfer patterns, and accounts for observable, time-variant factors, such as marital status, assets, and earnings. I control for year-specific effects, such as the business cycle, with λ_t.

Importantly, the panel data in the HRS allows me to distinguish between the onset of disability ($H_{it} = 1$) and the time of disability receipt ($D_{it} = 1$). I define the onset of the disability as the first wave in which the respondent reports that they have a health condition that limits their work, and

define the first receipt of disability benefits as the wave corresponding to the year of the first payment in the administrative records. On average, disability receipt occurs two years after the onset of a disability in the HRS, approximately one wave later. The parameter β_1 will reflect any change in income, formal or informal transfers at the onset of the disability, and β_2 will reflect the change after disability receipt: the crowd out parameter. A rejection of the null hypothesis that $\beta_2 = 0$ would imply that disability benefits affect the level or frequency of other types of support. Formal and informal assistance likely respond to both the onset of disability and receipt of benefits, but only the response to receipt of disability benefits (β_2) represents the causal impact of disability benefits on changes in assistance.

Of course, individuals who were accepted onto SSDI or SSI are different in many ways from those who were rejected. Accepted beneficiaries likely have more severe health limitations and (particularly for SSI beneficiaries) lower earnings. If families are more likely to transfer income to more severely disabled family members, a direct comparison of accepted and rejected applicants could lead to an over-estimate of changes in family transfers, income and other assistance. While fixed effects will account for unobserved differences in levels of transfers between groups, they will not control for any unobserved changes in the evolution of transfers, disability or other characteristics. I address these concerns in several ways. First, I include time-varying controls for changes in health and income over time, which may also be correlated with receipt of transfers. Secondly, I estimate a propensity score for the likelihood of SSDI or SSI receipt based on baseline observable characteristics in health and income, and then re-weight the sample of rejected applicants so that it resembles the accepted beneficiaries.[3]

I estimate the propensity score using a step-wise regression procedure to determine which baseline characteristics should be included in the propensity score estimation based on a likelihood

[3] Results without propensity score weights are broadly consistent and available upon request.

ratio test comparing models where each additional control is included compared to the baseline. If the test rejects the null hypothesis that the models with and without the additional controls are the same, then the additional variable is included (Imbens, 2015).[4] Figure 1 shows the distribution of propensity scores of disability benefit receipt before and after the re-weight; the sample of rejected applicants closely resembles the distribution of recipients once applying the weights. To confirm this, I estimate a weighted regression of the propensity score on an indicator for receiving disability benefits and the coefficient is -0.007 and insignificant. Moreover, the summary statistics in Table 1 are calculated with propensity weights, and show that observable characteristics are balanced.

However, this reweighting exercise will not address differences between accepted and rejected applicants that are unobserved and cannot be included in the propensity score estimation. For example, the stigma of rejection or discouragement from re-entering the labor force after rejection could affect non-beneficiaries' outcomes of interest, but would not be controlled for here. As a result, I consider an alternative sample of HRS respondents who do not match the SSA administrative records (i.e., those who have never applied for SSDI), but do report a chronic disability in the HRS, and are under the full retirement age, meaning they would be eligible for SSDI or disability SSI benefits if they were to apply. I measure chronic disability as those who report that a health condition limits their ability to work in at least two waves of the HRS.[5] I conduct a similar propensity score reweight for this sample, and run the same analyses as those conducted with the disability applicant sample. The results, shown in the appendix, are

[4] Propensity scores were estimated using weights provided by the HRS that account for the fact that a non-random group of respondents were matched to the SSA administrative records.

5 Results are similar using a more strict definition of chronic disability after three waves of reporting a health condition limits work, or by additionally conditioning on ADL or IADL limitations.

quantitatively similar and in many cases indistinguishable from those estimated with the disability applicant sample.

Because the individual fixed effect α_i absorbs any time-invariant characteristics, this means that the parameters β_1 and β_2 are identified off of people whose health status and disability receipt changes during the survey ("switchers"). If switchers who change recipient status during the survey are dramatically different from those who do not, this could affect the extent to which these results generalize to the broader disability beneficiary population (Grosz et al., 2016). As I show in Table A2, approximately half of all disability beneficiaries in my sample begin receiving benefits during the panel window where I observe them. Not surprisingly, respondents who are receiving benefits at the baseline are more likely to have a work-limiting health problem at the baseline (89 vs. 35 percent), and are in worse health as measured by a higher prevalence of all the health indicators included in the survey. They also have lower earnings, assets, and are slightly older. Table A3 indicates that respondents who are receiving disability at baseline are also more likely to ever have received a transfer from children.

By construction, switchers have not yet experienced the physical or financial impacts of disability at the baseline. However, by the time of the last interview, similar shares of individuals who begin receiving benefits at baseline and during the survey report a work-limiting health condition and other specific health conditions, including mobility problems, back problems, high blood pressure, and hospitalization. Furthermore, a higher share of beneficiaries who begin receiving assistance during the survey report arthritis and diabetes. Still, the differences between the two groups at the time of first interview suggest that the identifying variation in this analysis comes from a group of beneficiaries who is younger and in better health at baseline, those about to undergo the shock of disability rather than whose condition has stabilized after disability onset. If

other types of formal or informal assistance take time to respond, these results could represent a lower bound on the full, long-term response of various forms of assistance.

An additional key assumption for the difference in difference approach is that beneficiaries and rejected applicants would have had similar trends in income and transfers in the absence of disability receipt. Figure 2 shows that beneficiaries and rejected applicants experienced similar trends in health and income during the years leading up to the receipt disability benefits. I calculate the average duration between reported onset of disability and the time of disability receipt for accepted applicants (1.7 years on average), and then add that duration to the time of disability onset for rejected applicants to approximate the date when these applicants would have received benefits if they had been accepted. Figure 2a shows that both accepted and rejected applicants experience a significant decline in total household income in the years leading up to disability onset. Beneficiaries' and non-beneficiaries' incomes decline by approximately one-third, from $55,000 per year to $35,000 per year. Figure 2b tracks the trends in the number of reported health conditions for both accepted and rejected applicants. While the number of reported health conditions is higher for beneficiaries compared to rejected applicants, both groups exhibit a gradually increasing trend in the number of health conditions with a sharp increase around the time of disability onset. On average, both groups report approximately 3 health conditions 5 years prior to disability benefit receipt, and this increases to nearly 7 conditions one year after receipt. While the levels of income are lower and the severity of health conditions is higher for accepted beneficiaries, both patterns display parallel trends before and after the time of disability benefit receipt, and the 95-percent confidence intervals overlap.

Similarly, Figures 2c and 2d show that family transfers also followed a similar trend prior to receipt of disability benefits. The trend in monetary transfers, while noisy, is relatively flat before and after the onset of disability and disability receipt. The trend in in-kind transfers follows a

similar pattern to the increasing severity of the health condition shown in Figure 2b, increasing steadily in the years leading up to the first reported onset of a work-limiting health condition.

5 Results

5.1 Composition of Income and Other Assistance

Figures 3 - 6 provide a closer descriptive examination of the trends in the composition of respondent and household income, health insurance and other assistance before and after the onset of a work-limiting health condition. Figure 3 analyzes trends in respondent earnings and benefit values using the SSA administrative data. This figure again shows a sharp decline in respondent earnings during the year in which the beneficiary began receiving benefits, with a downward trend in earnings beginning even two years prior to benefit receipt. This is consistent with the fact that HRS respondents first report a work-limiting health condition about 2 years prior to first receipt of disability benefits, on average. Income levels are significantly lower for SSI and dual beneficiaries. While respondent earnings decline significantly for all beneficiaries, this decline is offset on average by the receipt of SSI benefits for SSI and dual beneficiaries, mitigating the impact on overall respondent income. By contrast, total respondent income declines by approximately one-third for SSDI beneficiaries. For all groups, disability benefits comprise approximately two-thirds of total respondent income after benefit receipt.

Figure 4 takes a step back to examine trends in total household income for disability beneficiaries and non-beneficiaries, using data from the HRS to measure these trends relative to the time of disability onset (the first reported incidence of a work-limiting health condition). The HRS captures several types of income that are not included in the administrative data, including spousal earnings (for those who are married), pensions/OASI benefits, Unemployment Insurance or Workers' Compensation, other government transfers (the sum of Veterans' benefits, food stamps

and other welfare), family monetary transfers, as well as disability benefits. For consistency across income types, I show earnings and disability benefits as reported in the HRS in this figure. The two figures in each row compare married and unmarried individuals receiving a certain type of benefits, or not receiving benefits at all. Panel A compares SSDI recipients who are married with those who are unmarried, and Panels B and C presents the same comparison for SSI recipients and rejected applicants, respectively.

There are several broad patterns of note. First of all, all groups experience a marked decline in total household income after the onset of disability. SSI beneficiaries experience the largest relative decline of 30-40 percent of pre-disability income for married and unmarried SSI beneficiaries, respectively. Married and unmarried SSDI beneficiaries experience a decline of 23-27 percent beneficiaries, while non-beneficiaries experience a decline of 18 percent on average. While several types of income change after the onset of disability, the dark blue bars at the bottom of the column indicate that the overall decline in household income is driven by a decline in beneficiary earnings. Not surprisingly, overall income is significantly higher for married individuals across all groups - in some cases, income levels for married respondents is nearly double the income level of single respondents. This larger income level results from the combination of spousal earnings and spousal receipt other forms of income including pensions and other government transfers. The next broad trend, as expected, is that total income is significantly lower for SSI beneficiaries - on average, approximately 60 percent of total income of SSDI recipients both before and after disability onset.

