DISABLED WOMEN AND THEIR ECONOMIC WELL-BEING[1]

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September 15, 2014

Abstract

We study the economic effects of disability on women using 44 years of data from the Panel Study of Income Dynamics. We begin by documenting the trends in point-in-time disability rates of women as well as estimating the prevalence of disability over a woman's lifetime. We find that women are more likely than men to have experienced disability byt a given age in the first half of their working years, but are less likely to have experienced a serious disability prior to retirement. The onset of disability for women is also found to be associated with a fall in labor supply, family income and consumption. The fall varies with the degree of disability but tends to be smaller than that of disabled men. We also find mixed evidence on the labor supply response of husbands to their wives' disability. Disability of a woman is also found to be associated with higher divorce rates thatdepend on the nature of the disability. Cross-sectional differences in time use suggest that, relative to their non-disabled counterparts, disabled women, as well as their husbands do not engage more in home production, but spousal caring comes in the form of more time being spent doing activities together.

KEYWORDS: Disability, Gender Differences, Income, Consumption, Time-use

[1]This research was supported by the U.S. Social Security Administration through grant #1 DRC12000002-02-00 to the National Bureau of Economic Research as part of the SSA Disability Research Consortium. The findings and conclusions expressed are solely those of the authors and do not represent the views of SSA, any agency of the Federal Government, or the NBER. We thank Nayoung Lee, Hans Van Kippersluis and Yin-Chi Wang for helpful conversations.

1. Introduction

There is a common view that rising disability insurance rolls are an alarming policy and budgetary issue (Autor and Duggan, 2006). The policy concerns stem in part from the many studies that have investigated the moral hazard problems of disability insurance (Parsons, 1980; Autor and Duggan, 2002; von Wachter et al., 2011; Maestas et al., 2013). Yet a balanced assessment of the current disability insurance system requires an understanding of its benefits as well. However, research on the economic consequences of disability is less developed and has tended to focus on men. For example, Stephens (2001), Charles (2003), and Meyer and Mok (2014) examine only male household heads. This focus has occurred despite a rising share of the disabled who are women. According to the 2013 edition of the Annual Statistical Supplement to the Social Security Bulletin, the number of women receiving Social Security Disability Insurance (SSDI) in December of 2011 was about 4.08 million (excluding the children and spouses of disabled workers), a 76% increase relative to a decade earlier and a larger increase than for men (52%). In fact, there is a stronger case that disability rolls are inexplicably higher than in the past for women than for men (Liebman 2014). Older data from the Survey of Income and Program Participation (SIPP) show that among the disabled in the sample, 53% are women and this higher disability rate is observed across virtually all race groups (McNeil, 1997). The same study also shows that disabled women are less likely to work than disabled men and, among those who are working, disabled women have lower earnings than disabled men.[2] Given that women have relatively lower earnings than men and the that SSDI benefits depend on past earnings, knowledge of whether the present system sufficiently guarantees a disabled woman's well-being is of vital importance to the design of the disability insurance system. Other work has shown that the nature and consequences of income loss differs between the genders (Weiss and Willis, 1997; Singleton, 2012). Maybe not surprisingly, disabled women are more likely to be living in poverty and rely more on means-tested public transfer than their male counterparts.[4,5]

[2] Specifically, among women with non-severe and severe disabilities, 68.4% and 24.7% of them were working, respectively. For men, these rates are 85.1% and 27.8%, respectively. Care is needed in interpreting these numbers owing to gender differences in the labor supply, even in the absence of disability.

[4] The poverty rates for women with non-severe and severe disabilities are 33.8% and 40.5%, respectively, and 24.2% and 31.2%, respectively, for men (US Census Bureau, 1993).

Furthermore, most of the existing evidence on women is based on cross-section evidence or short panels.

The purpose of this study is to fill this gap in the literature by providing multi-faceted evidence on how disability affects the well-being of women over time, using longitudinal data from the Panel Study of Income Dynamics (PSID) and other sources. We have several objectives: First, we study how point-in-time disability rates have evolved for women since 1980, as their labor market attachment as increased. Furthermore, we study the differences in lifetime disability prevalence between men and women. Second, following Meyer and Mok (2014), we examine how a woman's disability affects her economic well-being over time as well as that of other household members. We measure well-being with a broadset of outcome variables, including earnings, family income, food and housing consumption, and time-use. We compare how changes in most of these economic outcomes differ from those of disabled men. Third, we study how other insurance mechanisms, such as spousal labor supply and marriage, change following the onset of a married woman's disability. Fourth, we look at time-use data and study the differences in time-use patterns between disabled and non-disabled women and examine the patterns of spousal caregiving.

Our present study differs significantly from the limited existing studies of disabled women. First, understanding that disability is often long term and persistent, though not always, a long panel data permits a better view of how disability affects individuals. Here, we employ the entire PSID panel data which covers a period of over 40 years. Second, understanding changes in the economic well-being of disabled women requires an examination of a large set of outcomes besides earnings and income. Our study looks additional outcomes including consumption, changes in wealth, and non-pecuniary measures such as time use and marriage stability. Third, we account for the underlying differences between female heads and wives, given the former group of women is often economically deprived (Meyer and Sullivan, 2003).

[5] US Census Bureau (1997) shows that, among women with work disabilities, 25.6%, 29.1%, and 36.2% receive Social Security, Food Stamps and Medicaid, respectively. For men with work disability, these rates are 30.6%, 19.8%, and 27.2%, respectively.

This study has several key findings. Disability affects women very differently from men. Women are more likely to experience disability than men in their early working years, but the rates are similar at later working ages. A woman reaching the age of 60 has a 62% chance of ever experiencing a disability and a 19% chance that the experience will be of a serious form, characterized by the permanence and severity of the limitation. However, these rates are lower than those for men. While disabled women suffer a fall in key economic outcomes, including earnings, family income, and consumption following the onset of a disability, the fall depends on the nature of the disability and is on average smaller than for men. We find that by the tenth year after disability onset, an average disabled woman is estimated to suffer from a 25 percent drop in earnings, but only a 6 percent drop in after-tax income and a 4 percent drop in food and housing consumption. Women suffering from a Chronic and Severe disability are estimated to experience an 82 percent drop in earnings, a 20 percent drop in after-tax income, and a 10 percent drop in food and housing consumption. In terms of spousal responses to disability, consistent with theory, we find very few significant changes in the labor supply of husbands of disabled women, even among families with seriously disabled wives. Nevertheless, we do find that a wife's disability increases the probability of divorce, but such an effect varies with the extent of her disability. This finding contrasts sharply with the results of existing studies that do not find any relationship between disability and divorce, or find that such an effect diminishes quickly after disability onset. Our results on time-use do not suggest more time spent on home production for either spouse, but the husbands of disabled wives decrease working hours and spend the extra time with their disabled wives in a variety of activities, mostly watching TV.

The rest of the paper is organized as follows: Section 2 describes the data and the methodology. Section 3 discusses the prevalence of disability from a lifetime perspective. Section 4 examines the changes in a wide range of economic outcomes for households with a disabled woman. Section 5 investigates the effect a wife's disability has on the stability of her marriage. Section 6 studies the time-use patterns of disabled women and their husbands and Section 7 concludes the paper.

2. Data and Methodology

Our primary source of data is the PSID, a longitudinal dataset launched in 1968, with an initial sample of about 4,800 US households and 18,000 individuals. The survey has conducted interviews annually since 1968 and bi-annually since 1997. Split-offs, such as divorcees or children forming their own family, are followed and interviewed. Besides demographic information, the survey provides comprehensive data on transfer program receipt, earnings, income, food, and housing consumption. The longitudinal nature of these data allow an investigator to track economic outcomes for an individual over a long period of time. As of the 2011 wave, data from 73,251 individuals had been collected.

In this study we use the entire PSID panel, covering 1968–2011. However, the PSID survey does not collect the same information from every individual and the questionnaire changes from time to time. In particular, the survey initially focused on the family head, normally defined as the principal male family member, and only later treated female spouses in a parallel fashion. Because of this restriction, we must focus on female household heads and wives, but we find that these two groups constitute the vast majority of adult women. How such a data structure affects our sampling frame is discussed below.

Defining Disability and Disability Rates

The key question we use to determine an individual's disability status is: "*Do you have any physical or nervous condition that limits the type or amount of work you can do?"* While the use of such a self-reported response is controversial in disability studies, we have no good alternative in the PSID.[7] After determining the presence of a work-limiting condition, the interviewer asks a severity question to determine the extent to which this condition limits the

[7] See the discussion in Meyer and Mok (2014). Past work that argue self-reported disability/health indicators are endogenous includes Baker et al. (2004), Kreider (1999), Kreider and Pepper (2007). Studies that argue self-reported indicators are close to exogenous include Stern (1989), Dwyer and Mitchell (1999), Benítez-Silva et al. (2004). Campolieti (2002) finds that using self-reported disability carries a "downward bias" relative to a case of instrumenting disability with health measures in a labor force participation framework.

individual's work capability.[8] We follow the same strategy as Meyer and Mok (2014) and group the responses to the severity question into two categories: "*Severely Disabled*" (for those who respond "*can do nothing*," "*completely*," "*a lot*," or "*severely*" in these severity questions) and "*Not Severely Disabled*" (for those who respond "*just a little*," "*somewhat*," "*not limiting*," or "*not at all*" in these severity questions).

Such disability questions were asked of the family head fairly consistently in the survey. However, wives were asked these questions only in 1976 and in the 1981–2011 waves of the survey. Given such a data structure, we focus on two groups of women: female household heads and married women. These two groups of women constitute about 80% of all women ages 22-61 in the United States, and usually a slightly higher percentage of all disabled women in the same age range. Hence, we view these two groups as providing a good approximation to the patterns for all women in the United States.[9]

Table 1 shows the weighted disability rates for current female heads and wives ages 18–61 during the PSID survey period 1968–2011. These rates are high and are a few percentage points higher than those found for male household heads (Meyer and Mok, 2014). Although this female disability rate has gone up from 12.8% in 1981 to 14.3% in 2011, the disability rate has fluctuated quite a bit in this period. We also observe that female heads are more likely to suffer from work limitations than wives, with an average difference of about 5 percent points in the 1980s, 4 percent points in the 1990s and about 7 percent points in the recent decade. Regarding the fraction of disabled women reporting a severe work limitation, it should first be noted that the severity question changed, beginning in 1986, asking about limits to "work you can do" instead of about any limits (see page 15 of the online appendices of Meyer and Mok, 2014); so the question is more restrictive in defining a severe disability. Not surprisingly, this change had the effect of decreasing the share of disabled women recorded as severely disabled between 1985 and 1986. However, since 1988, there seems to be a noticeable upward trend in the share of

[8] Meyer and Mok (2014) have shown that the response to such a question has a high correlation with the individual's tolerance of various physical and health limitations.

[9] Using the Current Population Survey (CPS) Annual Demographic File/Annual Social and Economic Supplement (ASEC), we find that female household heads and wives of householders comprise about 85% of women aged 18–61 years during 1989–2012. The rest are women who live with their parents or siblings (who are their householders) or other related and unrelated householders (such as friends).

women reporting a severe work limitation and this is more apparent for female household heads than for wives.

One might be concerned that what limitations are characterized as *severely disabled* is different for men and women, which would cast doubt on the possibility of comparing their as is done in some subsequent sections of this study. There are two points worth noting. First, questions about wives are usually answered by their husbands in the PSID, unless they are incapacitated, although for female-headed households, these questions are answered by the female heads themselves. Second, the 1986 and 1999–2011 waves of the PSID also asked questions about limitations in several physical activities (such as walking, bathing) and doctor-diagnosed health problems. We have examined the gender differences in these indicators for those with no current disability, those whose disability is not severe, and those whose disability is severe. In general, we find no large differences between the genders in the association between disability and these physical limitations or diagnosed health problems and consider the interpretation of these disability questions to be similar between the two genders.

Sample Construction

The principal strength of the PSID is its longitudinal nature, but since it is an unbalanced panel, we impose a number of restrictions similar to those of Meyer and Mok (2013) to ensure sufficient information for each individual for the major part of our analysis. First, we require that the individual be a head or wife for at least six surveys overall, four of which must be consecutive, with the individual in the age range of 22–61 years. Second, we delete those individuals with missing key demographic information (race, marital status, age, or education).[10] Third, since the goal of our paper is the dynamics of disability, knowledge of when an individual became disabled is quintessential. Determining the year of limitation onset for the disabled sample requires combining information from multiple years of data. A valuable feature of the PSID available only for heads in the 1969–1975 and 1978 waves is a retrospective question on

[10] To the extent possible, we impute the missing values of key demographic variables using the nearest available wave of data.

when a work limitation began. For those female heads disabled on or before 1978, we use the responses to this question to determine their year of disability onset.[11] We require that individuals who first reported having a disability after 1978 report no limitations in the two consecutive survey years immediately prior to the year in which they first reported having a work limitation.[12] Our focus is on disabilities that begin during the working years; accordingly, we exclude those whose onset age was under 18 years or above 56 years.[13] To obtain sufficient information after onset, we require that a disabled individual in our sample take part in the survey for a minimum of three years during the ten years after disability onset. This restriction is important to determine disability persistence and severity groups (introduced below). Due to the restrictions that we impose in selecting our sample, we slightly understate the extent of work limitations, as discussed further below. The application of these restrictions results in a primary sample of 6,963 women, 2,016 (29%) of whom are classified as ever having been disabled.

Classifying Disability

Meyer and Mok (2014) point out that treating the disabled as a single group could be misleading and disaggregation based on the permanence and severity of disability reveals substantial heterogeneity responses. We also follow this approach in this paper. The *One-Time Disabled* are those who reported a disability once but did not report a disability again during the next ten years. The *temporarily disabled* are those who had one or two positive limitation reports within the ten years after disability onset. Thus, including the onset report, a temporarily disabled individual will have at most three positive limitation reports through the tenth year after onset. The *Chronically Disabled* are those who had three or more positive limitation reports during the ten years after disability onset.

[11] Some individuals may have more than one response due to the panel nature of the data. Since the responses to these questions were coded in intervals (except in the 1978 survey, when the exact number of years is given), we determine the intersection of the intervals given by these questions and take the earliest year within the intersection as the year of disability onset, similar to Meyer and Mok (2014).

[12] For example, if an individual first reports having a limitation in 1983, then the year of onset would be 1983 if the individual had no limitations in 1981 and 1982. Since there is only one interview per year, we also choose the year of onset to be the year including the midpoint in time of adjacent interviews.

[13] Our main estimation sample includes the person-year observations prior to disability onset for those who became first disabled after age 56 as they form part of the implicit comparison group for the disabled.

Since the severity questions were asked nearly every year, thereby providing us multiple reports, we rely on average severity throughout the paper. Specifically, we define the *severity ratio* as the fraction of time the individual reports she is *Severely Disabled* in the year of onset and the subsequent ten years after onset.[14]

We combine the two disability dimensions in our main analyses by splitting the *Chronically Disabled* into two groups. Hence, this classification yields four groups of interest – *One-time, Temporary, Chronic-Not Severe* (with a severity ratio under 0.5) and *Chronic-Severe* (with a severity ratio over 0.5) which we collectively call the *Extent of Disability groups*.[15] Based on the first observed disability string, 589 (29%) of them are classified as *One-Time*, 518 (26%) as *Temporary*, 605 (30%) as *Chronic-Not Severe*, and 304 (15%) as *Chronic-Severe*. Much of our analysis focuses on the *Chronic-Severe* group, because this group performs unusually poorly. Using the SIPP and Detailed Earnings Records of the Social Security Administration, Singleton (2014) has also shown that the disabled with self-reported *Work-Preventing* limitations do not experience a rebound in their earnings, even if their SSDI application was rejected.[16] This suggests that their disability is real and serious. If a simple definition of self-reported disability is too wide and a program-based definition of disability is too narrow, then focusing on this self-reported *Chronic–Severe* group could be a good alternative.[17]

Table 2 provides descriptive statistics for our sample. On average, the disabled are about four years older than the non-disabled, less likely to be white, and less likely to be married but have participated in more waves of the survey. Among the disabled, the *Chronic–Severe* group

[14] Individuals who never responded to the severity question in this 11-year period (year of onset and the subsequent 10 years) are dropped from the main analyses.