Figure 5 shows the trends in each type of income as a percent of total household income. This figure highlights the relative importance of various types of income for each group. As was evident in Figure 4, spousal earnings play an important role in smoothing the income shock after the onset of disability, increasing from approximately 20 to 30 percent of household income from before to after the onset of disability. Spousal income comprises a slightly higher share of overall household

income for SSI recipients. Respondent earnings make up the majority of household income for unmarried SSDI and SSI beneficiaries prior to disability onset, and the combination of earnings and pensions constitute the majority of income for unmarried non-beneficiaries. Notably, the combination of disability benefits and family transfers make up 50-60 percent of total household income after disability onset for unmarried beneficiaries of both SSDI and SSI. Disability benefits alone account for approximately 40 percent of household income for unmarried SSDI and SSI beneficiaries. Other income transfers, however, are only a small share of total income, accounting for less than 5 percent of total household income before or after disability onset.

Figure 6 conducts a similar exercise analyzing the share of respondents who report various sources of assistance (in-kind assistance from family members, home care, and long term care insurance coverage), relative to the year that they first report the onset of a work-limiting health condition in the HRS. The most striking pattern is the sharp and significant increase in in-kind transfers after the onset of the work-limiting health condition, particularly for unmarried respondents. This pattern persists for recipients of both types of benefits, and for rejected applicants. Furthermore, family assistance is especially high among SSI beneficiaries, with 20-25 percent of SSI beneficiaries reporting receipt of in-kind assistance from a child during the years after onset of a health condition. Use of home care also increases significantly from 3-5 percent prior to disability to 12-17 percent after disability onset among disability beneficiaries, perhaps due to better access to home care through Medicare and Medicaid, the relatively higher severity of the health condition, or the fact that disability benefits may be used to subsidize the cost of purchasing home care. Use of home care also increases among rejected applicants, although levels of use are significantly lower (increasing from 2 to 9 percent before and after disability onset, respectively).

Finally, Figure A1 shows the trends for receipt of various forms of health insurance before and after the onset of the health condition. Not surprisingly, use of Medicare and Medicaid increase

sharply following the onset of the health condition for disability beneficiaries, coinciding with their eligibility through participation in either SSDI or SSI. Employer coverage falls as individuals likely exit from work, and receipt of health insurance through the VA is low at less than 1 percent across all years before and after onset. Medicare and Medicaid also increase among rejected applicants as respondents age into eligibility at 65, but employer based coverage also remains slightly higher even after the onset of the work conditions for those who may continue or return to work.

5.2 Regression results

Tables 2 - 4 show the β_1 and β_2 coefficients from Equation 1 for the various outcomes shown descriptively in the previous figures. The first row in each panel, labeled "Disability Onset", shows the coefficient for β_1 and the second row labeled "Onset*Ben" shows the crowd out coefficient β_2. In addition, the regression controls for time-varying characteristics of applicants, including the number of children, marital status, health (measured by reported problems with mobility, the number of doctors' visits and hospital stays in a year), assets, individual fixed effects and year fixed effects. Panel A shows the results for the entire sample, and Panels B and C split the treatment sample into whether the respondent reports receiving SSDI or SSI.[6]

First, Table 2 examines the impact of disability payments on monetary and in-kind transfers from children to their disabled parents. Columns 1 - 3 show the impact on the extensive margin of whether or not a parent receives a monetary, in-kind or either form of transfer, while columns 4 - 6 examine the intensive margin of changes to the dollar value of transfers, or the frequency of in-kind support provided.

[6]Approximately one-third percent of disability beneficiaries in my sample are dual recipients of both SSDI and SSI; these respondents are included in both Panels B and C.

Similar to the descriptive trends shown in Figure 6, the regression results show that overall, the probability of receiving an in-kind transfer increases by approximately 5.8 percentage points after the onset of a work-limiting health condition. Additionally, disability beneficiaries are 5.3 percentage points more likely to receive an in-kind transfer after the onset of disability. Relative to the 38 percent of the population who ever report receiving an in-kind transfer in Table A1, this is equivalent to a 13 percent increase in the probability of receiving an in-kind transfer. The 3.5 percentage point increase in the probability of any transfer corresponds to a 7 percent increase relative to the mean. This overall increase in the probability of receiving an in-kind transfer is similar for both SSDI and SSI recipients. This increase in the extensive margin of in-kind assistance is consistent with the increase in the intensive margin as well. On average, relative to non-recipients, SSI recipients receive an additional 4 hours or 1.5 days of assistance per month from their grown children after the onset of a health condition, nearly doubling the level of assistance provided compared to the baseline mean.[7] The results are similar for SSI and SSDI beneficiaries; while the magnitudes of the coefficients are larger for SSI beneficiaries, they are not significantly different from the overall coefficients or those of SSI beneficiaries.

While the results do not provide any evidence that the probability of receiving a monetary transfer changes with the onset of a work-limiting health condition or with receipt of disability benefits, Column 5 shows that DI also crowds in monetary assistance increases on the intensive margin after receipt of disability benefits by approximately $150 per survey wave. Furthermore, this response is driven by SSDI recipients.[8] The differential response between provision of monetary assistance for SSDI recipients and in-kind assistance for SSI recipients may reflect the fact that by definition, SSI beneficiaries tend to have lower incomes. Their children thus may also

[7] The confidence intervals on the coefficients for the change in hours and days of assistance provided contain 8 hours, or one day of assistance, meaning these two results are broadly consistent with one another.
[8] Values of zero are included in this regression.

be more likely to have low incomes (Chetty et al., 2015) and may be more readily able to provide in-kind assistance rather than additional income.

To gather a more complete picture of changes to other sources of support, Tables 3 and 4 explore interactions between disability benefits and other formal sources of support that the disabled may utilize. The regressions in these tables take the same form as those in Table 2 but simply change the dependent variable. Table 3 reflects changes in the level of other sources of income, including UI or WC, other transfer benefits (including food stamps, VA benefits, and other welfare), and respondents' own earnings and spousal earnings.[9] Columns 1 and 2 show that both UI/WC and other transfer payments increase after the onset of disability, which could indicate that applicants use other government transfers during the initial stages of disability or during the transition and application process for disability benefits. Panel C indicates that SSI reduces receipt other welfare by approximately $700. While the crowd-out coefficients on UI/WC and other income transfers tend to be negative in the overall and SSDI samples, none of these coefficients are statistically significant. Furthermore, as shown in Figure 5, these other monetary transfers comprise only a small percentage of overall household income both before and after the onset of disability.

Not surprisingly, beneficiary earnings fall significantly, by approximately $7,000 on average, for all groups following the onset of a work-limiting health condition. Earnings fall by an additional $9,000 per year for SSDI beneficiaries after receipt of disability benefits, which is again consistent with other work finding that receipt of disability benefits reduces labor supply. Column 5 also shows the importance of spousal earnings as an insurance mechanism. While spousal earnings do not change significantly at the onset of a work-limiting health condition, spousal

[9] Individuals who do not receive these benefits are included in the regression with a value of zero.

earnings increase by approximately $7,500 per year for SSI recipients. This added worker effect for SSI beneficiaries could reflect a need to maintain income and lack of other available savings or assets to use when the respondent can no longer work. Panel C also indicates that receipt of SSI beneficiaries receive less income from their pensions, perhaps indicating that respondents stop or delay the drawdown of other assets when they receive SSI. Somewhat surprisingly, SSI beneficiaries also increase their annual earnings after receiving SSI, although the earnings level is still very low.

Finally, Table 4 shows that other sources of support including long term care and home care do not change significantly after the onset of a health condition. There is no significant change in the level of these transfers after onset of disability, but are significant interactions between long term care and home care and SSI. Receipt of SSI reduces the probability of receiving other long term care insurance by approximately 2 percentage points, perhaps due to the provision of long term care services through Medicaid. By contrast, SSI increases the probability of receipt of home care by approximately 3 percentage points, perhaps due to the fact that respondents are better able to afford these services with the additional income provided by SSI, or again due to increased access to home care through Medicaid.

In sum, these results provide evidence that disability benefits do not have substantial impacts on the level of support received from other formal sources. However, receipt of disability benefits leads to an *increase* in both monetary and in-kind transfers from children, and increased earnings from a spouse. By contrast, disability benefits may crowd out some other sources of support for SSI beneficiaries, including long term care and other government transfers. However, because relatively few beneficiaries utilize these other government transfers or long term care at the time they apply for SSI, the impact of this potential crowd-out is quite small. Recent work in Europe finds evidence of partial crowd out of both formal assistance and spousal labor supply (Ball and

Low, 2014; Autor et al., 2017). Given the fact that European countries have a more universal safety net, however, it is not surprising that there would be more scope for crowd out of public benefits, and less need for spousal work, in the European setting compared to the U.S.

There are several reasons why disability insurance could increase use of informal assistance provided by families. First of all, shifts in assistance could reflect complementarities between the types of assistance provided by families, consistent with an exchange motive. For example, disability benefits could be used to provide income to offset children's costs of providing informal care. In addition, disability benefits could facilitate access to formal home care, either through eligibility for Medicaid with SSI, or allowing families to purchase this care directly. Disability benefits may also increase the need for in-kind assistance that is not easily obtained elsewhere, such as assistance in managing the disability benefit application and verification process. Finally, SSDI and SSI could provide families with a signal of the severity of their family members' condition, leading them to adjust to the permanence of their family member's needs. I next examine the outcomes of DI beneficiaries' children to explore some of these potential mechanisms.

To further explore the possibility that the increase in transfers from children reflects an exchange motive, I estimate Equation 1 with three outcomes related to the respondents' children: whether or not children were paid for their help, whether any child works full-time and whether any child works part time. I do not detect significant changes in any of these outcomes in the overall sample, or for SSDI beneficiaries. However, children of SSI beneficiaries are 3 percentage points more likely to have been paid for their help, and 8 percentage points more likely to be working after the parent receives disability. Tables A7 and A8 show that the impacts on a child being paid for their help are robust to inclusion of additional health controls, and use of the alternative control group, with coefficients ranging between 0.01 and 0.03. While small in

magnitude, only 1 percent of all households report that any child is paid for their help, so a 1-3 percentage point increase in the probability of being paid represents at least a doubling of the probability of being paid for their help. However, this does not appear to fully offset the costs of providing this care. The increased probability that children work after their parents receive disability benefits could reflect one way that children shoulder the increased family need of their parents' disability.

5.3 Robustness

One main concern is that disability beneficiaries experience greater declines in their health compared to rejected applicants. In other words, instead of reflecting a response to the change in benefits, the results instead simply reflect the fact that disability beneficiaries experience a greater change in their need. I address this concern in two ways. While the baseline results do include some controls for health (including controlling for mobility problems, number of doctor visits and number of hospitalizations), I additionally control for the number of reported health conditions and reported issues with ADLs and IADLs in each wave of the survey to capture changes in health. Secondly, I present results using a different control group: respondents who report a health limiting condition but do not apply for disability benefits. In constructing this alternative control group, I estimated a separate propensity score weight to adjust this alternative control group's demographics to resemble the treatment group, as was discussed for the rejected applicant control group in Section 3.

Table 6 shows the results including additional controls for the number of health conditions reported. The magnitude and significance of the main findings from Table 2 persist in these results: overall, disability benefits crowd in monetary transfers by approximately $150 since the last interview, and this finding is driven by SSDI beneficiaries. Panel C demonstrates that disability benefits

also crowd in-kind transfers on the extensive and intensive margins for SSI beneficiaries. Table A4 repeats the baseline specification using the alternative control group of disabled respondents who do not apply for disability benefits. The coefficients are similar in magnitude and significance as the coefficients in Table 2. Tables A5 and A6 also demonstrate broadly similar impacts on changes in income and other assistance using this alternative control group.

5.4 Heterogeneity

Table A9 shows the coefficients from Equation 1 for various subgroups in the population. First of all, Panels A and C shows that the increase in in-kind and monetary transfers from children is driven by respondents who have a child living within 10 miles and for respondents who are married at the time of their first interview. Disability beneficiaries in these groups are approximately 5 percentage points more likely to receive an in-kind transfer than non-beneficiaries. Monetary transfers also increase by approximately $200 per survey wave for these groups after receipt of DI. The final two panels show some evidence that in-kind transfers increase more strongly at the onset of disability for higher severity respondents (where higher severity is measured by the number of health problems reported at the time of the first interview). The dependent variable means at the bottom of each panel indicate that the baseline levels of transfers is generally higher for higher severity applicants, meaning the response to disability insurance may be leading to a convergence of assistance levels between these two groups. Similarly, the baseline levels of assistance are also higher for single respondents, again suggesting that part of the response for married respondents could result from convergence between assistance levels for married and single respondents. By contrast, baseline levels of support are higher for respondents who have children living nearby, meaning that the response to disability benefits simply reinforces the difference in support levels for respondents with children living

close and far away. Admittedly, the small sample sizes for some of these subgroups limit the ability to detect significant changes in these groups.

6 Conclusion

I examine trends in formal and informal assistance to the disabled both before and after the onset of a significant work-limiting health shock. Using panel data from the HRS matched to administrative SSA records on earnings, I document several important findings. First of all, household income falls significantly after the onset of disability. I additionally find that the decline persists for individuals across income levels and marital status, although the extent of decline varies from between 20 percent for married individuals who do not receive disability benefits and up to 40 percent for SSDI beneficiaries regardless of marital status. The decline in income is driven by a decline in disabled beneficiaries' own earnings, and unadjusted trends suggest this decline is partially offset by spousal earnings (for married respondents) and, to a smaller extent, increased assistance provided by the family. I also document significant increases in in-kind transfers provided by children to disabled parents after the onset of disability.

After documenting this decline in income, I formalize these patterns in a fixed-effects, difference in differences regression to estimate the extent of crowd out associated with receipt of disability benefits. This regression allows me to both control for unobserved, time- invariant differences in use of various sources of support across individuals, and to identify the extent to which receipt of disability insurance has a causal impact on the trends in these transfers over time. Disability benefits may reduce other formal income transfers and receipt of long term care for SSI beneficiaries, but other income transfers make up only 5 percent of total household income before or after disability onset. Furthermore, I find that in-kind and monetary assistance from grown children increases by approximately 7 percent, meaning that disability insurance actually crowds in

these other sources of support. These results are stronger for SSI beneficiaries, for whom disability benefits and family support comprise a larger share of total household income. Use of home care also increases significantly for SSI beneficiaries, suggesting either complementarities with receipt of Medicaid, or the fact that disability benefits may enable families to purchase this additional care.

While the decline in income suggests that all disabled individuals are in need of additional support, assistance from family likely reinforces assistance for those who have started from a higher baseline level of need. As a result, federal disability programs and other sources of formal government assistance play a more important role in insuring more vulnerable groups with fewer alternative insurance mechanisms against the health shock of a disability. Analyzing child outcomes reveals that SSI may facilitate this increase in transfers by helping to pay children for their assistance. However, this does not fully offset the costs of providing this care, as children also are more likely to work full time after their parent receives SSI.

These results raise several policy conclusions. First of all, the findings highlight the relative importance of federal disability benefit programs in insuring individuals against disability risk. Other formal income transfers make up only a small share – less than 5 percent on average – of household income after the onset of disability. By contrast, disability benefits comprise nearly 40 percent of household income after onset. While families provide crucial informal assistance, federal disability benefits are even more important for individuals who do not have these informal safety nets to rely on, such as unmarried individuals and those without extended families in a position to support them. At the same time, when family is able to provide support, formal assistance crowds in additional family assistance, highlighting the importance of the family's role. These findings provide new evidence that family shares significantly in the burden of disability, and impacts on families should be taken into

consideration when considering the value of disability benefits.

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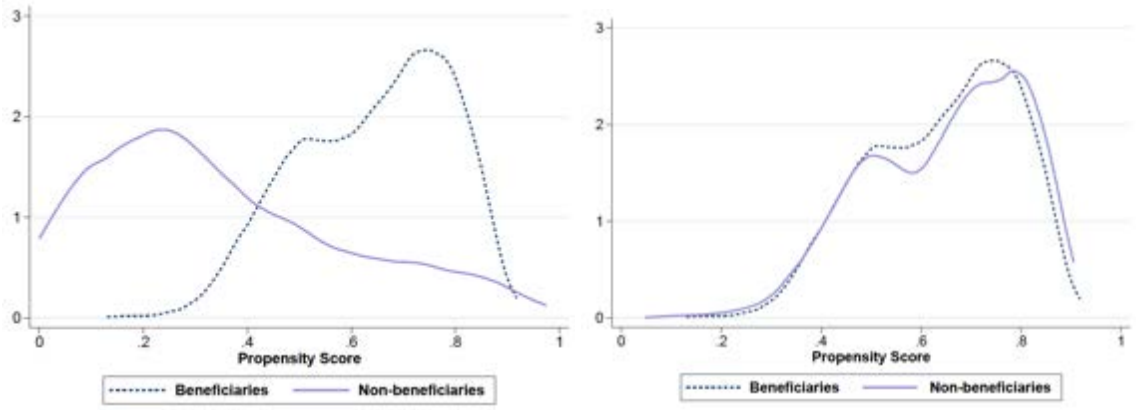
Figures

Figure 1: Distribution of Propensity Scores of Receiving SSDI for Beneficiaries and Non-Beneficiaries

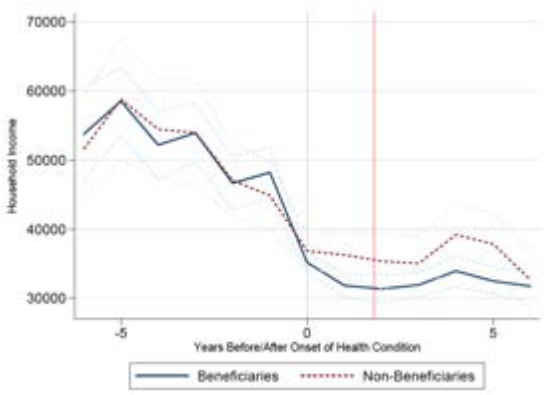


(a) Unweighted

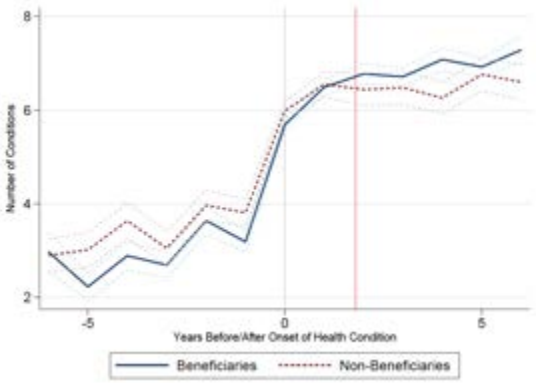
(b) Weighted

Notes: Data from Health and Retirement Study matched to administrative SSA records, 1992-2014. Propensity score of disability benefit receipt estimated using a stepwise regression procedure (Imbens, 2015). Variables included in propensity score estimation include demographics (e.g., age, gender) and measures of health, assets and incomes for respondents at the time of their first interview in the HRS.