[15] In the case where exactly half of the responses indicate severe disability (a severity ratio of 0.5), we classify the disabled head based on the first severity report. Of the disabled women, 131 have a severity ratio of 0.5. Of the 304 chronically disabled women, only 26 have a severity ratio of 0.5.

[16] Although we stop short of declaring that our *Chronic-Severe* group and the *Work Preventing* group in Singleton's study are the same, we expect there to be a large overlap of these two groups.

[17] Many authors argue that using a self-reported definition of disability in estimating the effect of health on labor supply would suffer from justification bias (which would overstate the estimated effect) and attenuation bias (which would bias the effect towards zero) but that these two biases may cancel each other out (Bound, 1991). The evidence of Singleton (2014) seems to suggest that the justification bias is small for the worst self-reported group. It may be plausible that those who report severely disability are aware of their physical and health limitations (see the previous discussion on the number of objective health indicators versus self-reported disability severity), thus the two biases may offset each other for this group.

is generally older on average, much less likely to be white, and much less likely to be married. Nevertheless, the four disabled groups have on average participated in a similar number of interviews, though the two chronic groups have responded more often since the year of disability onset.

Methodology

Following past studies of outcomes with longitudinal data, we follow the popular event-study approach and estimate individual fixed effect regressions of two forms:

$$(1) \quad y_{it} = \alpha_i + \gamma_t + X_{it}\beta + \sum_g \sum_k \delta_k^g A_{kit}^g + \varepsilon_{it},$$

$$(2) \quad y_{it} = \exp(\alpha_i' + \gamma_t' + X_{it}\beta' + \sum_g \sum_k \delta_k'^g A_{kit}^g + \varepsilon_{it}').$$

Model (1) is a standard linear regression with individual fixed effects, while model (2) is a Poisson model with individual fixed effects. Which model we use for each outcome is explained below. The variable y_{it} is an outcome of interest for person or family i in year t (such as family food and housing consumption); α_i (α_i') is an individual fixed effect and γ_t (γ_t') is an indicator variable for year t; and X_{it} is a set of time-varying explanatory variables, including marital status, state of residence, age and age squared, education, and the number of children. The interactions of these variables may be included, depending on the dependent variable (see the data appendix for more details). To account for the underlying life-cycle differences between the two groups of women, we include age and age-squared interacted with an indicator variable for a woman who is classified as a female head.[18] The term A_{kit}^g is an indicator variable that equals one if, in year t, a disabled individual i belonging to disability group g is k years from the

[18] We classify a non-disabled woman as a female head if we observe her to be a female head for at least half of the time in the PSID survey during which she was age 22-61. For the disabled, we look at the fraction of years in the five years from onset when the woman was head. The disabled woman is classified as head if the fraction is at least 0.5.

year of disability onset and ε_{it} ($\varepsilon_{it'}$) is a potentially serially correlated error term. Our coefficients of interest are δ_k^g (δ'^g_k), measuring the change in the dependent variable during the *k*-th year from disability onset for a disabled individual belonging to disability group *g,* relative to herself in the baseline period (taken here as the time before the fifth year before the onset of her disability). The inclusion of individual fixed effects removes all time-constant unobservables of the person or family. Our analysis below looks at the disabled on both an aggregated and disaggregated basis. We estimate (1) whenever we are interested in how disability affects the *level* of a dependent variable, while we estimate (2) when we want to study how disability affects the *percentage change* in the dependent variable.[19] Although it is popular to estimate a log-linear version of model (1) when studying the percentage changes of an outcome, a Poisson model would be better if the dependent variable has a value of zero for many observations (which makes it difficult to take logarithms), such as the case of annual earnings, when many women are not working.

In our analysis, all monetary values are reported in 2012 dollars, adjusting for inflation using the Consumer Price Index Research Series Using Current Methods (CPI-U-RS).

3. Lifetime Disability Prevalence of Women

While most research provides the percentage of women who are disabled (based on a point-in-time self-report or program-based definitions), a more important statistic for the notion of insurance is the lifetime prevalence of disability (i.e., the probability of *having had* a prolonged disability any time prior to a given age). The PSID, with its longitudinal structure and long history, is ideal for this purpose.

Ideally we would like to capture this measure over a person's lifetime, but with the unbalanced nature of the PSID, it is important to use only individuals who have had a long enough time period in the sample so that the experience we are recording is approximately their lifetime probability of ever having had the various types of disability, some of which are long

[19] The percentage change is obtained by exponentiation of the estimated coefficient and subtracting one.

term. To do so, we focus on the sample of female household heads and wives in 1984–1994 who responded to the disability questions at least 10 times already.[20] We choose 1994 as the last year in this period so we have sufficient information to classify the disability group for a woman whose disability started that year. We also account for the potential worsening of a condition and changes in disability group classification, with *Chronic–Severe* as the most serious form of disability.

Table 3 shows these lifetime disability prevalence rates. In theory, these rates should be monotonic with age, but they are not so here because of the unbalanced nature of the PSID panel. By the time a woman reaches the age of 30, she is estimated as having a 25.6% chance of ever getting a disability, though the chance of ever suffering from a *Chronic–Severe* disability is less than 1%. As she ages, the lifetime disability prevalence increases. By the time she reaches 40 years of age, there is a 31% chance of her ever suffering from disability, with a 4% chance of a *Chronic–Severe* disability. These rates increase rapidly as the woman enters her 50s. By the time she reaches 60 years of age, there is a 62% chance that she will ever suffer from disability during her working years, with a 19% chance of a *Chronic–Severe* disability ever being experienced. As shown below, the *Chronic–Severe* group experiences much worse outcomes than the average disabled. Coupled with the fact that there is a 19% chance of such an experience for a women in her working years, one should not think of such group as merely consisting of outliers.

It is also of interest to compare these lifetime disability prevalence rates with those of men shown in Meyer and Mok (2014). For ease of comparison, Figure 1 shows the lifetime disability prevalence rates (any and chronic–severe) for men and women. We see that the probability of having had a disability (any type) is generally higher for women than for men before reaching the mid-forties age range. The pattern is slightly reversed afterward: By 60 years of age, the probability of ever having a disability is very similar between men and women. Regarding the prevalence of a *Chronic–Severe* disability, the rates are somewhat similar between men and women prior to reaching 48 years of age but, from then on, we observe a relatively

[20] Specifically, we select these women in the 1984–1994 period from the person–year data format. For a person–year observation in this subsample, we further require the individual to have 10 or more years of disability information by this year.

rapid increase in the chance of men ever experiencing a *Chronic-Severe* disability. By age 60, a male household head is estimated to have a 21% probability of ever experiencing a *Chronic–Severe* disability sometime in his life, while it is 19% for our female sample. These numbers provide alternative evidence that the higher point-in-time disability rates observed for women using cross-sectional data may not reveal the entire picture.

4. Effect of Women's Disability on Economic Outcomes and Comparison with Men

Hours of Work, Work, and Earnings

One of the goals of this study is to examine the dynamics of disability of women. We first examine how disability affects a woman's labor supply in terms of annual hours worked. Estimating (1) using annual hours of work as the dependent variable and treating the disabled as a single group yields the results shown in column 1 of Table 4. In the year of disability onset, it is estimated that annual hours of work drops by about 160 on average (relative to the years before the fifth year prior onset) and this drop continues through ten years after onset, when the drop is estimated to be about 300 hours. In terms of labor supply at the extensive margin, we examine the raw fraction of women not working in a given year (defined as working zero hours in the year). Column 2 of Table 4 shows that on average there is about a 10 percentage point increase in the fraction of women not working over the 11-year period from onset to ten years after.

Turning our attention toward these results after disaggregating the disabled, we report in columns 1 and 2 of Table 5 the changes in the hours of work and the raw fraction not working only for the most disabled group, the *Chronic-Severe* group.[21] We plot these changes for all disability groups along with the average disabled in Figures 2 and 3 for ease of comparison. For the *Chronic-Severe* group, annual hours of work are estimated to drop by a massive 425 hours by the year of disability onset. By the tenth year after onset, the estimated drop has more than

[21] Detailed results for the other disability groups are available from the authors upon request.

doubled, reaching an estimated 1,126 hours with more than three-quarters of such disabled not working. One can see the sharp difference in the figures, where the drop in the annual hours of work for the *Chronic-Severe* group by the tenth year after onset is almost quadruple that of the average disabled and triple that of the lesser disabled *Chronic-Not Severe* group. For the *One-Time* and *Temporary* groups, the drops are relatively small, as one would expect, given their mild disability and possible fast recovery.

In terms of annual earnings, we estimate model (2) and column 3 of Table 4 shows the estimated changes for the average disabled while the corresponding results for the *Chronic-Severe* group are reported in column 3 of Table 5. These results are illustrated in Figure 4. The average disabled is estimated to suffer a 12 percent decline in annual earnings by the year of onset, and the drop accelerates to 23 percent by the fifth year after disability onset, and stays around this level for the next 5 years. An examination of the results suggests that most of this drop is attributed to the *Chronic-Severe* group, with an estimated drop of about 40 percent by the year of onset and a massive drop of 82 percent by the tenth year after onset. One should not be surprised by this result, since more than three-quarters of the disabled in the *Chronic-Severe* group are not working, but one should also note that treating the disabled as a single group, as done in many past studies, could be misleading. This is an especially important consideration for any future research on the disabled using survey data.

We also note a modest drop in earnings for the *Chronic-Severe* group before the year of onset. This is somewhat observed in many studies employing an event-study framework (Singleton, 2012; Meyer and Mok, 2014). A plausible explanation is that the disability shock could hit the individual prior to her first declaration of disability, which is likely to be a function of many factors, such as the degree of pain and the associated level of stigma.[22,23] It may therefore be preferable to focus on the years around onset rather than its exact point in time when interpreting these results.

[22] For example, the individual may first experience a modest level of pain that distracts her at work, but not enough for her to declare that she is work limited. Since the PSID interviews are mostly answered by the family head, the wife's disability may not be noticed until he is told about it or the disability becomes observable to him.
[23] The yearly format of the survey (a biannual format in recent years) can also result in a systematic overstatement of the year of disability onset.

Comparing these results with those of male household heads (Meyer and Mok, 2014), we find the decline in annual work hours for disabled women as a whole is somewhat smaller. The drop for disabled women is on average about 80 percent of that of disabled men. The increase in non-work after disability onset is quite similar between the two genders, at 10 percentage points. The earnings decline is also very similar, at 10–12 percent by the year of onset and 22–25 percent by the tenth year after onset. However, some notable patterns emerge as we switch our focus on the various disability groups, especially the *Chronic-Severe*. Disabled men in this category suffer from a much larger drop in annual hours of work (about 300 hours more) than their female counterparts, which is mostly attributed to the larger increase in non-work for these men. The fraction of these disabled men working zero hours roughly quadruples, from 16 percent by the year of onset to 66 percent by the tenth year after onset. For the *Chronic-Severe* disabled women though, this fraction has about doubles, from about 35 percent to 78 percent. In terms of the earnings drop, both men and women in this disability category experience similar magnitudes, namely, 37–40 percent by the year of onset and 76–82 percent by the tenth year after onset.

Income and Poverty

While the drop in earnings for the disabled is large, whether it translates to a large decline in material well-being for the individual requires an examination of other non-labor sources of income, especially public benefits and social insurance. Other private mechanisms, such as spousal earnings (to be discussed below) and private insurance benefits, may also be important in mitigating the decline in material well-being associated with the drop in earnings due to disability. We estimate (2) again with two measures of family income: after-tax income prior to transfers and after-tax income with transfers. The former measure looks at only how private arrangements help in terms of cushioning the drop in earnings, while the latter measure includes

many public transfer benefits accounted for the underreporting of these benefits.[24] Taxes are estimated using TAXSIM.

The results for the disabled as a whole are reported in columns 4 and 5 in Table 4, while the results for the *Chronic-Severe* group are shown in the corresponding columns in Table 5. For ease of comparison, the results for all the groups and the average disabled are plotted in Figure 5. For the average disabled, the drop in income is around zero by the year of onset, but it is estimated to accelerate over the course of disability. As earnings continue to drop for the average disabled, after-tax income prior to transfers is estimated to drop by 7.4 percent by the year after onset, while the drop is less than 4 percent when public transfers are included. In the tenth year from onset, after-tax income without and with public transfers is estimated to drop by 10 percent and 6 percent respectively. Relative to the drop in earnings, private arrangements diminish the drop by 60 percent and, coupled with public transfers (changes presented in Figure 6), more than three-quarters of the drop in material well-being (measured by earnings alone) is cushioned.

Looking at the figures, we again observe substantial differences across the disability groups and the drop in income for the average disabled is again mostly due to the *Chronic-Severe* group. By the year of onset, the *Chronic-Severe* are estimated to experience a drop of 17 percent of their family income before accounting for public transfers. The inclusion of public transfers reduces the drop to only 13 percent. The role of private and public transfers becomes increasingly significant over time. By the tenth year after onset, after-tax income prior to transfers is estimated to drop by about 38 percent, but accounting for public transfers reduces this to 20 percent. Figure 7 shows the changes in public transfer receipts over the course of disability, obtained by estimating (1) with amount of public transfer received as the dependent variable. Indeed, for the *Chronic-Severe*, the amount of public transfers received is estimated to quintuple, from about $1,000 annually in the years prior to onset, increasing to about $5,500 annually in the two years after onset, and further increasing to about $8,000 per year by the 6-10 years after disability onset.

[24] These public transfer benefits include AFDC/TANF, Food Stamps/SNAP, Veterans Benefits, Social Security, Supplemental Security Income, and the estimated value of subsidized housing. To account for underreporting, we scale up the amounts of these benefits using the reporting rates shown in Meyer, Mok and Sullivan (2009).

Another indicator of policy interest is the poverty rate, measured as the fraction of families with income below the thresholds prescribed by the US Census Bureau, which varies by family demographic structure. Figure 8 shows the poverty rate of families for different disabled groups over the years of disability. To better capture the degree of material deprivation for such an unusual group, we use after-tax income with public transfers as the basis for determining poverty status.[25] The *Chronic-Severe* group is much more likely to be living below the poverty line, even in the years prior to disability onset, but the poverty rate for this group still increases to more than 30 percent during the initial years after disability onset. By the tenth year after disability onset, the poverty rate for the *Chronic-Severe* group is about 28 percent. In comparison, the rate for the average disabled is only about 15 percent.

Contrasting these results with those of disabled male household heads, the drops for disabled women are generally smaller, although the differences are usually small. Without accounting for transfers, families with a disabled male head suffer from drops in income over the course of his disability that are 3–6 percentage points larger than families with disabled women and such a difference persists even after we account for the various types of public benefits received. This finding is, however, far from a generalization when we focus on chronically and severely disabled men and women, especially in the later stage of the disability spell. Without public transfers, the drops in income for families with disabled men are much larger than for their female counterparts. By the year of onset, the drop for families with a disabled male head is about 23 percent, while it is about 17 percent for families with a disabled woman. By the fifth year after onset, the drop is about 47 percent for men, and 36 percent for women. By the tenth year after onset, the drop is about 52 percent for men, and 38 percent for women. These differences are slightly evened out when we account for public transfers: By the year of onset, families with such disabled men suffer from an 11 percent decline in income, compared to 13 percent for families with disabled women, and by the tenth year after onset the difference is about 8 percentage points.

[25] Note that the standard income measure used by the US Census Bureau does not account for in-kind transfers, such as food stamps, or the possible underreporting of transfer benefits.

Consumption

The use of consumption data over income data in assessing material well-being has become popular in the literature. From a theoretical perspective, material well-being is more directly tied to current consumption than to current income, since income is subject to transitory fluctuations caused by events such as job or family composition changes. Living standards may remain unaffected despite large income changes with mechanisms such as savings and borrowings (Cutler and Katz, 1991; Poterba, 1991). From a practical perspective, first, measuring disposable income by accounting for taxes can be complicated in survey data. In addition, consumption may be more accurately reported than income for those who are disadvantaged, possibly due to the many small irregular sources of income received by this group (Meyer and Sullivan, 2003). By contrast, analyzing consumption may reduce or even eliminate many of these problems. Furthermore, consumption is more closely associated with other measures of well-being for the disadvantaged (Meyer and Sullivan 2003, 2011).

The PSID has an array of proxies for consumption; by far the most important are expenditures of food eaten at home and outside the home and housing expenditures. In this section we define food expenditure as the sum of expenditures for food eaten at and outside the home and the face value of food stamps. We also construct a housing expenditure variable based on the value of the owned dwelling, the rent paid (if the family is renting), and the rental equivalent for those in subsidized housing.[26] We define family consumption as the sum of food and housing expenditures.

Food Consumption

Estimating (2) with food expenditure as the dependent variable yields the results shown in columns 6 of Table 4 (for the average disabled woman) and Table 5 (for the *Chronic Severe* group). These results are also displayed in Figure 9. Although there is some indication that food consumption drops for women suffering from disability, this drop is usually small and no more

[26] See Meyer and Mok (2014) for details on the housing expenditure variable.

than 3 percent throughout the 10 years since disability onset. Regarding the *Chronic-Severe*, although the drops are estimated to be larger and can be up to five times as large as those of the average disabled, they are imprecisely measured at conventional levels. By the tenth year after onset, the drop in food expenditure is estimated to be 5.4 percent (with a standard error of 4.7).

Food Eaten at Home and Food Eaten outside the Home

The rather small drop in food consumption observed above may be caused by a substantial shift of food eaten outside the home relative to food eaten at home. If the utility contributions of these two types of food eaten are different, then it would be too early to say that families with disabled women can fully smooth their consumption. Columns 7 and 8 of Table 4 report changes in expenditures on food eaten at home and outside the home for the average disabled, while the corresponding columns in Table 5 report these changes for the *Chronic-Severe* group. These estimates, together with those of the other disability groups, are shown in Figures 10 and 11.

For food eaten at home, we observe that the changes are mostly small and are all statistically insignificant, even for the *Chronic-Severe* group. The estimated standard errors are much larger than the coefficient estimates in virtually all years since onset. On the surface, this suggests that food eaten at home is not at all affected.

Turning to the expenditure on food eaten outside the home, the drops for the average disabled are somewhat larger compared with those for food eaten at home, but are still small in magnitude (rarely above 7 percent) and mostly statistically insignificant or with fairly large standard errors. By the year of onset, the drop is about 3.4 percent (imprecisely measured) and increase to about 7 percent in the third year after onset (significant at the 5 percent level). The drop staying around this level for most of the remaining years after disability onset. Such patterns are also evident for the *One-Time*, *Temporary* and *Chronic-Not Severe* disabled groups. For the *Chronic-Severe*, however, these drops are many times larger. By the year of onset, food away from home is estimated to drop by about 14 percent (almost statistically significant at the 5 percent level) and the short-run decline continues, reaching about 27–30 percent by 2-4 years

after onset (all significant at the 1% level). Some recovery is observed thereafter (but estimates are noisy), but by the tenth year after onset the drop remains high, at 31 percent (significant at the 1% level). Based on these results, there seems to be a large degree of substitution toward eating at home when the female household head/wife is found to be seriously disabled.

Food plus Housing Consumption

A more comprehensive measure of consumption is the sum of food and housing, which collectively accounts for almost half of expenditures for the average family (Aguiar and Bils, 2011). Figure 12 shows the results for this consumption measure (individual coefficients reported in column 9 of Table 4 for the average disabled and in Table 5 for the *Chronic-Severe*). The drop for the average disabled is about 2 percent by the year of onset, increasing to about 4 percent in the 1-3 years after disability onset and then increasing further to 4–6 percent in the 5-10 years after disability onset. Although these estimates are all statistically significant, they are still small in size, especially when compared with those for the *Chronic-Severe* group, whose drops are often about twice as large in magnitude relative to the average, with a 10 percent drop by the tenth year after onset.

Compared with those of men, the drops for our female sample are generally smaller among the *Chronic–Severe*. For average disabled men, the drops in food are about several times as large (on average four percentage points larger) in the course of disability as for their female counterparts, again with decreases in food away from home explaining most of the drop. For food plus housing, the drops are greater for men (about twice as large). A sharp distinction arises among the *Chronic-Severe* disabled: The drops in food are generally many times greater for *Chronic–Severe* disabled men: 9 percent by the year of onset, and about 18 percent by the tenth year after onset. The same can be said for food eaten at home and outside the home. The decline in food plus housing is also about 2-4 times larger for these disabled men, who suffer from a 25 percent drop by the tenth year of their disability. Based on these comparisons, it seems that the *Chronic-Severe* disabled group is performing very badly, although the families of such disabled women are doing relatively better than those of similarly disabled men. However,

we should not be surprised by such findings. Relative to men, women's earnings usually constitute a smaller fraction of family income and, therefore, the loss in earnings due to their disabilities would have a smaller impact on family income and therefore family consumption. These results may shed light on whether the design of future disability policies should also focus on non-pecuniary support for women with disabilities, for example, providing helpers for household chores.

Spousal Labor Supply and Earnings

In a standard neoclassical unitary household framework, a negative unexpected shock to household income (such as the unemployment of a spouse) would induce members of the household to increase their labor supply to smooth family consumption, if leisure is a normal good. This is sometimes known as the "added worker effect" and a number of studies have empirically determined its existence (Lundberg, 1985). The principle states that the marginal value of time a spouse spends on non-work decreases upon a reduction in income due to the decreased labor supply of the other spouse, thereby inducing him/her to increase labor supply to maintain the family income. In theory, this effect may be dampened by changes in non-labor income as a result of the unexpected shock, such as unemployment insurance (Cullen and Gruber, 2000). In the case of a health or disability shock to a working spouse, the theoretical prediction is not so straightforward. The associated reduction in family income may induce the healthy spouse to increase his/her labor supply as in a unitary household model. However, the nature of the shock can also change the healthy spouse's marginal utility of time spent on non-work due to the need for more spousal caring (versus purchasing care on the market). The availability of transfers such as disability insurance will also dampen the need to increase the labor supply of the non-disabled spouse. The empirical evidence on changes in the spousal labor supply in the event of health shocks is somewhat mixed and mostly focuses on the health shocks to the husbands. Berger and Fleisher (1984) find that transfers matter in whether the wife will work more in the event of deterioration of her husband's health. Siegal (2006) uses the Health and Retirement Survey and finds that the effect of a husband's health on the wife's labor supply is sensitive to the measure of health used. When health is measured by physical function limitation,

the wife increases her labor supply if her husband's health deteriorates. Few papers study the husband's labor supply response to his wife's health shock and these mostly point to the conclusion of a small added worker effect. Coile (2004) uses the first six waves of the Health and Retirement Study (HRS) and finds a very small increase in the husband's hours of work and a small reduction in the probability of leaving the labor force in the event of a spousal health shock. The effect disappears when subjective survival probability variables are added. Bound et al. (2003) find little to no change in spousal labor earnings after the application of disability insurance, even among the wives of rejected applicants.

Our purpose here is to complement the above existing research using our long panel data, with a specific focus on the disability of wives and the extent of their disability. It is worth noting that the effect of a wife's disability may not be the same as that of the husband, especially in light of our results so far. First, a wife's earnings are typically lower than her husband's (or zero if she is a full-time housewife), so the associated decline in family income may not be large enough to induce the added worker effect. Second, the disabled wife may switch more of her time toward home production and the associated increase in specialization between the spouses may increase the husband's labor supply.

Using the event-study framework described above, we first restrict to the currently married wives and estimate the regression models with the husband's hours of work and earnings as the dependent variable.[27] We group the yearly time from onset indicator variables into four time periods for the ease of understanding. Specifically, let k be the year from onset as before, we have *Before Onset* ($-5 \leq k \leq -2$), At Onset ($-1 \leq k \leq 1$), *Short-run* ($2 \leq k \leq 5$), *and Long Run* ($6 \leq k \leq 10$). The coefficients of interest will show how the wife's disability affects her spouse's labor supply. Here, we look at the overall net effect of the spousal labor supply rather than specific factors that could affect it, as noted above. We measure the husband's labor supply in terms of his annual labor earnings, annual hours of work and work at the extensive margin (defined here as working 500 or more hours per year).

[27] We also use the husbands' demographic variables instead; see the Appendix for the controls included.

Panel A of Table 6 shows the estimated changes in the current husband's labor supply over the course of his wife's disability, by the extent of her disability. Here, we do not see sufficient evidence that the husband increases or decreases his labor supply, across all extent of disability groups. There is some mild suggestion that husbands of chronically disabled wives are experiencing lower earnings, work fewer hours or even leaving work altogether, but the estimates are very noisy, with the estimated standard errors being in many cases just as large as the estimated coefficients.

A problem of this analysis is that we are only looking at the current husbands of these currently married women and this strategy does not account well for the possibility of divorce and new marriages during the disability spell. A competing hypothesis is that disabled women who divorce become less competitive in the marriage market should they decide to remarry and will therefore attract and marry men of lower quality (i.e., positive assortative mating on work skills may lead us to conclude that the husbands of disabled wives do not increase their labor supply). The time-invariant individual fixed effect in the regression will not be able to account for this time-changing phenomenon. Thus, we also re-estimate these spousal labor supply regressions, restricting on the same marriage spell.[28] To alleviate the problem that disabled wives chose to marry lower quality husbands we delete those marriage spells when the wife became married after the year of her disability onset. Thus we have data where her disability is more likely to be regarded as a shock in the marriage. The results are presented in panel B of Table 6. We see a similar picture as before, that there is no significant evidence that husbands would change their labor supply following disability of their wives.

One possibility with the above observation is that the changes in labor supply of husbands are so heterogeneous and are offsetting each other in a predictable way, thereby resulting in no effect in total. For example, a husband with family health insurance coverage may not have the pressure to increase his labor supply so to pay for his disabled wife's medical costs, while a husband lacking such coverage may need to work more so to bring in the money

[28] Marriage histories data are available via the Marital History Files. These data were first collected in 1985, therefore those who left the survey prior to this year would not be included. The marital history files are updated annually, containing information of marriage(s) an individual (head or wife) has had, such as the order of marriage, year of marriage, year of separation and divorce.

needed to pay for the medical expenses.[29] While the heterogeneity may be seen by the rather large standard errors pertaining to the estimates in Table 6, a more convincing exercise would be to look at the distribution of these spousal labor supply changes. Let z_{ik} be husband i's labor supply (annual earnings or annual hours of work) at year k, where k again is the wife's year from her disability onset. We first calculate each husband's average labor supply in the years well before his wife's disability ($k < -5$), let this be denoted as z_i^B. Then, for each husband and for each of the years from $k = -5$, we obtain his relative change in labor supply as $p_{ik} = z_{ik}/z^B$. Our next step then looks at the distribution of p_{ik} for different time from disability periods (of the wife).

Table 7 reports the various percentiles of these relative changes in husband's annual hours of work. We also report the Interquartile Range (IQR) and the 90^{th}-10^{th} percentiles as measures of dispersion. Indeed we see large changes in spousal hours of work over the course of the wife's disability in opposite directions as the lower quartile gets smaller and the upper quartile gets bigger and that both measures of dispersion get larger over time. The median relative change however suggests that spousal hours of work decrease over time. Table 8 reports analogous estimates for husband's annual earnings and we see a similar picture. One may argue that the decrease at the lower tail may be due to that the husbands are aging (as Table 8 suggests that increasingly many of them do not work), but labor supply at the upper tail is increasing as well.

Public Transfer Receipts and Changes in Net Wealth

Our array of results above shows that while disabled women suffer from large drops in earnings, their drops in income and especially in consumption are relatively modest, suggesting the important role of public transfer receipts. Table 9 shows the receipt rates of various transfers for the different disabled groups in the 6-10 years after disability. About 40 percent of families with such Chronically and Severely disabled women receive benefits from the Social Security

[29] Coile (2004) finds that a sharp increase in the wife's number of activity limitations reduces the husband's enjoyment in spending time together.

Administration (OASI, SSDI or SSI), with 34 percent of them receiving social security in the form of OASI and SSDI. It is also surprising to see that about 43 percent of such disabled women receive food stamps (SNAP). This suggests that many women may not have earned enough during their pre-disabled years and are therefore ineligible for SSDI or entitled to only very small benefits. It should be pointed out that our *Chronic-Severe* group consists of women who are more likely to be household heads, black, older, and high-school dropouts.

It is also important to see how wealth changes for our various disabled groups to illustrate the degree of dissaving. Wealth data come from the 1984, 1989, 1994, and 1999–2011 waves of the PSID. We linearly interpolate family wealth from 1982 to 2011 from the available data. We define net wealth as total wealth, including home equity. The last two rows of Table 9 show medium net wealth in the year of disability onset and in the 6-10 years after. We see the correlation of the change of net wealth and the extent of disability. The net wealth of the *One-Time, Temporary* and *Chronic-Not Severe* groups grows by 38, 17 and 10 percent respectively. For the *Chronic-Severe* group, there is virtually no change in family net wealth. Altogether, these results suggest that for the *Chronic-Severe* group, on average, declines in earnings and consumption and the rise in public transfer receipts cancel each other out so that there is very little net dissaving during the course of disability. Such a result contrasts sharply with the case of disabled male heads, where dissaving was evident (Meyer and Mok, 2014).

5. Disability and Marital Dissolution

There has been interest in using economic models to explain marital formation and dissolution since the seminal work of Becker (1976) and Becker, Landes and Michael (1977). In their theory, marriage occurs when the joint benefit of doing so exceeds that of remaining single for both individuals (the difference in values is termed the marital surplus). If welfare can be transferred between the spouses, then marriage can still occur when the welfare of one spouse declines upon marriage, contingent on the gaining spouse being able to transfer welfare such that both agree to the union. Given this, divorce at a given time would occur if the joint benefit of

returning single exceeds that of remaining married, which depends on the spouses' expectations of how these values would change in the future.

Singleton (2012) discusses that the effect of disability on the divorce decision can be ambiguous. Disability can decrease the values of both remaining married and going back to being single. For example, if the disability of a spouse is associated with the additional negative stigma of "being together" or if the non-disabled spouse now has a binding constraint on time spent on certain commitments (e.g., household chores would have to be done by the non-disabled spouse instead), this would decrease the marital surplus and may then lead to marital dissolution. Likewise, the increased need for caretaking (whether provided by the non-disabled spouse or purchased from the market) would reduce the value of the marriage. However, it is also possible that the association between disability and divorce works in the opposite way, especially for the case of a disabled wife who was previously working. Because of her disability, she may switch more of her time to home production, which can result in the increased specialization of both spouses, thus increasing the value of the marriage and decreasing their divorce hazard for such a couple. Important research by Weiss and Willis (1997) finds that "an unexpected increase in the husband's earnings capacity reduces the divorce hazard, while an unexpected increase in the wife's earnings capacity raises the divorce hazard." Thus, it is a priori unclear whether disability and the divorce hazard are positively correlated. Indeed, conclusions from the limited amount of research available is somewhat mixed.