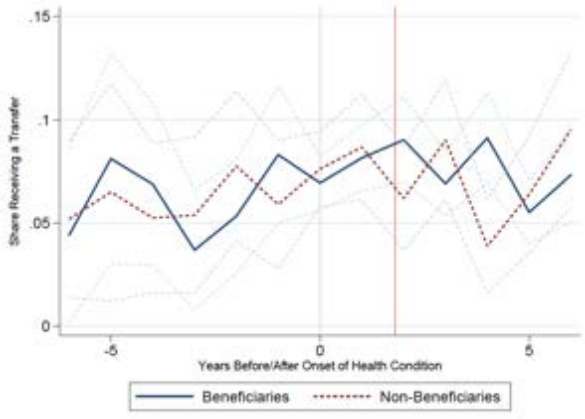
Figure 2: Health and Income Shock Before and After Onset of Disability for Beneficiaries and Non-Beneficiaries



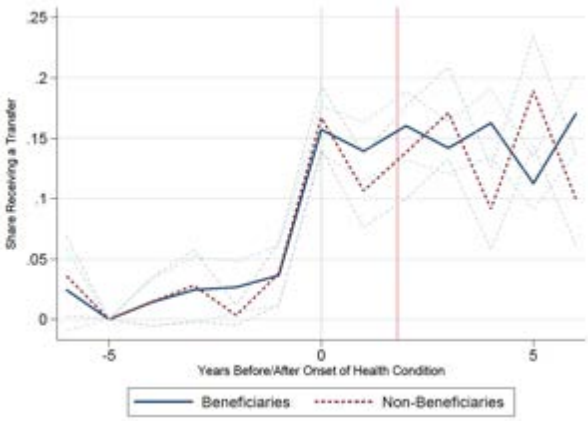
(a) Average total household income



(b) Average number of conditions reported



(c) Monetary transfers



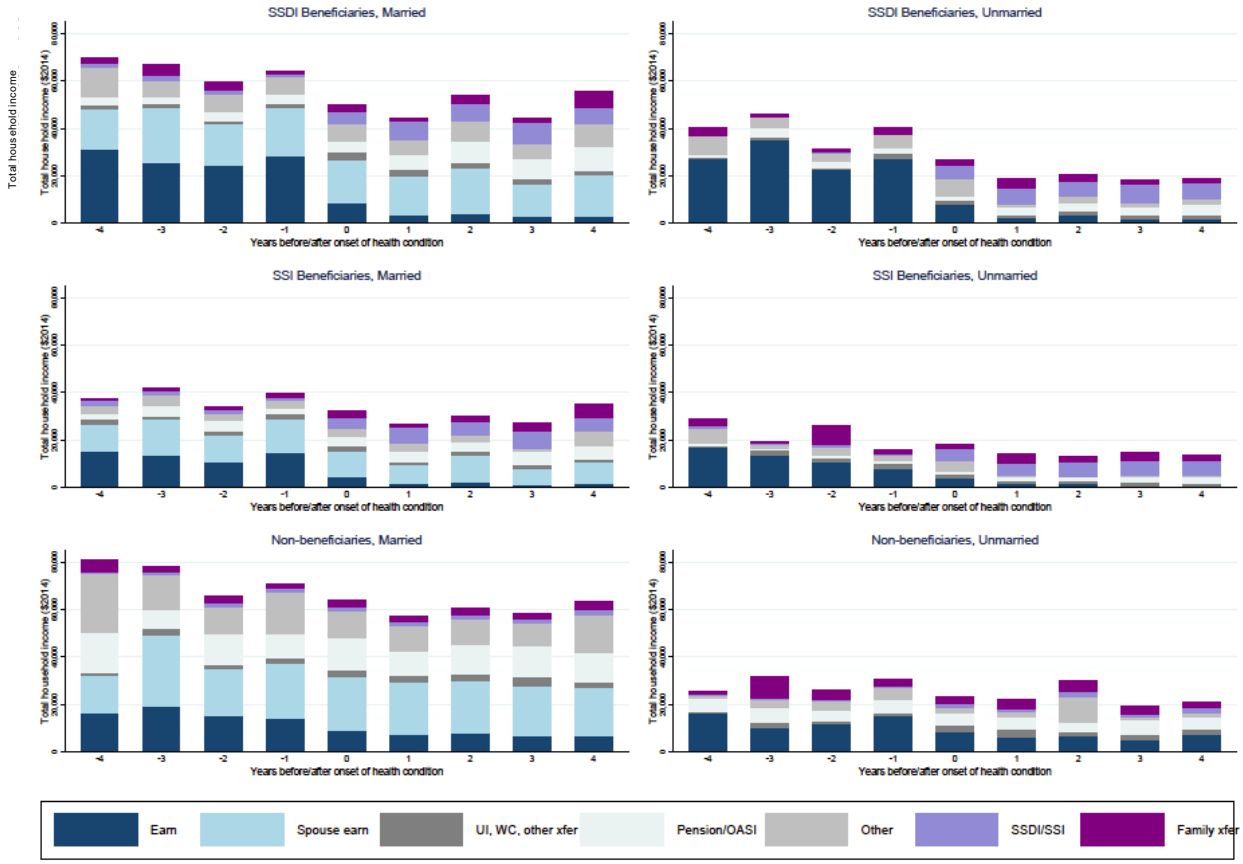
(d) In-kind transfers

Notes: Data from Health and Retirement Study matched to administrative SSA records, 1992-2014. Gray dashed line at zero indicates the time of first report of a health condition that limits work. The solid red line indicates the average time of receipt of disability benefits relative to disability onset, approximately 2 years later. 95-percent confidence intervals shown in dashes around trend lines.

Figure 3: Average Composition of Respondent Income Before and After Receipt Disability Benefits

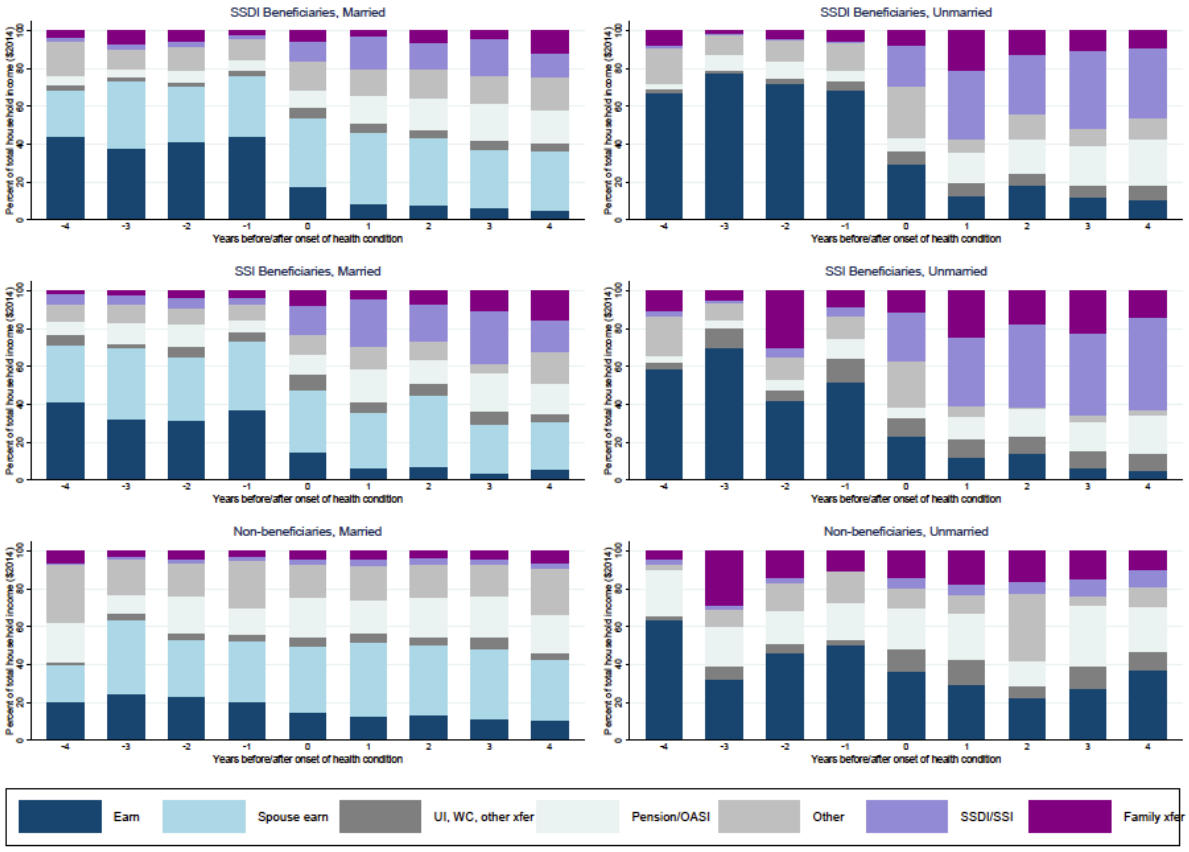
Notes: Data from SSA Master Beneficiary Record and Master Earnings File, 2012.

Figure 4: Average Composition of Household Income Before and After Onset of Disability



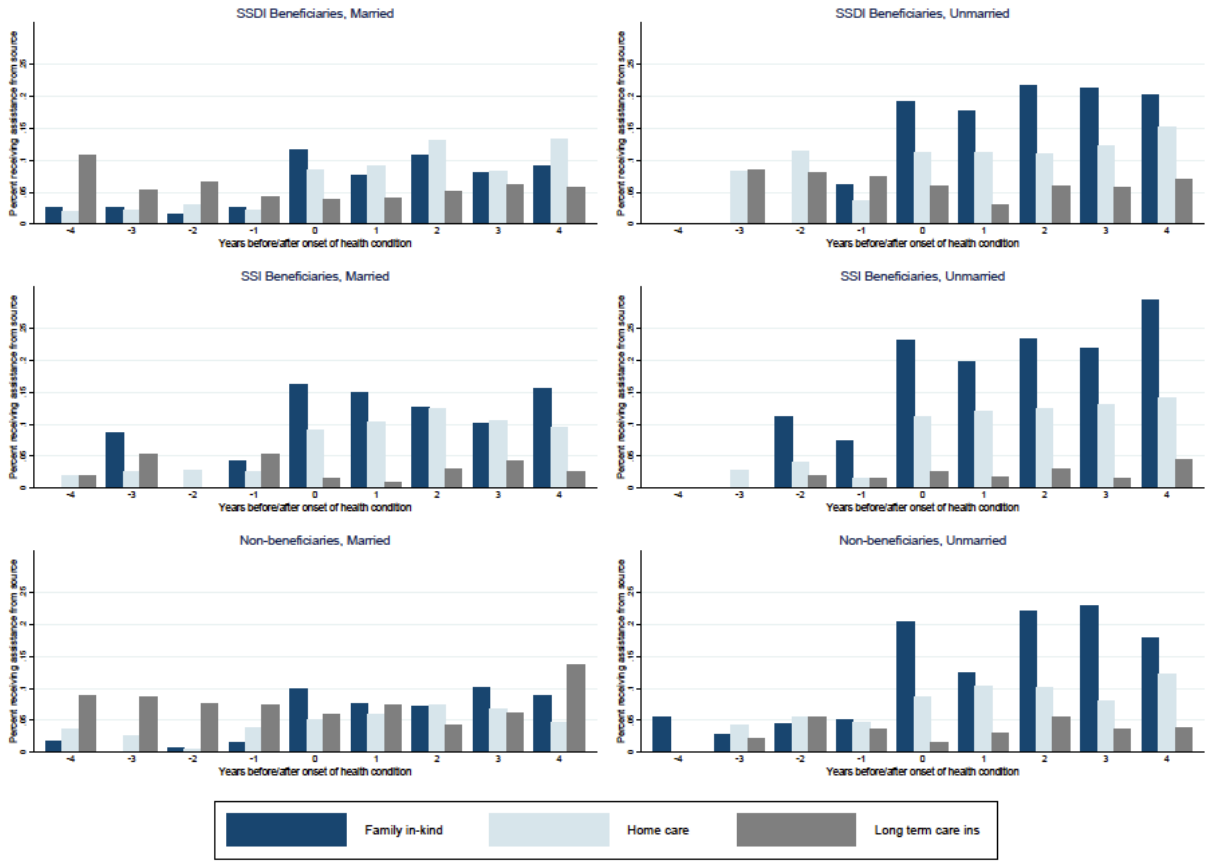
Notes: Data from Health and Retirement Study matched to administrative SSA records, 1992-2014. Other income includes alimony, lump sum payments, capital gains, and other non-specified income. Figures for married respondents sum each type of income reported for the respondent and the spouse.

Figure 5: Household Income from Various Sources Before and After Onset of Disability, as a percent of Total Income



Notes: Data from Health and Retirement Study matched to administrative SSA records, 1992-2014. Other income includes alimony, lump sum payments, capital gains, and other non-specified income. Figures for married respondents sum each type of income reported for the respondent and the spouse. in some cases, spouses receive disability benefits prior to the survey respondent as shown by the small fraction of income coming from disability insurance prior to the onset of the respondent's work-limiting health condition.

Figure 6: Receipt of Non-Monetary Assistance Before and After Onset of Disability



Notes: Data from Health and Retirement Study, 1992-2014.

Tables

Table 1: Sample Characteristics at First and Last Interview

	First Interview		Last Interview	
	Beneficiaries	Non-Beneficiaries	Beneficiaries	Non-Beneficiaries
Demographics				
Age	53.27	52.69	66.65	63.02
In Labor Force	0.42	0.53	0.07	0.25*
Married	0.63	0.61	0.45	0.48*
Spouse works	0.37	0.38	0.29	0.40*
Number of children	3.22	3.44	3.33	3.65
Health				
Health limits work	0.63	0.62	0.82	0.70**
Mobility problems	0.67	0.68	0.85	0.77**
Back problems	0.59	0.61	0.61	0.62
Psych problems	0.32	0.31	0.43	0.43
High blood pressure	0.55	0.51	0.77	0.74
Diabetes	0.22	0.22	0.42	0.38
Arthritis	0.55	0.55	0.77	0.72+
ADL problems	0.31	0.32	0.48	0.40**
IADL problems	0.19	0.22	0.43	0.37**
Hospitalization	0.31	0.29	0.44	0.4
Transfers				
Monetary transfer	0.08	0.08	0.07	0.06
In-kind transfer	0.14	0.12	0.21	0.18
Income				
Earnings (unconditional)	12,378	13,671	927	5,936**
Assets (unconditional)	89,610	83,383	112,006	124,799
UI/WC (unconditional)	0	0	36	317
Other transfers (unconditional)	55	56	1,677	1,661
N	1,954	1,139	1,954	1,139

Notes: Data from Health and Retirement Study matched to administrative SSA records, 1992-2014. Statistics calculated with propensity score weights. Stars on final column indicate p-values from a test of the difference-in-difference between denied and accepted applicants at first and last interview. ** $p<0.01$, * $p<0.05$, + $p<0.1$

Table 2: The Effect of Disability and SSDI on Family Assistance

	(1) Monetary	(2) In-Kind	(3) Any	(4) Dollars	(5) Hours	(6) Days
Panel A: All						
Disability Onset	0.001	0.058**	0.064**	-89.067	0.873	0.285
	(0.013)	(0.015)	(0.018)	(63.774)	(0.931)	(0.295)
Onset * Benefits	0.003	0.053*	0.036+	159.601*	4.063+	1.518*
	(0.015)	(0.023)	(0.021)	(64.666)	(2.248)	(0.622)
Individuals	3,077	3,064	3,064	3,084	3,052	3,052
Mean	0.0700	0.110	0.160	197.8	5.430	1.560
Panel B: SSDI Recipients						
Disability Onset	0.001	0.058**	0.065**	-89.552	0.581	0.249
	(0.013)	(0.016)	(0.019)	(65.631)	(0.940)	(0.308)
Onset * Benefits	0.007	0.058*	0.041+	202.854**	3.782	1.659*
	(0.017)	(0.026)	(0.023)	(71.584)	(2.443)	(0.709)
Individuals	2,536	2,525	2,525	2,543	2,518	2,518
Mean	0.0600	0.100	0.150	190.1	4.300	1.330
Panel C: SSI Recipients						
Disability Onset	-0.003	0.061**	0.067**	-95.470	0.769	0.239
	(0.014)	(0.017)	(0.020)	(69.337)	(1.001)	(0.330)
Onset * Benefits	-0.011	0.110**	0.078*	134.791	9.461**	2.892**
	(0.024)	(0.040)	(0.034)	(89.057)	(3.644)	(1.055)
Individuals	2,014	2,001	2,001	2,021	2,003	2,003
Mean	0.0700	0.120	0.170	201.9	6.190	1.660