Of the few studies that examine the association between disability and marriage dissolution, Charles and Stephens (2004), using data from the 1968–1993 waves of the PSID and a probit model of divorce hazard, find that "disability experienced by either a husband or wife does not affect the divorce hazard in any statistically significant fashion." Though the relevant coefficient estimates summarizing such an association are fairly large for the husband's disability, these estimates are small for the wife's disability in the first five years since disability onset. Even in the longer term, the sign of the larger coefficient estimate is opposite from that expected; that is, the wife's disability reduces divorce hazard in the longer term. Singleton (2012) examines this relation using data from SIPP and reaches a somewhat different conclusion, especially after accounting for the nature of disability severity that Meyer and Mok (2014)

emphasize. Singleton's study separates the disabled into those who experienced a work-limiting disability and those who experienced a work-preventing disability. He finds that the association between disability and divorce is greatest among working age (ages 22–64) and educated male workers with work-preventing limitations. For women, there is some association (but statistically significant only at the 10 percent level) between disability and divorce, but only in the period prior to disability onset for working age and educated women with a work-preventing disability. Due to the short duration nature of the SIPP, Singleton analyzes the divorce hazard of these disabled individuals only up to the third year from onset.

Our goal here is to use the PSID and present more evidence of the association between disability and divorce. Compared to Charles and Stephens (2004), we use more data and disaggregate the disability groups. Relative to Singleton (2012), we look at the association over a longer period over the course of a woman's disability. We obtain all marriage related information from the PSID marriage history file, which contains detailed information of the dates (and the year of divorce) of all the marriages for the respondents who were interviewed in the 1985-2011 period.

Define the divorce hazard at year t as the probability of a divorce at t given the marriage was intact at t-1. Our regression model is:

Where again γt is the set of calendar year controls, and are the time from disability onset indicator variables as before. Xit controls for a rich set of demographic, family structure and marriage quality variables. With the rich information of the marital history file, we can control for the current order of the marriage for the wife and the age at marriage for each spouse, which serve as controls for the quality of the marriage. As stressed by Charles and Stephens (2004), it is important for these controls to fully capture the quality of marriage in a non-linear hazard model, even if the unobserved factors of marriage quality do not relate to the key coefficients of interests.

Given divorce is a rare event, we focus on three periods from the onset of a spouse's disability: at onset (the year of onset and the following year), in the short run (from the second to

fifth year from onset), and in the long run (from the sixth to the tenth year from onset). We also require the disability to have happened during the marriage so that it came as a shock to the married couple. As the marital history file data were first collected in 1985, we use only the couple-year data in the period 1985-2011. While this implies that a couple must last until 1985 to be included in our data and this might overrepresent the more durable marriages, we nevertheless concur with Charles and Stephens (2001) that having accurate marriage information overrides such concern. We estimate the above regression model both as a linear probability model and as a probit model, and report marginal effects.

Table 10 shows the results. Without disaggregating the type of disability (panel A), there is some suggestive evidence that the disability of husband reduces the divorce hazard in the period around his disability onset, and the divorce hazard increases in the long run period after his disability. These estimates are very noisy and so we refrain from making any conclusion here. For the wife, there is some evidence that her disability increases the divorce hazard overtime. In the long run, such hazard goes up by about 0.6 percent (linear probability) and 0.5 percent (probit) and the estimates are significant at the five percent level. It is important to point out that divorce is a rare event. The annual divorce rate of our sample of couple-year observations is about 1.4 percent, so the effects of disability on divorce we reported above are actually quite large.

We next look at how different types of disability affect marriage stability. Panel B of Table 10 shows these results, with somewhat surprising patterns. The One-Time disabled women do not suffer from higher prospects of divorce in a statistically significant fashion, but the point estimate for the effect in the short run is large. The Temporary and Chronic-Not Severe groups experience a sharp effect, with the divorce hazard increasing significantly over time since the disability shock. However, for the Chronic-Severe group, we do not see significant changes in the hazard. This somewhat suggests that the nature of the disability plays an important role in the story: A wife's disability destabilizes the marriage by reducing its value by a term, but this term is not constant and could be a nonlinear function of the seriousness of the disability.

We have several possible explanations for the above observation. First, there may be some sense of guilt on the part of a husband who decides to leave his seriously disabled wife, which reduces the value of his option of going back to being single. Second, we may also suspect that the amount of divorce compensation would be high. Most economic models of marriage and divorce are frictionless, in the sense that there is no additional cost to enter or leave the marriage. In the case of a spouse's disability, the non-disabled spouse may be required to pay a substantial regular payment, which would again reduce the value of going back to being single. Third, in the language of Becker, Landes and Michael (1977), the role of certain "marriage-specific capital," such as the number of children or "togetherness" (Hammermesh, 2007), may interact with a spouse's disability in a positive way for the value of the remaining married. For example, the children might feel better if their father stays in the marriage and looks after their very disabled mother. While it is beyond the scope of this paper to identify the principal cause of the above observed pattern, these are important questions that future research should address. We should perhaps also emphasize that many of the key findings above are still preliminary in the sense that many estimates are very close to 5 percent significant.

6. Disability, Time Use, and Spousal Caring

In this section we focus on how the use of time differs between disabled and non-disabled women, as well as examine whether there is evidence suggestive of an increase in spousal care. Research on time use is still in its infancy due to the lack of such data (particularly longitudinal data) and studies on the time use of the disabled are virtually non-existent, with Meyer and Mok (2014) being a first attempt. We follow the same methodology as these authors and use the American Time Use Survey (ATUS) for our analysis here.

The ATUS is a large-scale cross-sectional annual survey conducted by the US Bureau of Labor Statistics (BLS) and US Census Bureau since 2003. The primary purpose of the survey is to study how people divide their time among various activities (BLS and US Census Bureau, 2007) on a typical day. Upon completion of the eighth and final basic monthly CPS interviews, a subset of households is selected and one person (aged 15 and above) from each of these households is interviewed (mostly by computer-assisted telephone interviewing) approximately

three months later.[33] Selected respondents are first asked about basic household characteristics, employment status, and to recall the activities and time spent on each activity between 4 a.m. of the previous day to 4 a.m. of the interview day. By 2012, the survey had collected time-use information from about 137,000 individuals overall.

Sample Selection

We use the 2003–2012 ATUS surveys. The ATUS does not have a usable disability question, so we first match the ATUS data with the corresponding ASEC data that year, which include answers to a disability question asked of all respondents, regardless of employment status. Respondents whose final CPS interview took place between March and June of that year are potentially also selected to participate in the ATUS. Using this link, we can obtain the disability status of a subset of ATUS respondents.[34]

We keep only those whose ATUS interviews are classified as complete by ATUS. Upon matching, we obtain a sample of individuals who participated in both surveys. Two subsamples are derived:

- *The female household heads and wives sample.* We select those who were female household heads or wives of householders and aged 22–61 at the time of their ASEC interview. The disabled are those who gave affirmative answers to the ASEC disability question "*does … have a health problem or a disability which prevents work or which limits the kind or amount of work*?"

- *The husbands sample.* We select all husbands who were aged 22–61 and whose wives were also in this age range. The wife of a husband is disabled if her response to the ASEC disability question is affirmative.

[33] Since the ATUS sample is drawn from the CPS, the universe is essentially the same as that of the CPS (i.e., civilian non-institutional population).

[34] Despite the large ATUS sample, our data restrictions eliminate a large number of observations. For example, focusing only those who answered the CPS ASEC survey would eliminate two-thirds of the data and restricting the sample to only female heads or wives would eliminate at last another half of the data.

It should be noted that we do not have further information in the ASEC about the nature of the disability other than the presence of such a condition. Thus, our analysis below looks at the time use of the disabled women as a whole group.

Difference in Time Use in Food Production and Shopping

If an individual's utility depends on a consumable good which in turn, depends on a production function that uses time and expenditure as inputs, then a fall in food expenditure may not necessarily translate into a drop in material well-being if there is a shift towards more time spent on producing the consumable good (see Aguiar and Hurst, 2005, for an important application of this idea in terms of retirement). We first examine change in time spent on home food production, which ranges from time spent on preparing food as well as shopping for food. Panel A of Table 11 shows the difference in the average time spent (in hours per week) on these time-use categories between non-disabled and disabled female heads and wives. Relative to their non-disabled counterparts, disabled women spend on average 0.7 hour per week more in food preparation, but 0.1 hour per week less in food shopping and 1.6 hours per week less in all forms of shopping. To account for possible confounders of these results, we estimate linear regressions of time spent (on various activities) on age, age squared, education and region indicators, year indicators, an indicator variable for living in an urban area, race indicators, indicators for the ATUS survey month and weekday of interview, family composition (number of family members and number of children), and the disability indicator. We report the coefficient of the disability indicator in the third column of Panel A, with robust standard errors in parentheses beneath each estimate. After controlling for these confounders, we find an insignificant increase in the time disabled women spend on food preparation and an insignificant decrease in the time they spend on food shopping compared to their non-disabled counterparts. The only result of statistical significance is the time spent on shopping in general, with the disabled women expected to spend 1.53 fewer hours than their non-disabled counterparts. Overall, there does not seem to be much change in the food preparation and food shopping behavior among our disabled women.

We next examine whether there could be change in spousal support for these food and shopping activities. Using the husbands sample, we again report the means in the time spent on such activities, as well as the results of a linear regression with similar specification—using the husband's demographic variables but we also include his wife's disability status, as well as her age. The coefficient of interest pertains to the wife's disability status, which measures the change in time spent on an activity for a non-disabled husband with a disabled wife. Overall, we do not see any significant changes in the time spent by these husbands on these home production activities.

Time Use in General

Given that disabled women spend less time working, how they allocate their extra time is of interest. Panel A of Table 11 again shows the means and linear regression results for various time-use categories of disabled women. The large reduction in market work (defined as time spent on actual work, including time on work-related travel) is expected. Much of the extra time is spent "watching TV," "relaxing," "sleeping," and with the "use of medical services." The regression results suggest that disabled women spend 1.86 hours per week more than non-disabled women on using medical services, more than twice the number of hours for disabled men (Meyer and Mok, 2014).[35]

Regarding husbands with disabled wives, it is somewhat surprising to see that they too experience a reduction in work of 5.3 hours per week, which is largely attributed to an increase in time spent watching TV (an increase of 3.3 hours per week). One may be surprised by the lack of difference between the two groups of husbands for their time spent on "caring for adults" and conclude that there is a lack of evidence on spousal care support for disabled women. Nevertheless, spousal caring may come in different forms, ranging from sharing the burden of cooking and household chores to more time accompanying each other and doing activities together. For each time-use activity, the ATUS also records who else was involved with the activity. We use such information and look at how much time was spent on activities when the

[35] We cautiously note that over 90% of disabled women report zero time spent on medical services.

wife was also present. The results suggest that all of the reduction in working hours is spent with the wife, mostly watching TV together. We saw above that the disabled women are spending more time watching TV; therefore, their husbands also spending more time watching TV may just be a demonstration of spousal caring in light of the wives' physical limitations. In addition, the reduction in work time is not apparent when unobserved characteristics are controlled for, so we view the time-use evidence above as suggestive only and this points out the need for further research when longitudinal time-use data are available.

7. Discussion and Conclusion

The problem of a growing disabled population and its associated public expenditure has recently attracted a lot of attention in academia and the public policy arena. Most of the current debate, however, has focused on the moral hazard problem of disability insurance and less so on its economic benefits. In addition, the limited number of studies on the well-being of the disabled have mostly focused on men. This study provides a comprehensive and panoramic view of how disability affects the well-being of women. While disability reduces the earnings and labor supply of women just as in the case of men, its effect on family income and family consumption is somewhat smaller than for disabled men. Nevertheless, disabled wives fare less well when it comes to marriage stability and we show evidence of their higher divorce hazard following disability in the short run. For those whose marriage remains intact, we do not see much evidence that the husbands of disabled would change their labor supply. Time use data, however, suggest husbands of disabled wives do spend more time on home activities that could be regarded as expressions of caring. In general, disabled women seem to fare better than disabled men, with a smaller reduction in outcomes that affect utility directly.

We view the comprehensive array of results presented in this paper as important background work for future research avenues. First, one could address some of the above research topics with the use of the HRS. The main advantage of the HRS is its more detailed and accurate data on health conditions and social security records (e.g., past earnings). However, it should be noted that the HRS is originally based on a cohort born in the 1930s and is therefore

not representative of the overall population of the United States. Second, we restrict most of our analysis to the working years and how the disabled fare as they enter retirement is not actively researched, despite of the increasing importance of these two life events. Given the problem of old-age poverty, it is also important to analyze to what extent pre-retirement disability explains material deprivation during retirement. Third, further research on the relation between disability and divorce is needed, since our results differ somewhat from those in the literature. In particular, one could look at whether the receipt of disability insurance reduces the probability of martial dissolution, an economic benefit of disability insurance that is somewhat understudied in the literature.

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Table 1: Annual Disability Rates of Women

	All Female Heads and Wives			Female Heads			Wives		
YEAR	N	% Disabled	% of Disabled that are Severe	N	% Disabled	% of Disabled that are Severe	N	% Disabled	% of Disabled that are Severe
1968				1,063	0.208	0.459			
1969				983	0.230				
1970				987	0.227				
1971				1,007	0.260				
1972				1,041	0.211	0.519			
1973				1,060	0.189	0.512			
1974				1,100	0.178	0.497			
1975				1,142	0.182	0.454			
1976	4,004	0.129	0.353	1,151	0.192	0.461	2,853	0.110	0.290
1977				1,175	0.212	0.559			
1978				1,190	0.196	0.557			
1979				1,243	0.206	0.506			
1980				1,267	0.190	0.533			
1981	4,578	0.128	0.487	1,326	0.187	0.526	3,252	0.106	0.461
1982	4,699	0.120	0.515	1,397	0.191	0.540	3,302	0.092	0.494
1983	4,624	0.129	0.417	1,404	0.175	0.427	3,220	0.110	0.411
1984	4,685	0.140	0.355	1,422	0.170	0.415	3,263	0.127	0.320
1985	4,751	0.151	0.361	1,452	0.175	0.437	3,299	0.142	0.325
1986	4,743	0.113	0.274	1,453	0.118	0.339	3,290	0.111	0.242
1987	4,798	0.140	0.257	1,491	0.165	0.233	3,307	0.128	0.272
1988	4,824	0.161	0.238	1,495	0.168	0.311	3,329	0.158	0.202
1989	4,820	0.149	0.276	1,472	0.175	0.300	3,348	0.137	0.260
1990	6,246	0.151	0.282	1,915	0.177	0.327	4,331	0.140	0.255
1991	6,126	0.153	0.263	1,863	0.182	0.287	4,263	0.139	0.247
1992	6,421	0.144	0.248	1,980	0.170	0.269	4,441	0.130	0.234
1993	6,520	0.134	0.247	2,122	0.162	0.283	4,398	0.121	0.225
1994	6,980	0.134	0.277	2,290	0.168	0.306	4,690	0.122	0.262
1995	6,703	0.137	0.301	2,205	0.168	0.358	4,498	0.122	0.262
1996	5,527	0.148	0.289	1,863	0.177	0.327	3,664	0.133	0.263
1997	4,529	0.140	0.311	1,433	0.159	0.335	3,096	0.131	0.296
1999	4,701	0.144	0.296	1,524	0.171	0.338	3,177	0.133	0.272
2001	4,958	0.146	0.261	1,594	0.188	0.317	3,364	0.127	0.222
2003	5,223	0.143	0.345	1,763	0.214	0.382	3,460	0.109	0.310
2005	5,330	0.140	0.322	1,820	0.191	0.370	3,510	0.115	0.284
2007	5,452	0.146	0.358	1,924	0.187	0.440	3,528	0.126	0.297
2009	5,617	0.152	0.341	2,077	0.190	0.421	3,540	0.131	0.278
2011	5,619	0.143	0.335	2,202	0.174	0.384	3,417	0.126	0.294

Notes: The sample includes female heads and wives ages 22-61. The rates are weighted using family weights.

Table 2: Sample Means and Standard Deviations, Non-disabled and the Extent of Disability Groups

	Non-Disabled	All Disabled	One-Time	Temporary	Chronic Not Severe	Chronic Severe
Age at Disability Onset		36.9	34.5	36.6	37.5	41.1
		(10.1)	(9.5)	(10.2)	(10.2)	(9.6)
Age	35.5	39.2	36.0	37.6	40.6	45.3
	(7.6)	(8.1)	(6.0)	(7.1)	(8.2)	(9.0)
White	0.637	0.587	0.655	0.635	0.583	0.378
	(0.481)	(0.493)	(0.476)	(0.482)	(0.493)	(0.486)
Married	0.704	0.575	0.697	0.649	0.515	0.330
	(0.381)	(0.417)	(0.378)	(0.390)	(0.422)	(0.396)
Number of Years In Survey (ages 22-61)	14.3	20.2	19.8	20.2	21.5	18.1
	(8.3)	(8.1)	(8.1)	(8.3)	(7.8)	(8.0)
Highest Level of Education - High School	0.332	0.328	0.332	0.347	0.319	0.289
	(0.471)	(0.470)	(0.471)	(0.477)	(0.466)	(0.454)
Highest Level of Education – College	0.530	0.415	0.521	0.452	0.372	0.234
	(0.499)	(0.493)	(0.500)	(0.498)	(0.484)	(0.424)
Years in Survey after Onset		12.7	10.3	10.9	14.9	16.0
		(7.6)	(5.5)	(7.0)	(7.9)	(9.1)
Number of Consecutive Positive Limitation Reports		1.514		0.344	2.426	4.625
		(3.993)		(0.571)	(4.472)	(6.889)
Number of Valid Reports of Disability Status from Onset to the 10th Year after Onset		7.147	6.854	6.689	7.783	7.227
		(2.460)	(2.473)	(2.550)	(2.226)	(2.464)
Number of Positive Limitation Reports from Onset to the 10th Year after Onset		2.747		1.413	5.033	5.789
		(2.756)		(0.493)	(2.001)	(2.159)
Severity Ratio (up to the 10th Year after Onset)		0.262	0.154	0.205	0.140	0.808
		(0.358)	(0.362)	(0.304)	(0.164)	(0.175)
Age in the Last Interview	45.8	54.5	50.2	52.5	57.3	61.0
	(12.0)	(13.2)	(11.5)	(12.6)	(13.3)	(13.4)
Number of Observations	4,947	2,016	589	518	605	304

Notes: See text for the construction of the sample.

Table 3: Lifetime Prevalence of Disability among Women

Age	N	Any Disability	Currently Disabled	One-Time	Temporary	Chronic-Not Severe	Chronic-Severe
30	480	0.2560	0.0404	0.0944	0.0936	0.0598	0.0082
		(0.0267)	(0.0113)	(0.0189)	(0.0181)	(0.0137)	(0.0050)
32	738	0.2625	0.0937	0.0773	0.0892	0.0804	0.0157
		(0.0210)	(0.0134)	(0.0122)	(0.0144)	(0.0125)	(0.0053)
34	873	0.3017	0.0860	0.0992	0.0944	0.0736	0.0345
		(0.0201)	(0.0118)	(0.0127)	(0.0136)	(0.0110)	(0.0075)
36	940	0.2875	0.1091	0.1039	0.0604	0.0858	0.0375
		(0.0190)	(0.0132)	(0.0129)	(0.0101)	(0.0119)	(0.0076)
38	925	0.3282	0.0987	0.0958	0.0766	0.1083	0.0475
		(0.0195)	(0.0124)	(0.0120)	(0.0108)	(0.0132)	(0.0093)
40	817	0.3072	0.1014	0.1052	0.0616	0.0988	0.0417
		(0.0203)	(0.0131)	(0.0134)	(0.0101)	(0.0134)	(0.0090)
42	725	0.3341	0.0999	0.1006	0.0851	0.1120	0.0364
		(0.0223)	(0.0135)	(0.0141)	(0.0131)	(0.0156)	(0.0082)
44	608	0.3297	0.1194	0.0930	0.0671	0.1307	0.0389
		(0.0242)	(0.0169)	(0.0151)	(0.0131)	(0.0180)	(0.0092)
46	511	0.3179	0.1200	0.0904	0.0611	0.1112	0.0553
		(0.0255)	(0.0175)	(0.0163)	(0.0136)	(0.0163)	(0.0125)
48	406	0.3120	0.1359	0.0589	0.0748	0.1223	0.0562
		(0.0281)	(0.0209)	(0.0149)	(0.0153)	(0.0197)	(0.0135)
50	391	0.3187	0.1339	0.0519	0.0926	0.1242	0.0501
		(0.0293)	(0.0214)	(0.0138)	(0.0180)	(0.0208)	(0.0127)
52	361	0.4117	0.1943	0.0796	0.1227	0.1281	0.0812
		(0.0330)	(0.0266)	(0.0183)	(0.0224)	(0.0221)	(0.0171)
54	345	0.4126	0.1775	0.0626	0.1253	0.1620	0.0628
		(0.0346)	(0.0258)	(0.0179)	(0.0246)	(0.0260)	(0.0135)
56	335	0.4639	0.2006	0.0751	0.1091	0.1674	0.1123
		(0.0364)	(0.0280)	(0.0198)	(0.0233)	(0.0265)	(0.0210)
58	300	0.5915	0.2715	0.1195	0.1472	0.1780	0.1469
		(0.0374)	(0.0329)	(0.0253)	(0.0275)	(0.0284)	(0.0245)
60	284	0.6151	0.2917	0.1143	0.1030	0.2119	0.1859
		(0.0379)	(0.0344)	(0.0254)	(0.0232)	(0.0311)	(0.0292)

Notes: This table reports for each age the fraction of the sample members who have had a disability by the specified age, the fraction of individuals who are currently disabled, and the fraction for whom a given disability type is their most severe disability to date. For this table we only use data from 1984-1994 and individuals with at least 10 years of disability data prior to the specified age. The fractions are weighted using family weights. Standard errors are in parentheses. See text for details.

Table 4: Changes in Economic Outcomes Before and After Disability Onset, All-Disabled

Year from Onset	Hours (Level)	Fraction not working	Earnings (%)	After Tax Income prior Transfers (%)	After Tax Income with Transfers (%)	Food (%)	Food At Home (%)	Food away from Home (%)	Food plus Housing (%)
-5	25	0.24	1.3	-1.29	-0.77	0.87	0.84	1.31	-0.71
	(21)		(2.17)	(1.57)	(1.43)	(1.19)	(1.22)	(3.15)	(1.09)
-4	15	0.23	0.06	-0.16	0.81	0.45	0.12	2.9	-1.15
	(22)		(2.37)	(1.66)	(1.65)	(1.12)	(1.14)	(3.14)	(1.00)
-3	-21	0.23	-2.47	-2.11	-1.46	0.5	1.13	-1.97	-0.71
	(23)		(2.32)	(1.84)	(1.85)	(1.34)	(1.40)	(3.47)	(1.35)
-2	-13	0.24	-0.22	-1	-0.26	-2.03	-1	-5.73*	-2.94*
	(25)		(2.54)	(1.89)	(1.87)	(1.16)	(1.24)	(2.68)	(1.19)
-1	-86**	0.24	-4.86	-3.55	-1.76	-0.72	-0.09	-2.2	-1.65
	(25)		(2.56)	(1.89)	(1.87)	(1.23)	(1.29)	(3.07)	(1.32)
0	-161**	0.26	-12.26**	-3.7	-1.98	-0.03	0.94	-3.43	-2.21
	(27)		(2.63)	(2.71)	(2.76)	(1.52)	(1.62)	(3.03)	(1.39)
1	-277**	0.32	-19.49**	-7.40**	-3.56	-0.3	0.99	-4.46	-2.38
	(27)		(2.58)	(1.99)	(2.02)	(1.61)	(1.78)	(3.30)	(1.45)
2	-235**	0.33	-18.52**	-9.21**	-4.81*	-1.02	0.79	-5.77	-3.58**
	(29)		(2.66)	(1.92)	(1.92)	(1.29)	(1.38)	(3.02)	(1.37)
3	-241**	0.33	-20.83**	-8.96**	-4.41*	-1.65	0.14	-7.08*	-4.44**
	(29)		(2.55)	(1.86)	(1.85)	(1.35)	(1.44)	(3.12)	(1.44)
4	-236**	0.34	-19.96**	-7.31**	-4.45	-2.62	-1.43	-4.06	-4.75**
	(31)		(2.70)	(2.34)	(2.31)	(1.37)	(1.46)	(3.25)	(1.40)
5	-276**	0.35	-22.70**	-9.72**	-5.80*	-2.33	-0.28	-6.76*	-4.53**
	(31)		(2.74)	(2.24)	(2.36)	(1.49)	(1.60)	(3.27)	(1.51)
6	-257**	0.35	-21.69**	-8.68**	-4.37	-2.97*	-1.39	-5.34	-5.62**
	(32)		(2.84)	(2.24)	(2.25)	(1.40)	(1.50)	(3.28)	(1.54)
7	-286**	0.36	-19.09**	-5.34	-2.16	-1.2	1.14	-5.98	-5.92**
	(31)		(2.98)	(2.86)	(2.74)	(2.06)	(2.27)	(3.44)	(1.73)
8	-282**	0.35	-21.65**	-8.47**	-5.59**	-1.55	0.71	-6.85*	-5.59**
	(34)		(2.98)	(2.19)	(2.07)	(1.48)	(1.60)	(3.19)	(1.63)
9	-296**	0.37	-21.28**	-7.02**	-4.23	-2.77	-0.83	-6.31	-5.45**
	(34)		(3.26)	(2.46)	(2.35)	(1.64)	(1.68)	(3.97)	(1.68)
10	-293**	0.36	-24.17**	-9.78**	-6.24*	-1.67	-0.13	-3.63	-4.22*
	(37)		(3.21)	(2.85)	(2.94)	(1.77)	(1.77)	(4.31)	(2.12)

Table 5: Changes in Economic Outcomes Before and After Disability Onset, Chronic-Severe

Year from Onset	Hours (Level)	Fraction not working	Earnings (%)	After Tax Income prior Transfers (%)	After Tax Income with Transfers (%)	Food (%)	Food At Home (%)	Food away from Home (%)	Food plus Housing (%)
-5	-91	0.27	-5.93	-5.49	-3.20	0.04	0.58	0.09	-0.60
	(59)		(6.06)	(4.92)	(4.20)	(4.29)	(4.47)	(12.02)	(3.10)
-4	-53	0.27	-7.79	-6.37	-3.64	-4.11	-1.66	-13.68	-4.00
	(65)		(6.37)	(3.74)	(3.21)	(3.43)	(3.76)	(7.30)	(2.58)
-3	-197**	0.26	-15.52*	-2.61	-2.48	5.33	5.47	14.87	-0.03
	(66)		(6.81)	(3.55)	(3.15)	(6.34)	(7.34)	(11.81)	(4.04)
-2	-157*	0.27	-15.11*	-1.84	-3.67	0.97	4.33	-10.43	-2.57
	(74)		(7.07)	(4.29)	(3.63)	(4.48)	(4.65)	(8.87)	(3.03)
-1	-333**	0.32	-27.93**	-15.12**	-12.01**	3.45	6.94	-7.13	-0.54
	(72)		(7.01)	(3.97)	(3.64)	(4.21)	(4.44)	(10.22)	(3.13)
0	-425**	0.35	-40.27**	-17.22**	-13.20**	0.28	3.74	-13.51	-4.04
	(77)		(5.82)	(4.08)	(3.72)	(4.09)	(4.31)	(7.18)	(3.04)
1	-845**	0.57	-67.29**	-27.51**	-14.72**	1.28	5.29	-13.08	-4.03
	(74)		(4.36)	(3.75)	(3.51)	(4.45)	(4.57)	(10.20)	(3.20)
2	-902**	0.60	-68.74**	-32.63**	-16.32**	-1.04	6.41	-30.29**	-4.69
	(83)		(4.78)	(4.23)	(3.77)	(4.40)	(5.06)	(6.76)	(3.17)
3	-947**	0.66	-75.24**	-33.34**	-15.27**	-6.20	-0.94	-27.34**	-7.55*
	(76)		(3.73)	(3.91)	(3.54)	(4.19)	(4.41)	(8.80)	(3.31)
4	-982**	0.68	-73.34**	-29.19**	-12.94**	-3.99	2.58	-29.56**	-8.63**
	(79)		(4.16)	(4.39)	(3.65)	(4.29)	(4.77)	(7.34)	(3.07)
5	-1,031**	0.69	-76.81**	-36.34**	-17.93**	-5.13	0.25	-16.20	-8.20*
	(76)		(3.90)	(4.07)	(3.71)	(4.05)	(4.33)	(10.18)	(3.43)
6	-1,055**	0.72	-78.51**	-32.44**	-10.45*	0.75	6.07	-16.49*	-5.75
	(81)		(4.09)	(5.17)	(4.49)	(4.46)	(5.11)	(8.37)	(3.28)
7	-1,069**	0.75	-73.39**	-36.04**	-14.91**	-5.81	-1.28	-14.47	-10.83**
	(76)		(6.27)	(4.54)	(4.04)	(4.55)	(4.79)	(10.51)	(3.26)
8	-1,068**	0.71	-76.72**	-35.23**	-14.16**	-2.25	3.81	-21.71**	-6.97*
	(83)		(4.29)	(4.70)	(4.58)	(4.14)	(4.59)	(8.29)	(3.16)
9	-1,112**	0.78	-81.45**	-37.92**	-20.18**	-0.62	5.32	-12.20	-7.01
	(79)		(3.61)	(4.96)	(4.13)	(5.68)	(5.49)	(15.12)	(3.95)
10	-1,126**	0.78	-81.54**	-37.52**	-19.71**	-5.43	2.53	-30.59**	-9.80**
	(83)		(3.65)	(4.35)	(3.89)	(4.70)	(5.09)	(10.24)	(3.57)

Table 6
Changes in Husband's Labor Supply

	A. Current Husband				B. Current Marriage			
	One Time	Temporary	Chronic Not Severe	Chronic Severe	One Time	Temporary	Chronic Not Severe	Chronic Severe
1. Annual Earnings								
Before Onset	5.76	1.12	0.44	-6.13	4.18	3.09	-0.82	-5.94
	(6.75)	(2.96)	(3.08)	(5.06)	(6.98)	(3.01)	(3.18)	(5.23)
At Onset	13.47	1.24	-5.65	-4.34	11.68	3.17	-6.90*	-3.81
	(10.30)	(3.74)	(3.35)	(6.33)	(10.52)	(3.68)	(3.45)	(6.54)
Short Run	10.92	-0.51	-5.97	-7.72	9.24	1.01	-7.85	-7.54
	(8.17)	(3.98)	(3.90)	(7.09)	(8.35)	(3.98)	(4.03)	(7.04)
Long Run	4.88	-0.26	-2.83	-10.8	3.21	0.88	-3.85	-10.75
	(8.31)	(5.07)	(5.55)	(8.38)	(8.59)	(5.38)	(5.73)	(8.95)
2. Annual Hours of Work								
Before Onset	30	33	-25	-1	18	57	-25	6
	(37)	(34)	(36)	(72)	(39)	(35)	(37)	(77)
At Onset	-1	86	-48	-97	-11	107*	-38	-42
	(43)	(45)	(43)	(78)	(44)	(46)	(44)	(83)
Short Run	-10	61	-68	-26	-14	75	-56	-8
	(48)	(49)	(45)	(85)	(50)	(50)	(47)	(89)
Long Run	-8	120	-3	-9	-9	111	8	-6
	(50)	(64)	(52)	(97)	(52)	(68)	(54)	(100)
3. Working 500 or more hours								
Before Onset	0.005	0.011	-0.011	-0.04	0.004	0.016	-0.01	-0.035
	(0.010)	(0.012)	(0.013)	(0.028)	(0.011)	(0.012)	(0.014)	(0.028)
At Onset	0.001	0.012	-0.014	-0.023	-0.002	0.012	-0.007	-0.001
	(0.013)	(0.014)	(0.016)	(0.027)	(0.013)	(0.014)	(0.016)	(0.028)
Short Run	-0.012	0.011	-0.031	-0.038	-0.014	0.007	-0.029	-0.031
	(0.015)	(0.016)	(0.019)	(0.032)	(0.015)	(0.016)	(0.020)	(0.034)
Long Run	-0.013	0.003	-0.032	-0.05	-0.012	-0.003	-0.029	-0.039
	(0.016)	(0.021)	(0.020)	(0.036)	(0.017)	(0.023)	(0.021)	(0.039)

Notes: Standard errors in parentheses. We use Poisson regression (with individual fixed effects) for annual earnings, linear regression (with linear fixed effects) for annual hours and work at the extensive margin.