Notes: Data from Health and Retirement Study matched to administrative SSA records, 1992-2014. Regression also controls for number of children, marital status, health (measured by mobility problems, doctors' visits and hospital stays), assets, individual fixed effects and year fixed effects. Regressions calculated with propensity score weights. SSI and SSDI panels both include dual recipients. Intensive margin regressions include zero values. ** $p<0.01$, * $p<0.05$, + $p<0.1$

Table 3: The Effect of Disability and SSDI on Income from Other Sources

	(1) UI/WC	(2) Other transfer	(3) Pension	(4) Earn	(5) Spouse Earn
Panel A: All					
Disability Onset	317.52**	460.62*	-68.93	-7,260.50**	1,312.83
	(115.09)	(186.06)	(590.07)	(954.73)	(1,593.21)
Onset * Benefits	-135.75	-109.90	-445.60	-6,481.52**	2,542.24+
	(98.85)	(227.83)	(413.94)	(1,012.49)	(1,422.13)
Individuals	3,084	3,084	3,084	2,957	2,203
Mean	385	1,063	1,705	8,034	18,118
Panel B: SSDI Recipients					
Disability Onset	326.57**	457.16*	-104.43	-7,354.97**	1,481.98
	(119.12)	(191.51)	(614.81)	(993.65)	(1,632.76)
Onset * Benefits	-149.22	-2.98	-232.85	-8,230.56**	2,202.76
	(112.65)	(263.50)	(449.76)	(1,242.44)	(1,557.59)
Individuals	2,543	2,543	2,543	2,432	1,921
Mean	444	1,071	2,003	9,319	19,250
Panel C: SSI Recipients					
Disability Onset	290.66*	503.22*	-217.65	-6,407.91**	1,536.54
	(124.60)	(200.99)	(659.40)	(1,029.07)	(1,773.94)
Onset * Benefits	-177.38	-694.38*	-1,920.20**	1,960.46*	7,472.97**
	(108.51)	(348.87)	(500.32)	(773.76)	(1,597.53)
Individuals	2,021	2,021	2,021	1,915	1,366
Mean	252	940	1,287	7,173	17,197

Notes: Data from Health and Retirement Study matched to administrative SSA records, 1992-2014. Respondent earnings data come from the SSA MEF file; all other income values come from the HRS. Respondents who did not receive the type of income listed in the column header have values of zero and are included in the regression. Regression also controls for number of children, marital status, health (measured by mobility problems, doctors' visits and hospital stays), assets, individual fixed effects and year fixed effects. Regressions calculated with propensity score weights. ** $p<0.01$, * $p<0.05$, + $p<0.1$.

Table 4: The Effect of Disability and SSDI on Other Assistance

VARIABLES	(1) LTC	(2) Spouse work	(3) Homecare
Panel A: All			
Disability Onset	-0.01	0.03	-0.00
	(0.009)	(0.027)	(0.011)
Onset * Benefits	-0.01	-0.04	0.03*
	(0.008)	(0.033)	(0.011)
Individuals	3,082	2,156	3,084
Mean	0.050	0.510	0.080
Panel B: SSDI Recipients			
Disability Onset	-0.01	0.03	-0.00
	(0.009)	(0.028)	(0.011)
Onset * Benefits	-0.01	-0.05	0.02+
	(0.008)	(0.036)	(0.012)
Individuals	2,541	1,881	2,543
Mean	0.060	0.520	0.080
Panel C: SSI Recipients			
Disability Onset	-0.01	0.03	-0.01
	(0.010)	(0.030)	(0.012)
Onset * Benefits	-0.02*	-0.00	0.03+
	(0.008)	(0.056)	(0.016)
Individuals	2,019	1,333	2,021
Mean	0.040	0.490	0.070

Notes: Data from Health and Retirement Study matched to administrative SSA records, 1992-2014. Regression also controls for number of children, marital status, health (measured by mobility problems, doctors' visits and hospital stays), assets, individual fixed effects and year fixed effects. Regressions calculated with propensity score weights. ** $p<0.01$, * $p<0.05$, + $p<0.1$

Table 5: The Effect of Parent Disability on Child Outcomes

VARIABLES	(1) Paid for transfer	(2) Full time work	(3) Part time work
		Panel A: All	
Disability Onset	0.00	-0.01	-0.00
	(0.003)	(0.019)	(0.023)
Onset * Benefits	0.01	0.04	-0.01
	(0.008)	(0.023)	(0.029)
Individuals	3,064	3,084	3,084
Mean	0.010	0.790	0.230
		Panel B: SSDI Beneficiaries	
Disability Onset	0.00	-0.01	-0.00
	(0.004)	(0.019)	(0.023)
Onset * Benefits	0.01	0.04	-0.01
	(0.009)	(0.026)	(0.033)
Individuals	2,525	2,543	2,543
Mean	0.010	0.810	0.220
		Panel C: SSI Beneficiaries	
Disability Onset	0.00	-0.01	-0.01
	(0.004)	(0.020)	(0.025)
Onset * Benefits	0.03+	0.08*	0.00
	(0.014)	(0.037)	(0.049)
Individuals	2,001	2,021	2,021
Mean	0.010	0.780	0.240

Notes: Data from Health and Retirement Study matched to administrative SSA records, 1992-2014. Regression also controls for number of children, marital status, health (measured by mobility problems, doctors' visits and hospital stays), assets, individual fixed effects and year fixed effects. Regressions calculated with propensity score weights. Zero values included in the regression. ** $p<0.01$,* $p<0.05$, +$p<0.1$.

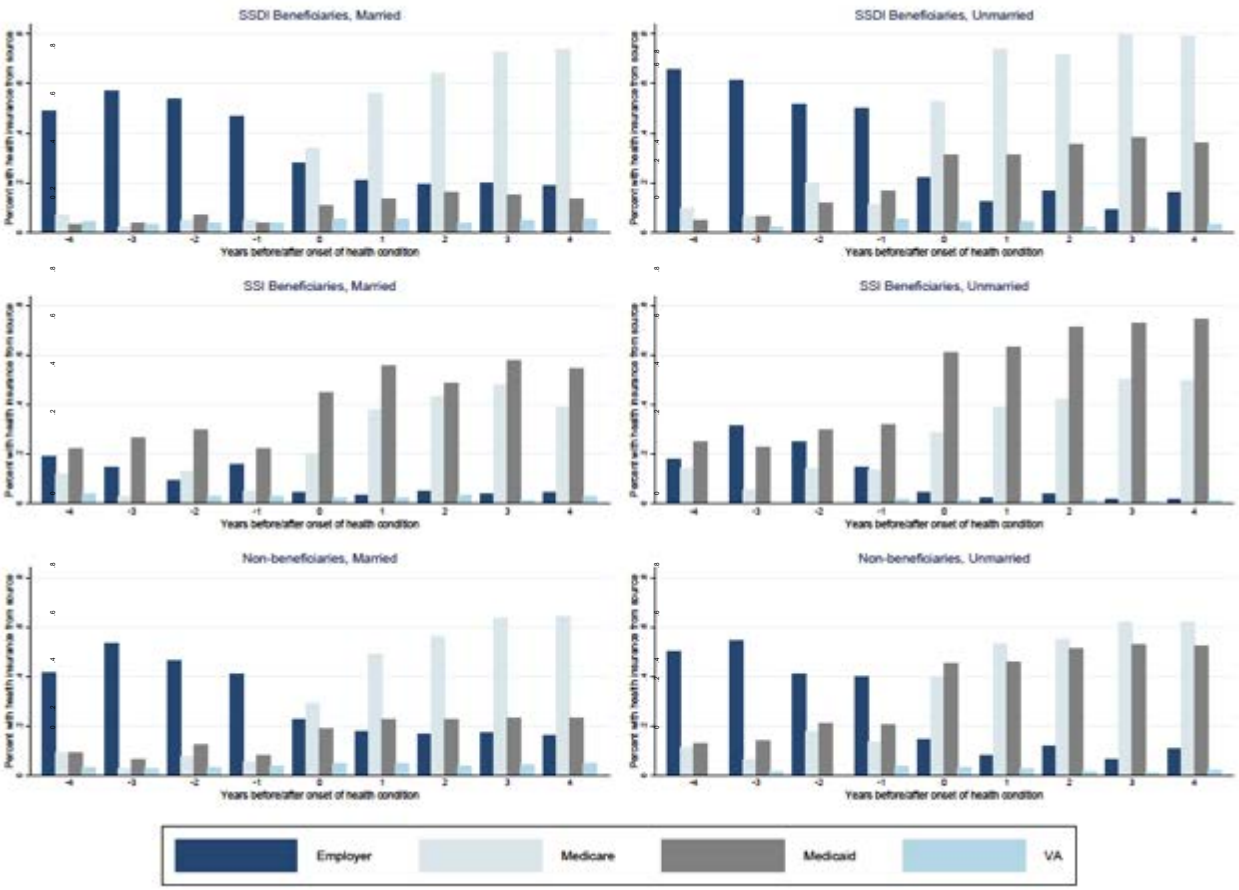
Table 6: Robustness - Transfers including additional health controls