Table 7 – Distribution of Changes in Husband's Annual Hours of Work

			Percentile								
	Period from Onset	Mean Ratio of Hours	5th	10th	25th	50th	75th	90th	95th	**IQR (75th–25th)**	**90th – 10th percentile**
One-Time	k < -5	1.000	0.590	0.766	0.912	1.000	1.097	1.244	1.390	**0.186**	**0.477**
	Before	0.987	0.083	0.650	0.860	0.985	1.113	1.343	1.563	**0.253**	**0.694**
	At Onset	0.960	0.000	0.389	0.836	0.989	1.135	1.386	1.533	**0.299**	**0.997**
	Short R	0.913	0.000	0.000	0.759	0.955	1.142	1.399	1.629	**0.383**	**1.399**
	Long R	0.889	0.000	0.000	0.727	0.939	1.151	1.383	1.557	**0.424**	**1.383**
Temp	k < -5	1.000	0.606	0.787	0.907	0.997	1.097	1.257	1.389	**0.190**	**0.470**
	Before	0.982	0.322	0.657	0.869	0.985	1.102	1.322	1.471	**0.233**	**0.664**
	At Onset	0.999	0.216	0.631	0.859	1.002	1.137	1.354	1.641	**0.278**	**0.723**
	Short R	0.941	0.000	0.448	0.825	0.964	1.107	1.330	1.504	**0.282**	**0.882**
	Long R	0.905	0.000	0.000	0.733	0.974	1.142	1.440	1.604	**0.409**	**1.440**
Chronic Not Severe	k < -5	1.000	0.566	0.768	0.910	1.004	1.104	1.258	1.399	**0.194**	**0.490**
	Before	0.953	0.000	0.472	0.847	0.971	1.091	1.314	1.587	**0.244**	**0.842**
	At Onset	0.923	0.000	0.463	0.813	0.965	1.092	1.297	1.431	**0.279**	**0.834**
	Short R	0.883	0.000	0.000	0.788	0.961	1.098	1.262	1.460	**0.310**	**1.262**
	Long R	0.891	0.000	0.000	0.771	0.972	1.139	1.376	1.519	**0.368**	**1.376**
Chronic Severe	k < -5	1.000	0.170	0.715	0.912	1.001	1.102	1.261	1.494	**0.190**	**0.545**
	Before	1.084	0.000	0.000	0.776	0.987	1.124	1.446	1.927	**0.348**	**1.446**
	At Onset	1.140	0.000	0.039	0.715	0.964	1.077	1.400	1.972	**0.362**	**1.361**
	Short R	1.195	0.000	0.000	0.683	0.945	1.097	1.421	1.631	**0.414**	**1.421**
	Long R	1.289	0.000	0.000	0.563	0.935	1.117	1.405	3.064	**0.554**	**1.405**

Table 8 – Distribution of Changes in Husband's Annual Earnings

			Percentile								
	Time from Onset	Mean Ratio of Earnings	5th	10th	25th	50th	75th	90th	95th	**IQR (75th–25th)**	**90th – 10th percentile**
One-Time	k < -5	1.000	0.389	0.604	0.838	1.000	1.151	1.357	1.544	**0.314**	**0.754**
	Before	1.100	0.000	0.489	0.821	1.051	1.311	1.604	1.886	**0.490**	**1.115**
	At Onset	1.173	0.000	0.229	0.752	1.055	1.416	1.885	2.235	**0.664**	**1.655**
	Short R	1.152	0.000	0.000	0.678	1.060	1.479	2.021	2.459	**0.801**	**2.021**
	Long R	1.114	0.000	0.000	0.478	1.043	1.543	2.126	2.665	**1.066**	**2.126**
Temp	k < -5	1.000	0.384	0.622	0.845	0.994	1.145	1.355	1.533	**0.300**	**0.732**
	Before	1.172	0.101	0.473	0.855	1.079	1.341	1.836	2.146	**0.486**	**1.363**
	At Onset	1.161	0.000	0.325	0.740	1.088	1.472	2.005	2.318	**0.732**	**1.680**
	Short R	1.162	0.000	0.088	0.710	1.114	1.472	2.095	2.555	**0.762**	**2.007**
	Long R	1.128	0.000	0.000	0.551	1.130	1.565	2.156	2.630	**1.014**	**2.156**
Chronic Not Severe	k < -5	1.000	0.334	0.605	0.844	1.000	1.144	1.351	1.595	**0.300**	**0.746**
	Before	1.086	0.000	0.247	0.868	1.077	1.320	1.673	2.094	**0.452**	**1.426**
	At Onset	1.075	0.000	0.075	0.776	1.075	1.334	1.693	2.138	**0.558**	**1.618**
	Short R	1.138	0.000	0.000	0.642	1.088	1.380	1.833	2.761	**0.738**	**1.833**
	Long R	1.300	0.000	0.000	0.509	1.089	1.523	2.060	3.104	**1.014**	**2.060**
Chronic Severe	k < -5	1.000	0.052	0.558	0.836	1.003	1.164	1.364	1.652	**0.328**	**0.807**
	Before	1.075	0.000	0.000	0.767	1.081	1.303	1.691	2.258	**0.536**	**1.691**
	At Onset	1.302	0.000	0.009	0.615	1.118	1.457	1.934	3.462	**0.842**	**1.926**
	Short R	1.311	0.000	0.000	0.459	1.087	1.490	2.161	3.400	**1.031**	**2.161**
	Long R	1.278	0.000	0.000	0.213	1.130	1.553	2.319	5.813	**1.340**	**2.319**

Table 9

Net Wealth at Onset, and Long run Wealth and Benefit Receipt Rates

	All Disabled	One-Time	Temporary	Chronic-Not Severe	Chronic-Severe
Benefit Receipt Rate					
Social Security (OASDI)	0.169	0.086	0.124	0.184	0.338
Supplemental Security Income	0.050	0.010	0.028	0.054	0.141
Social Security or SSI	0.199	0.092	0.140	0.216	0.423
Workers' Compensation	0.030	0.021	0.040	0.030	0.030
Unemployment Insurance	0.065	0.083	0.068	0.062	0.035
Food Stamps	0.226	0.125	0.173	0.250	0.428
Subsidized Housing	0.070	0.048	0.046	0.081	0.118
Any one of the above	0.439	0.296	0.361	0.465	0.739
Work and Wealth					
Not receiving any benefit above and work less than 1000 hours	0.207	0.251	0.190	0.199	0.180
Median Net Wealth in the year of Onset (2012 Dollars)	$41,535	$45,432	$46,090	$37,092	$25,731
Median Net Wealth (2012 Dollars)	$49,110	$62,678	$53,231	$41,561	$25,705

Notes: Unless indicated otherwise, the benefit receipt rates and median net wealth are numbers for the 6-10 years after the woman's year of disability onset. Benefit receipts are defined at the family level.

Table 10

Divorce Hazard Linear Probability and Probit Regression

A. All Disabled

	Linear	Probit
Husband Disabled		
At Onset	-0.0047	-0.0067
	(0.0030)	(0.0046)
Short Run	0.0005	-0.0006
	(0.0027)	(0.0028)
Long Run	0.0036	0.0025
	(0.0028)	(0.0026)
Wife Disabled		
At Onset	-0.0002	-0.0004
	(0.0034)	(0.0036)
Short Run	0.0045	0.0038
	(0.0027)	(0.0023)
Long Run	0.0061*	0.0053*
	(0.0031)	(0.0026)

B. By Extent of Disability

	Linear					Probit			
	One-Time	Temp	C-Not Severe	Chronic Severe		One-Time	Temp	C-Not Severe	Chronic Severe
Husband									
At Onset	-0.0025	-0.0067	-0.0067	-0.0054		-0.0033	-0.0099	-0.0139	-0.0052
	(0.0057)	(0.0044)	(0.0050)	(0.0107)		(0.0063)	(0.0095)	(0.0130)	(0.0139)
Short Run	0.0027	0.0027	-0.005	-0.006		0.0015	0.0022	-0.011	-0.0086
	(0.0048)	(0.0048)	(0.0039)	(0.0060)		(0.0040)	(0.0046)	(0.0079)	(0.0098)
Long Run	0.0051	0.0005	0.0022	0.0058		0.004	-0.0011	0.0013	0.0054
	(0.0050)	(0.0045)	(0.0052)	(0.0078)		(0.0040)	(0.0050)	(0.0053)	(0.0073)
Wife									
At Onset	-0.0064	0.0042	0.0066	-0.0037		-0.0095	0.0038	0.0068	-0.0031
	(0.0040)	(0.0069)	(0.0081)	(0.0140)		(0.0067)	(0.0061)	(0.0064)	(0.0147)
Short Run	-0.0008	0.0105+	0.0073	0.0026		-0.0008	0.0086*	0.006	0.0014
	(0.0036)	(0.0056)	(0.0051)	(0.0109)		(0.0039)	(0.0039)	(0.0041)	(0.0090)
Long Run	-0.0013	0.0150*	0.0114+	-0.0006		-0.0021	0.0118**	0.0100*	-0.0011
	(0.0039)	(0.0072)	(0.0060)	(0.0094)		(0.0044)	(0.0046)	(0.0045)	(0.0106)

Standard errors are in parentheses. For probit regressions, marginal effects (evaluated at the mean) are reported. ** $p<0.01$, * $p<0.05$, + $p<0.1$.

Table 11

Time-Use of Women and Husbands

	Women				Husbands		
	Means		Regression		Means		Regression
	Non-disabled	Disabled	Coef. On Disability Status		Estimated Change	With Disabled Wife	Coef. On Disability Status 0f Wife
	(1)	(2)	(3)		(4)	(5)	(6)
Food Preparation	6.47	7.20	0.68		2.14	2.16	0.16
	(7.55)	(8.45)	(0.55)		(4.37)	(4.64)	(0.26)
Shopping for Food	1.37	1.27	-0.05		0.76	0.80	0.09
	(3.10)	(3.11)	(0.19)		(2.48)	(2.27)	(0.15)
All Shopping	6.88	5.28	-1.50**		4.12	3.74	-0.05
	(10.58)	(8.81)	(0.56)		(8.64)	(7.43)	(0.47)
Market Work	25.41	5.35	-20.31**		40.01	28.73	-5.25*
	(30.77)	(18.34)	(1.44)		(35.25)	(35.31)	(2.15)
Leisure 2	105.19	121.82	13.86**		107.40	121.35	6.06**
	(26.27)	(29.36)	(1.85)		(31.29)	(33.62)	(2.01)
Watching TV	12.93	20.97	6.14**		16.36	24.82	3.31*
	(13.82)	(19.70)	(1.20)		(17.88)	(24.59)	(1.61)
Relaxing	1.49	4.33	2.41**		2.09	4.15	0.92
	(4.82)	(10.65)	(0.64)		(6.79)	(11.20)	(0.78)
Sleeping	58.63	64.24	5.73**		56.72	59.09	0.71
	(13.14)	(18.71)	(1.15)		(13.76)	(15.40)	(0.99)
Personal Care	5.36	4.27	-1.44**		4.08	3.64	-0.32
	(4.44)	(4.41)	(0.28)		(3.96)	(4.18)	(0.26)
Caring for Adults	0.29	0.43	0.07		0.23	0.47	0.18
	(2.22)	(3.69)	(0.20)		(1.81)	(3.01)	(0.19)
Use of Medical Services	0.47	2.42	1.86*		0.33	0.55	-0.07
	(3.14)	(11.18)	(0.88)		(2.66)	(3.89)	(0.29)
Housework	7.48	8.28	0.59		1.60	1.63	0.07
	(11.27)	(12.78)	(0.78)		(5.50)	(5.91)	(0.32)
Activities with Spouse					32.10	37.75	6.10**
					(28.95)	(30.53)	(2.03)
N	8,298	361			7,386	336	

Notes: Time is defined as hours per week. Columns 1, 2, 4 and 5 show the mean time spent on various activities by women and husbands (of non-disabled and disabled wives). Column 3 shows the estimated difference in the use of time between a disabled and a non-disabled woman, controlling also for her age, age-squared, education (HS, College, Graduate school), race, region, year, urbanicity, number of adults in family, number of children in family, and the weekday and month of the interview. Column 6 shows the estimated difference in the use of time between husbands of non-disabled and disabled wives, controlling also for the husband's age, age-squared, race and his education, the age of the wife, region, year, urbanicity, number of adults in family, number of children in family, and the weekday and month of the interview.