	(1) Monetary	(2) In-Kind	(3) Any	(4) Dollars	(5) Hours	(6) Days
Panel A: All						
Disability Onset	-0.007	0.013	0.017	-120.641	-1.407	-0.385
	(0.014)	(0.014)	(0.018)	(88.019)	(1.564)	(0.329)
Onset * Benefits	0.006	0.019	0.007	152.048*	1.294	0.861
	(0.016)	(0.020)	(0.019)	(74.698)	(2.524)	(0.662)
Individuals	3,070	3,057	3,057	3,070	3,028	3,028
Mean	0.0700	0.110	0.160	197.8	5.430	1.560
Panel B: SSDI Recipients						
Disability Onset	-0.007	0.014	0.019	-121.406	-1.726	-0.424
	(0.015)	(0.015)	(0.018)	(90.201)	(1.615)	(0.344)
Onset * Benefits	0.010	0.023	0.010	201.200*	0.940	1.008
	(0.018)	(0.023)	(0.021)	(78.282)	(2.715)	(0.757)
Individuals	2,530	2,519	2,519	2,530	2,498	2,498
Mean	0.0600	0.100	0.150	190.1	4.300	1.330
Panel C: SSI Recipients						
Disability Onset	-0.011	0.015	0.018	-128.867	-1.536	-0.466
	(0.016)	(0.015)	(0.020)	(96.990)	(1.734)	(0.362)
Onset * Benefits	-0.007	0.072*	0.046	78.855	7.992*	2.519*
	(0.026)	(0.034)	(0.030)	(101.539)	(3.875)	(1.139)
Individuals	2,010	1,997	1,997	2,010	1,986	1,986
Mean	0.0700	0.120	0.170	201.9	6.190	1.660

Notes: Data from Health and Retirement Study matched to administrative SSA records, 1992-2014. Regression also controls for number of children, marital status, additional controls for health (measured by total number of reported health conditions, issues with ADLs, IADLs, as well as the standard controls for mobility, doctors' visits and hospital stays), assets, individual fixed effects and year fixed effects. Regressions calculated with propensity score weights. Intensive margin regressions include zero values. ** p<0.01, * p<0.05, + p<0.1

Appendix Figures and Tables

Figure A1: Receipt of Various Forms of Health Insurance Before and After Onset of Disability



Notes: Data from Health and Retirement Study, 1992-2014.

Table A1: Time Invariant Characteristics of Beneficiaries and Non-Beneficiaries

	Beneficiaries	Non-Beneficiaries
Age at First Interview	53.27	52.46
Female	0.58	0.57
Non-white	0.38	0.41
Years ofeducation	11.25	11.25
Ever received any family transfer	0.49	0.43*
Ever received family monetary transfer	0.25	0.23
Ever received family in-kind transfer	0.38	0.32*
Any children within 10 miles	0.71	0.71
Married at first interview	0.63	0.61
Ever received SSDI (in MBR)	0.72	0.00**
Ever received SSI (in SSR)	0.45	0.04**
N	1,954	1,139

Notes: Data from Health and Retirement Study matched to administrative SSA records, 1992-2014. Statistics calculated with propensity score weights. Stars on final column indicate p-values from a test of equality of means. ** $p<0.01$, * $p<0.05$, + $p<0.1$

Table A2: Sample Characteristics at First and Last Interview for Disability Beneficiaries, by Time of First Disability Benefit Receipt

	First interview		Last interview	
	Baseline	During survey	Baseline	During survey
Demographics				
Age	54.09	52.39	64.91	68.52
In Labor Force	0.12	0.73	0.07	0.06**
Married	0.53	0.73	0.40	0.49**
Spouse Works	0.27	0.49	0.33	0.27**
Number of Children	3.01	3.44	3.17	3.51
Health				
Health Limits Work	0.89	0.35	0.82	0.82**
Mobility problems	0.80	0.53	0.86	0.85**
Back problems	0.69	0.50	0.63	0.59**
Psych problems	0.42	0.21	0.48	0.38**
High blood pressure	0.63	0.47	0.77	0.77**
Diabetes	0.27	0.17	0.40	0.44**
Arthritis	0.61	0.48	0.75	0.80**
ADL problems	0.44	0.17	0.51	0.45**
IADL problems	0.31	0.07	0.47	0.39**
Hospitalization	0.41	0.20	0.45	0.44**
Transfers				
Monetary transfer	0.08	0.08	0.07	0.07
In-kind transfer	0.19	0.08	0.23	0.19**
Income				
Earnings (unconditional)	2,304	23,157	830	1,030**
Assets (unconditional)	61,206	120,000	84,985	140,916
UI/WC (unconditional)	0	0	58	13
Other transfers (unconditional)	76	33	1,461	1,293
N	1,010	1,010	944	944

Notes: Data from Health and Retirement Study matched to administrative SSA records, 1992-2014. Statistics calculated with propensity score weights. Stars on final column indicate p-values from a test of the difference-in-difference between the two groups of disability beneficiaries. ** $p<0.01$, * $p<0.05$, + $p<0.1$

Table A3: Time Invariant Characteristics of Disability Beneficiaries, by Time of First Disability Benefit Receipt

	During Survey	Baseline
Age	54.09	52.39
Female	0.57	0.59
Nonwhite	0.45	0.31**
Years of Education	11.14	11.37
Ever received any family transfer	0.48	0.5
Ever received any monetary transfer	0.22	0.29**
Ever received family in-kind transfer	0.4	0.36+
Any children within 10 miles	0.68	0.75**
Married at first interview	0.53	0.73**
Ever received disability benefits (in MBR)	1	1
Ever received SSDI (in MBR)	0.68	0.77**
Ever received SSI (in SSR)	0.53	0.37**
N	1,010	944

Notes: Data from Health and Retirement Study matched to administrative SSA records, 1992-2014. Statistics calculated with propensity score weights. Stars on final column indicate p-values from a test of equality of means. ** $p<0.01$, * $p<0.05$, + $p<0.1$

Table A4: The Effect of Disability and SSDI on Family Assistance: Health Sample

	(1) Monetary	(2) In-Kind	(3) Any	(4) Dollars	(5) Hours	(6) Days
Panel A: All						
Disability Onset	-0.001	0.028*	0.026+	23.507	2.620	-0.007
	(0.009)	(0.013)	(0.014)	(78.560)	(2.422)	(0.533)
Onset * Benefits	0.016+	0.030*	0.037*	67.623	4.334+	1.001**
	(0.009)	(0.013)	(0.014)	(70.309)	(2.441)	(0.377)
Individuals	6,107	6,000	6,000	6,124	6,078	6,078
Mean	0.0600	0.0800	0.120	175.1	3.550	1.040
Panel B: SSDI Recipients						
Disability Onset	0.014	0.052**	0.064**	-56.856	3.979**	0.900**
	(0.009)	(0.011)	(0.014)	(64.500)	(1.295)	(0.227)
Onset * Benefits	0.015	0.016	0.018	169.788*	-0.687	0.651*
	(0.010)	(0.013)	(0.015)	(66.474)	(1.824)	(0.296)
Individuals	2,552	2,537	2,537	2,559	2,534	2,534
Mean	0.0600	0.100	0.150	190.1	4.300	1.330
Panel C: SSI Recipients						
Disability Onset	0.005	0.049**	0.061**	-57.268	4.827**	0.726**
	(0.012)	(0.013)	(0.016)	(60.803)	(1.870)	(0.263)
Onset * Benefits	-0.006	0.043*	0.034	43.605	4.927	1.551**
	(0.015)	(0.019)	(0.021)	(79.107)	(3.320)	(0.465)
Individuals	2,030	2,013	2,013	2,037	2,019	2,019
Mean	0.0700	0.120	0.170	201.9	6.190	1.660

Notes: Data from Health and Retirement Study matched to administrative SSA records, 1992-2014. Regression also controls for number of children, marital status, health (measured by mobility, doctors visits and hospital stays), assets, individual fixed effects and year fixed effects. Health sample contains individuals who received disability benefits and a control group of individuals who have work-limiting health conditions, but did not apply for disability benefits. Regressions calculated with propensity score weights. Intensive margin regressions include zero values. ** $p<0.01$, * $p<0.05$, + $p<0.1$

Table A5: The Effect of Disability and SSDI on Income: Health Sample

	(1) UI/WC	(2) Other transfer	(3) Pension	(4) Earn	(5) Spouse Earn
Panel A: All					
Disability Onset	189**	119	1,987**	-8,865**	-60
	(71.803)	(169.204)	(370.789)	(693.828)	(913.029)
Onset * Benefits	-43	-104	-712*	-6,291**	658
	(97.256)	(183.710)	(324.106)	(754.090)	(951.032)
Individuals	6,124	6,124	6,124	5,603	4,668
Mean	332	952	2,989	13,830	19,482
Panel B: SSDI Recipients					
Disability Onset	363**	90	144	-6,912**	1,389
	(117.715)	(142.044)	(401.131)	(683.421)	(1,100.127)
Onset * Benefits	-47	349+	571+	-12,753**	-396
	(145.678)	(187.783)	(332.176)	(735.114)	(1,144.696)
Individuals	2,559	2,559	2,559	2,447	1,936
Mean	444	1,071	2,003	9,319	19,250
Panel C: SSI Recipients					
Disability Onset	216*	400**	100	-5,434**	-484
	(95.556)	(146.840)	(481.855)	(675.412)	(1,303.302)
Onset * Benefits	-208*	-502**	-1,459**	-747	5,104**
	(93.828)	(159.818)	(301.474)	(653.075)	(1,174.136)
Individuals	2,037	2,037	2,037	1,930	1,381
Mean	252	940	1,287	7,173	17,197

Notes: Data from Health and Retirement Study matched to administrative SSA records, 1992-2014. Respondent earnings data come from the SSA MEF file; all other income values come from the HRS. Respondents who did not receive the type of income listed in the column header have values of zero and are included in the regression. Regression also controls for number of children, marital status, health (measured by mobility, doctors' visits and hospital stays), assets, individual fixed effects and year fixed effects. Health sample contains individuals who received disability benefits and a control group of individuals who have work-limiting health conditions, but did not apply for disability benefits. Regressions calculated with propensity score weights. ** $p<0.01$, * $p<0.05$, + $p<0.1$

Table A6: The Effect of Disability and SSDI on Other Assistance: Health Sample

VARIABLES	(1) LTC	(2) Spouse works	(3) Homecare
Panel A: All			
Disability Onset	0.00	0.02	0.03*
	(0.008)	(0.022)	(0.014)
Onset * Benefits	-0.01	-0.02	0.04**
	(0.008)	(0.021)	(0.011)
Individuals	6,122	4,609	6,124
Mean	0.060	0.530	0.060
Panel B: SSDI Recipients			
Disability Onset	-0.01	0.02	0.00
	(0.008)	(0.020)	(0.009)
Onset * Benefits	-0.01	-0.07**	0.02*
	(0.009)	(0.022)	(0.010)
Individuals	2,557	1,896	2,559
Mean	0.060	0.520	0.080
Panel C: SSI Recipients			
Disability Onset	-0.01	0.02	0.00
	(0.008)	(0.024)	(0.009)
Onset * Benefits	-0.01+	-0.00	0.04**
	(0.007)	(0.035)	(0.012)
Individuals	2,035	1,348	2,037
Mean	0.040	0.490	0.070

Notes: Data from Health and Retirement Study matched to administrative SSA records, 1992-2014. Regression also controls for number of children, marital status, health (measured by mobility, doctors' visits and hospital stays), assets, individual fixed effects and year fixed effects. Health sample contains individuals who received disability benefits and a control group of individuals who have work-limiting health conditions, but did not apply for disability benefits. Regressions calculated with propensity score weights. ** $p<0.01$, * $p<0.05$, + $p<0.1$

Table A7: The Effect of Parent Disability on Child Outcomes: Health Sample

VARIABLES	(1) Paid for transfer	(2) Full time work	(3) Part time work
		Panel A: All	
Disability Onset	0.00	-0.00	0.00
	(0.003)	(0.015)	(0.016)
Onset * Benefits	0.01+	0.00	0.01
	(0.003)	(0.013)	(0.015)
Individuals	6,000	6,124	6,124
Mean	0.0100	0.830	0.230
		Panel B: SSDI Beneficiaries	
Disability Onset	0.00	0.01	0.01
	(0.002)	(0.013)	(0.017)
Onset * Benefits	-0.00	0.00	-0.01
	(0.003)	(0.013)	(0.017)
Individuals	2,537	2,559	2,559
Mean	0.0100	0.810	0.220
		Panel C: SSI Beneficiaries	
Disability Onset	-0.00	-0.01	-0.02
	(0.004)	(0.016)	(0.019)
Onset * Benefits	0.02**	0.02	0.03
	(0.006)	(0.019)	(0.022)
Individuals	2,013	2,037	2,037
Mean	0.0100	0.780	0.240

Notes: Data from Health and Retirement Study matched to administrative SSA records, 1992-2014. Regression also controls for number of children, marital status, health (measured by mobility, doctors' visits and hospital stays), assets, individual fixed effects and year fixed effects. Health sample contains individuals who received disability benefits and a control group of individuals who have work-limiting health conditions, but did not apply for disability benefits. Regressions calculated with propensity score weights. ** $p<0.01$, * $p<0.05$, + $p<0.1$

Table A8: The Effect of Parent Disability on Child Outcomes - Additional Health Controls

VARIABLES	(1) Paid for transfer	(2) Full time work	(3) Part time work
		Panel A: All	
Disability Onset	0.00	-0.01	0.02
	(0.003)	(0.022)	(0.027)
Onset * Benefits	0.00	0.03	0.01
	(0.003)	(0.028)	(0.029)
Individuals	3,064	3,084	3,084
Mean	0.010	0.790	0.230
		Panel B: SSDI Beneficiaries	
Disability Onset	0.00	-0.01	0.02
	(0.003)	(0.023)	(0.028)
Onset * Benefits	-0.00	0.03	0.01
	(0.003)	(0.031)	(0.032)
Individuals	2,525	2,543	2,543
Mean	0.010	0.810	0.220
		Panel C: SSI Beneficiaries	
Disability Onset	0.00	-0.01	0.01
	(0.004)	(0.024)	(0.030)
Onset * Benefits	0.01*	0.07	0.04
	(0.004)	(0.045)	(0.048)
Individuals	2,001	2,021	2,021
Mean	0.010	0.780	0.240

Notes: Data from Health and Retirement Study matched to administrative SSA records, 1992-2014. Regression also controls for number of children, marital status, health (measured by mobility problems, doctors' visits and hospital stays), assets, individual fixed effects and year fixed effects. Regressions calculated with propensity score weights. Zero values included in the regression. ** p<0.01, * p<0.05, + p<0.1.

Table A9: Heterogeneity - Transfers

	(1) Monetary	(2) In-Kind	(3) Any	(4) Dollars	(5) Hours	(6) Days
Panel A: Child lives within 10 miles						
Dis Onset	0.009	0.029+	0.049**	-148.170+	0.909	0.403
	(0.014)	(0.015)	(0.019)	(76.040)	(0.995)	(0.304)
Onset * Benefits	0.007	0.049+	0.037	227.857**	1.741	0.841
	(0.017)	(0.027)	(0.025)	(85.111)	(2.174)	(0.538)
Individuals	2,271	2,271	2,271	2,271	2,270	2,270
Mean	0.0800	0.140	0.200	246.2	7.460	1.910
Panel B: No child within 10 Miles						
Dis Onset	0.009	0.060*	0.060+	3.438	0.965	0.212
	(0.013)	(0.027)	(0.031)	(75.184)	(1.140)	(0.254)
Onset * Benefits	-0.006	-0.014	-0.018	28.842	1.917	0.502
	(0.016)	(0.020)	(0.025)	(103.606)	(1.516)	(0.338)
Individuals	880	880	880	880	851	851
Mean	0.0400	0.0700	0.100	164.9	3.300	1.060
Panel C: Respondent ever married						
Dis Onsets	0.006	0.025+	0.038*	-51.202	0.878	0.312+
	(0.011)	(0.014)	(0.016)	(37.135)	(0.683)	(0.165)
Onset * Benefits	0.006	0.050*	0.036	200.451**	3.006	1.196*
	(0.016)	(0.025)	(0.022)	(75.436)	(2.001)	(0.474)
Individuals	2,270	2,270	2,270	2,270	2,260	2,260
Mean	0.0600	0.100	0.150	223.5	4.810	1.260
Panel D: Respondent never married						
Dis Onset	0.021	0.066*	0.093*	-347.134	1.458	0.622
	(0.033)	(0.032)	(0.044)	(252.649)	(3.569)	(1.090)
Onset * Benefits	-0.010	-0.025	-0.017	163.638	-2.647	-0.565
	(0.030)	(0.033)	(0.037)	(197.855)	(4.196)	(1.039)
Individuals	881	881	881	881	861	861
Mean	0.0900	0.190	0.250	235.9	12.82	3.370

Panel E: High severity at baseline (≥ 5 conditions reported)

Dis Onset	0.000	0.071**	0.072**	-139.199	1.374	0.720
	(0.016)	(0.021)	(0.025)	(98.779)	(1.903)	(0.580)
Onset * Benefits	0.020	0.048	0.053	166.472+	0.342	0.756
	(0.016)	(0.032)	(0.033)	(94.592)	(2.488)	(0.599)
Individuals	1,721	1,721	1,721	1,721	1,700	1,700
Mean	0.0800	0.170	0.220	213.9	8.740	2.390

Panel F: Low severity at baseline (< 5 conditions reported)

Dis Onset	0.035*	-0.026*	0.014	-26.830	-0.572	-0.218
	(0.016)	(0.012)	(0.018)	(63.473)	(1.008)	(0.246)
Onset * Benefits	-0.012	0.017	-0.006	248.583*	3.179	0.841
	(0.023)	(0.029)	(0.017)	(112.256)	(2.623)	(0.673)
Individuals	1,430	1,430	1,430	1,430	1,421	1,421
Mean	0.0600	0.0800	0.130	238.6	4.490	1.090

Notes: Data from Health and Retirement Study matched to administrative SSA records, 1992-2014. Respondents who did not receive the type of income listed in the column header have values of zero and are included in the regression. Regression also controls for number of children, marital status, health (measured by mobility, doctors' visits and hospital stays), assets, individual fixed effects and year fixed effects. Regressions calculated with propensity score weights. ** p<0.01, * p<0.05, + p<0.1.