Figure 1

Lifetime Disability Prevalence Rates for Men and Women

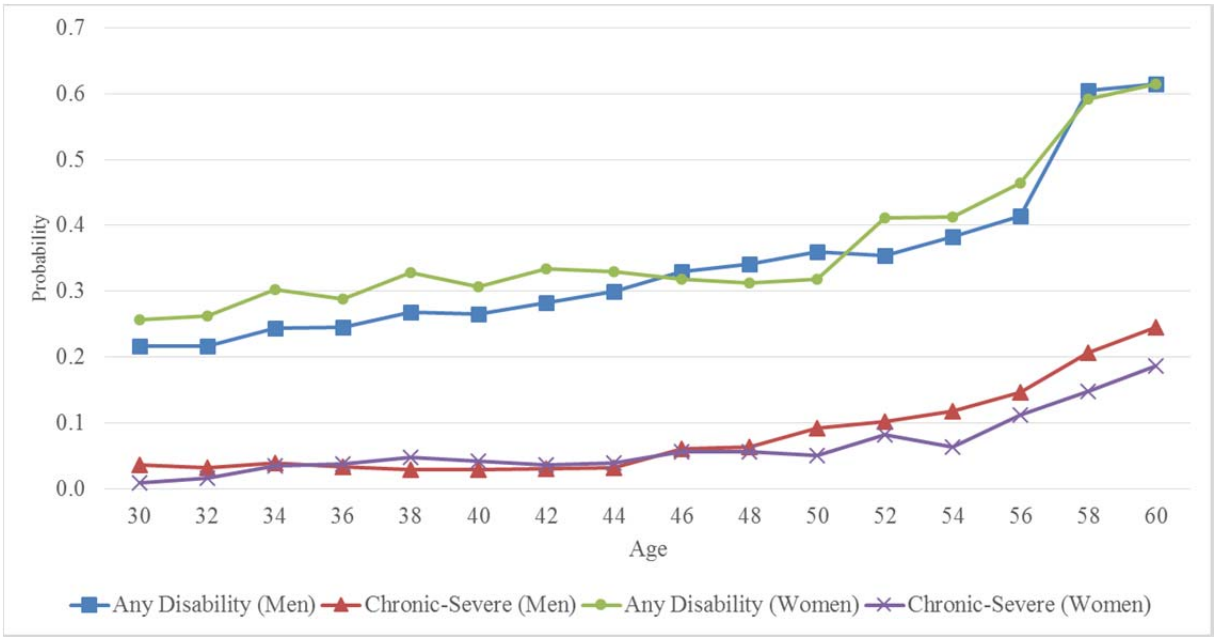


Figure 2

Annual Hours of Work (Linear, with Individual Fixed Effects)

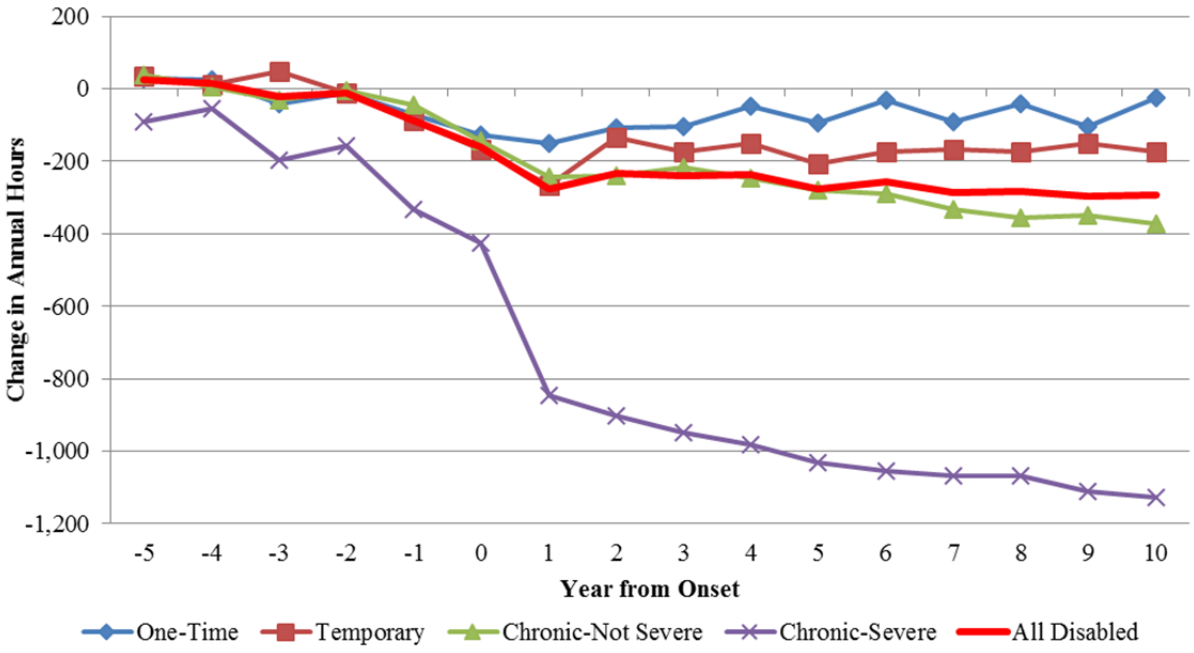


Figure 3
Fraction Not Working Before and After Disability Onset,
Extent of Disability Groups and All Disabled

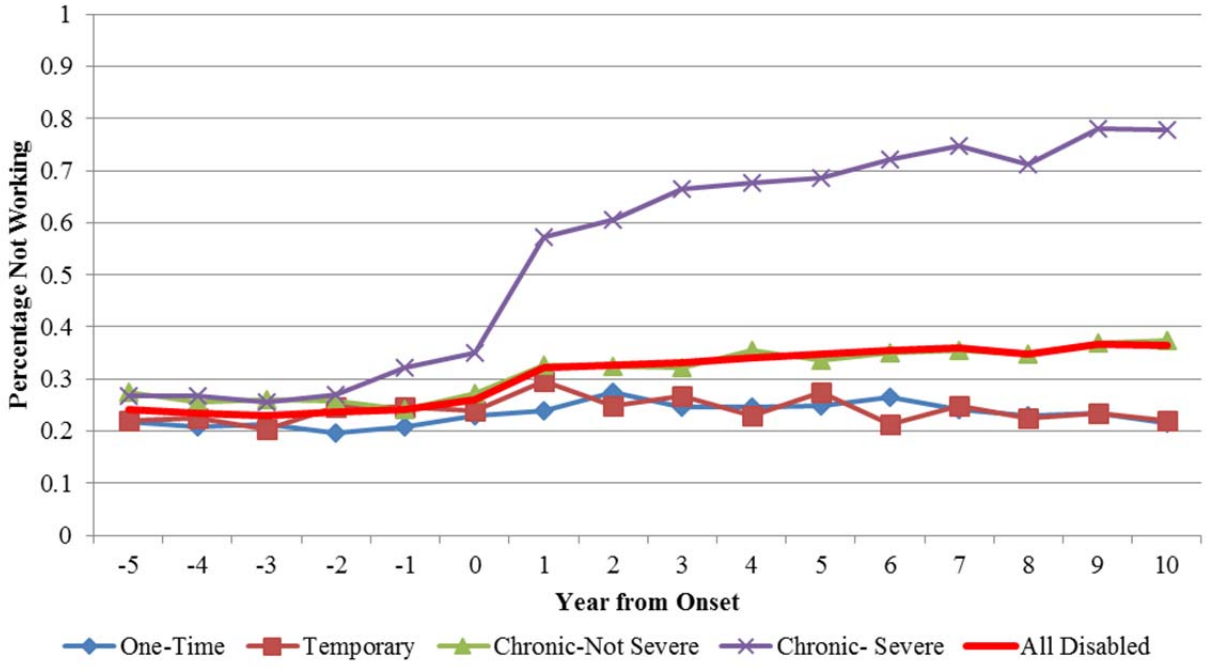


Figure 4
Percent Change in Annual Earnings Before and After Disability Onset,
Extent of Disability Groups and All Disabled

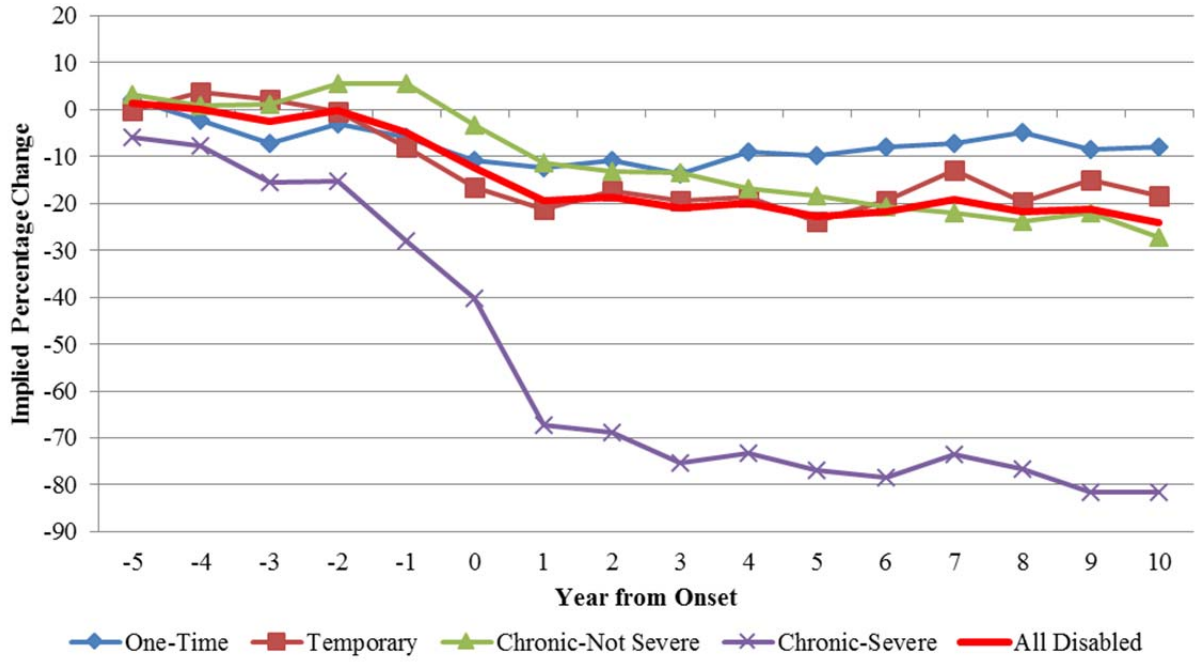


Figure 5
Percent Change in After-tax Pre-Transfer Income Before and After Disability Onset, Extent of Disability Groups and All Disabled

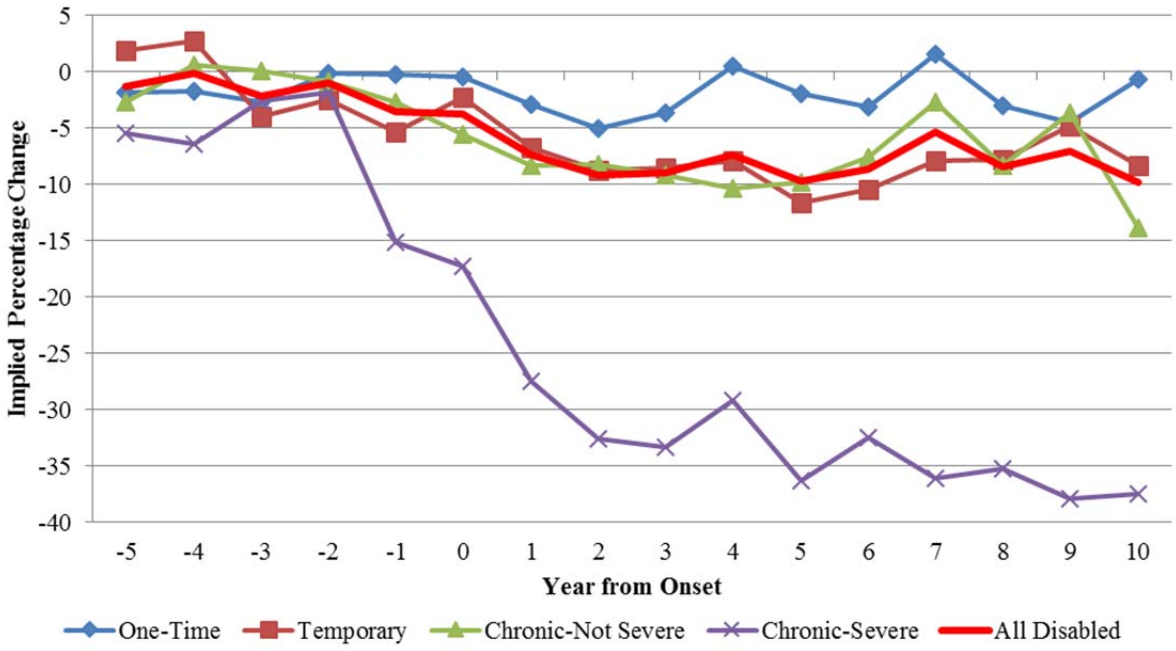


Figure 6
Percent Change in After-tax Post-Transfer Income Before and After Disability Onset, Extent of Disability Groups and All Disabled

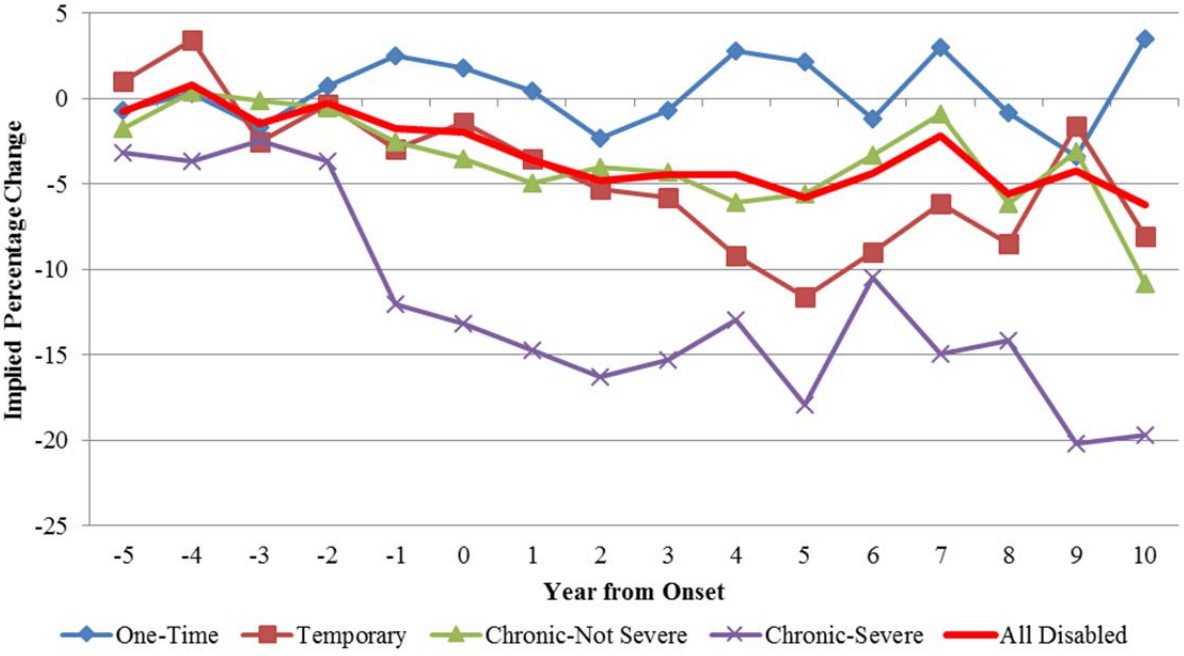


Figure 7
Change in Public Transfer Income (in 2012 dollars) Before and After Disability Onset, Extent of Disability Groups and All Disabled

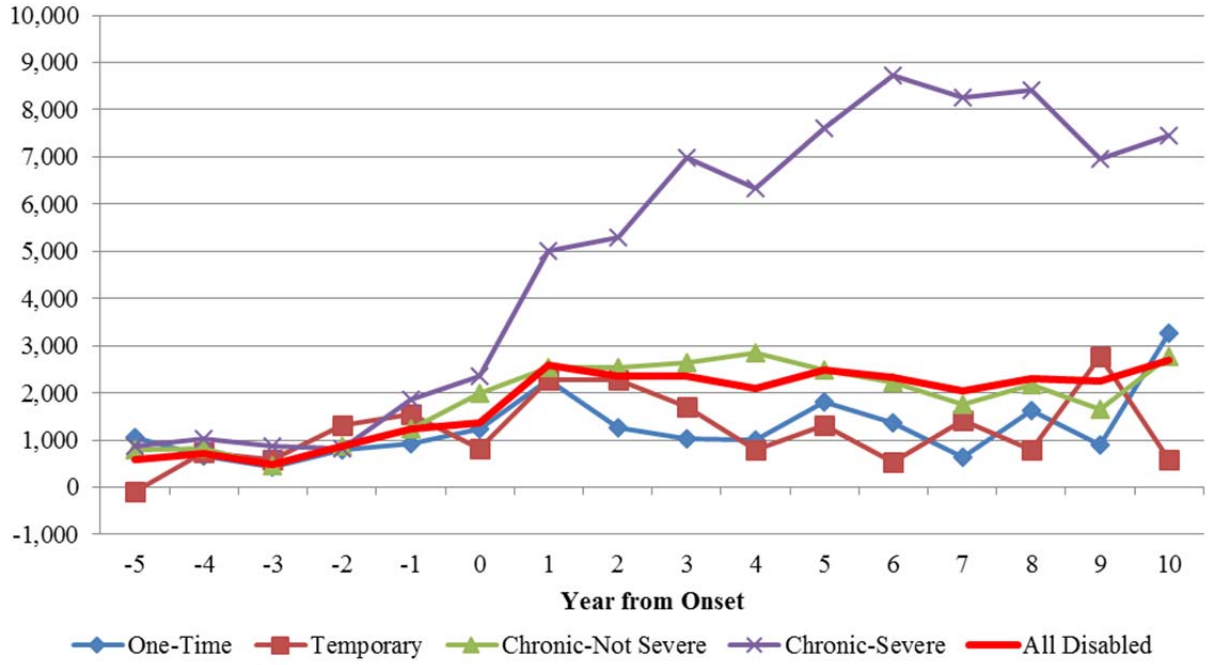


Figure 8
Poverty Rate Before and After Disability Onset, Extent of Disability Groups and All Disabled

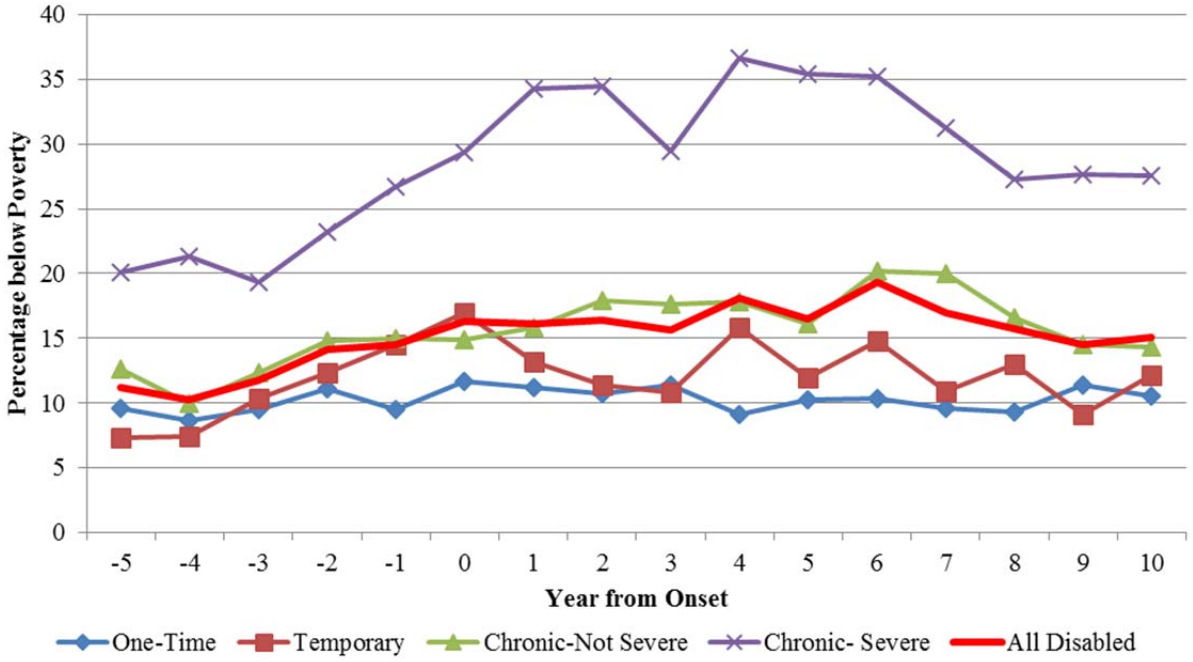


Figure 9
Percent Change in Food Consumption Before and After Disability Onset, Extent of Disability Groups and All Disabled

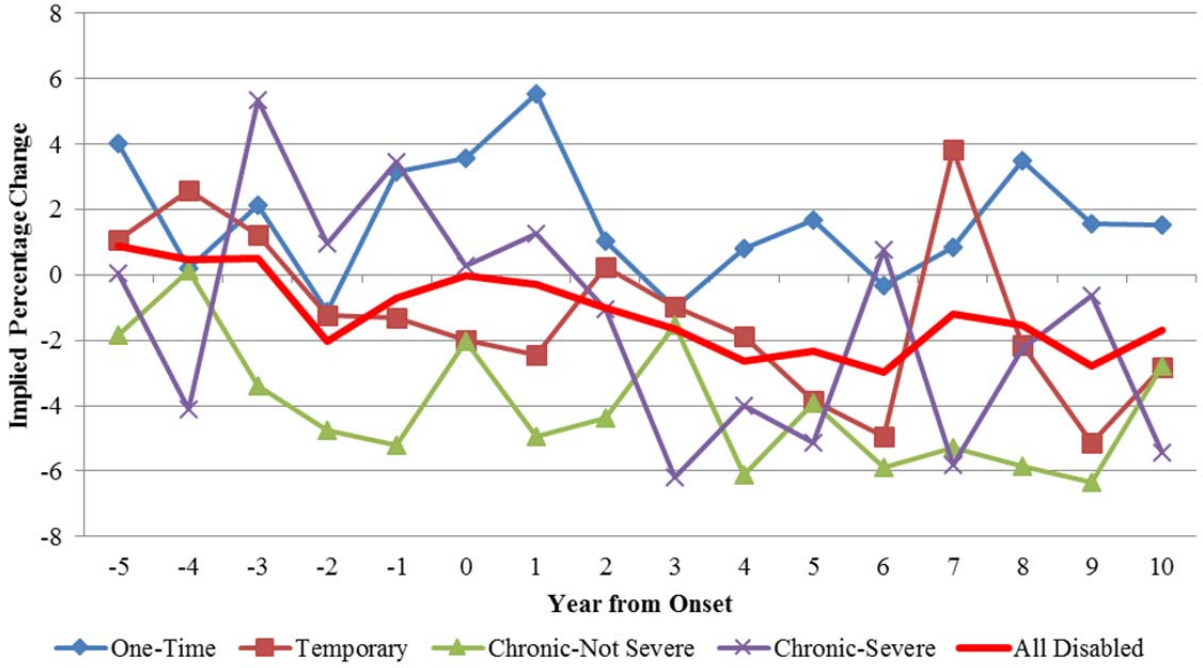


Figure 10
Percent Change in Food Consumption at Home Before and After Disability Onset, Extent of Disability Groups and All Disabled

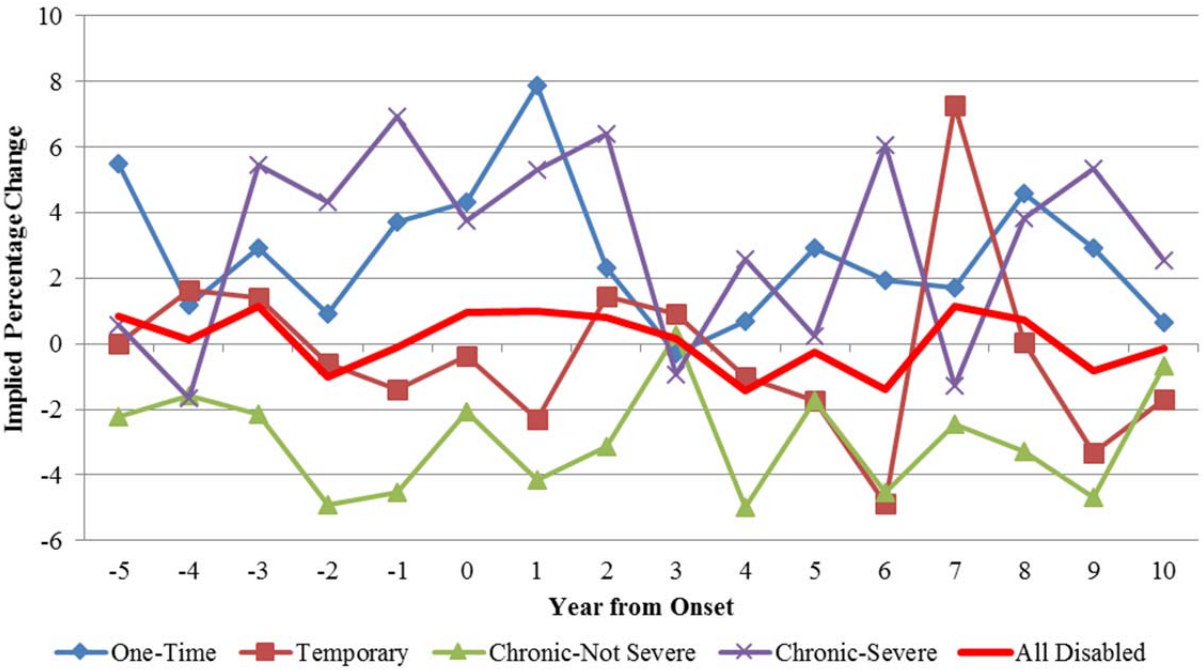


Figure 11
Percent Change in Food Consumption away from Home Before and After Disability Onset, Extent of Disability Groups and All Disabled

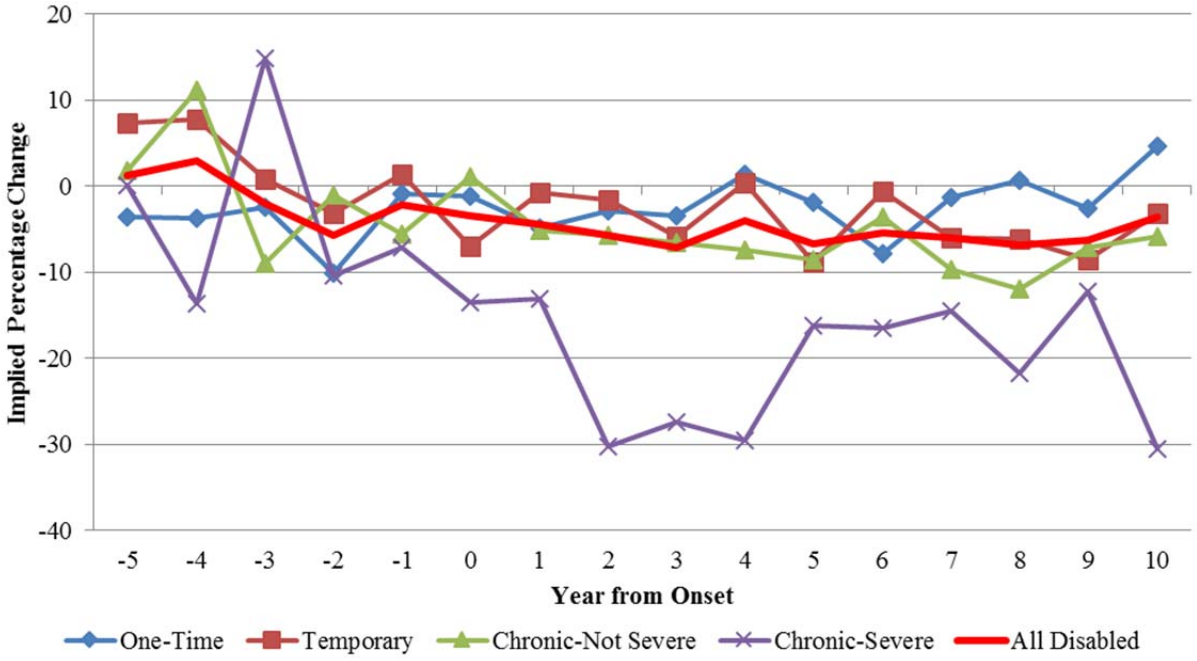
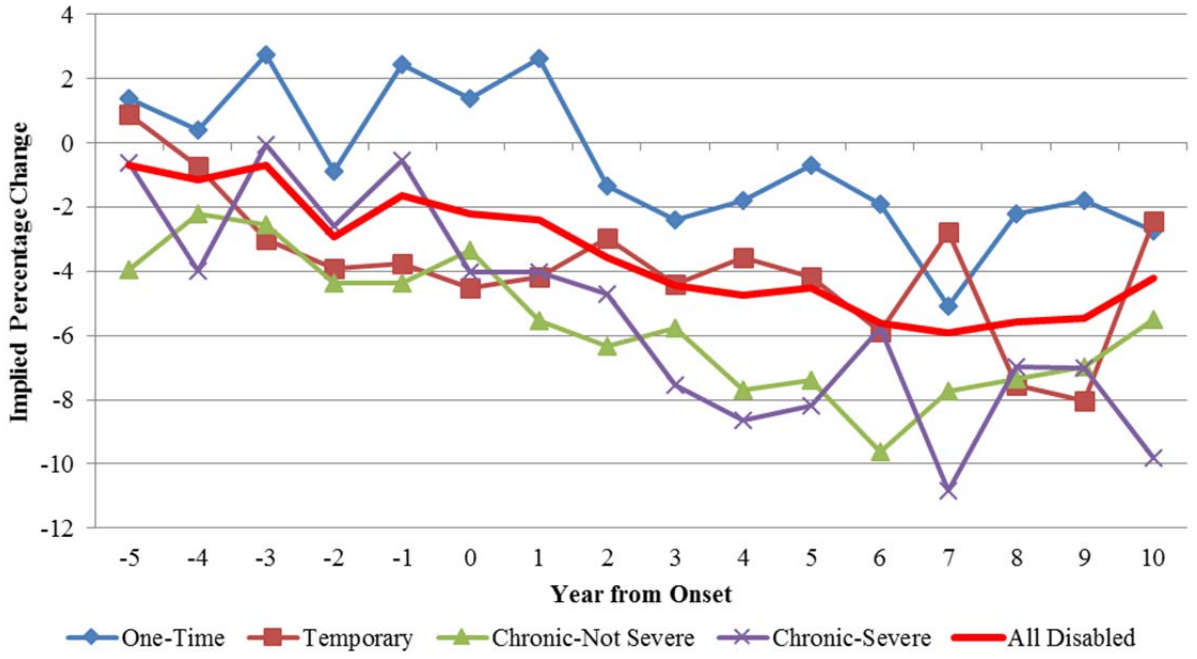


Figure 12
Percent Change in Food plus Housing Consumption Before and After Disability Onset, Extent of Disability Groups and All Disabled



Appendix

A. Controls for individual fixed effects regressions

All regressions include individual fixed effects and the time from onset dummies, year dummies, state dummies, age, age-squared, a married indicator, number of children, education dummies (12 yrs, 13-15 yrs, 16, 17+), also head status interacted with age, and age-squared. The following co-variates are also included, depending on the outcome variable:

Outcome	Additional Controls
Annual Earnings, Hours, Hourly Earnings	Education*Age interactions, Education*Age-sq interactions, Education*(linear time trend) interactions, Education*(linear time trend)-squared interactions
Income	Education*Age interactions, Education*Age-sq interactions, Education*(linear time trend) interactions, Education*(linear time trend)-squared interactions, number of family members, married indicator*(husband disability) interaction, married*(husband's age) interaction
Food, Food at Home, Food Away from Home, Food plus Housing	Number of men, number of women, number of kids (ages <=10), number of young adults (ages 11-17), number of elders (ages >=65) - And the squared of these five variables. married indicator*(husband current disability indicator) interaction, married*(husband's age) interaction
Public Transfers	Number of family members

B. Additional Controls for Regressions of Spousal Labor Supply

Outcome	Controls
Husband's Earnings, Hours of Work and Labor Supply at the Extensive margin	Wife's age and age-squared, Wife's education State dummies, year dummies, number of children. Husband's age and age-squared, Husband's education, and the following interactions: Education*Age interactions, Education*Age-sq interactions, Education*(linear time trend) interactions, Education*(linear time trend)-squared interactions Husband's current disability status.