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# Disability, Earnings, Income and Consumption

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# I. Introduction: what we do

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- Our goal is to understand the extent and nature of adult disability and to provide information needed to evaluate the success of disability insurance programs in the U.S. Key information needed:
    - Prevalence of disability
    - Economic outcomes before and after the onset of disability
    - Moral hazard or disincentive effects
  - We know much about the disincentive effects but little about lifetime disability rates and their consequences.
  - We examine employment, hours, wages, earnings, transfers, income, poverty, food and housing consumption, assets, and time-use.
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# I. Introduction: why it matters

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- The reason for social insurance is that it keeps living standards from falling when a bad event occurs.
  - It is most needed when the event is unpredictable and long-term. What is the evidence on key events?
    - Unemployment is temporary. Gruber (1997) finds a 6.8 percent drop in consumption that bounces back with reemployment. Browning and Crossley (2001) find 14% fall.
    - Retirement is usually planned, though its exact timing is uncertain. Fall in food expenditures with retirement: Bernheim et al. (2001—6-10 percent), Haider and Stevens (2003—10-15 percent), Hurst (2003—11 percent).
    - Aguiar and Hurst (2005) argue that this drop overstates the drop in well-being because of substitution of time for money.
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# I. Introduction: why it matters cont.

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- Disability is the prototypical bad event for which we need social insurance: unpredictable and long-term. The possibility of a consumption drop is greater since individuals are less able to insure against the income drop than in the other cases.
  - We find about a 25 percent drop in food plus housing consumption and somewhat less for just food. This drop persists for many years.
  - We conjecture that disability risk is a good candidate for the most important risk that people face.
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# I. Introduction: policy analysis inputs

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- The project provides important inputs to disability policy analyses such as:
    - Bound, Cullen, Nichols and Schmidt (2004)
    - Chandra and Samwick (2005)
    - Low and Pistaferri (2010).
    - In Chetty's (2006) formulation (that extends Baily), the key inputs to optimal DI benefit calculations are lifetime prevalence, consumption fall, and moral hazard response (as well as degree of risk aversion). We know a fair amount about moral hazard, but much less about prevalence and consumption.
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# I. Introduction: past work

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- The past work that is most closely related is by Charles (2002) and Stephens (2001).
    - Charles doesn't look at consumption. His earnings results don't replicate. In joint work with Charles we find an earnings fall several times as big.
    - Stephens for early period, only married men, very broad definition of disability, short-term effects. He finds very small effects on consumption and no differences by extent of disability.
  - Other important work by Bound, Burkhauser, Nichols, Haveman and Wolfe, and others.
  - We look at a broader range of outcomes, use recent data, and disaggregate the disabled.
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## II. Data: PSID sample

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- 1968-2009 waves
  - 6,741 Male household heads, ages 22-61.
  - We use an unbalanced panel.
  - We require at least six years of data, at least three must be consecutive, at least four must be while head 22-61.
  - Annual reports on whether the head has a disabling condition and how much it limits work.
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## II. Data: definition of disability

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- Definition of disability:  
*“Do you have any physical or nervous condition that limits the type or amount of work you can do?”*
  - We also use a self-reported severity measure as we will see shortly.
  - Disability is a function of available work options and available public and private income support.
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## II. Data: no alternative to self reports

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- There is no alternative to using self-reports if you want to look at longitudinal data with a wide range of outcomes.
  - About half of new Disability Insurance awards are for individuals without physical evidence of disability.
  - You might prefer self-reports to physical limitations because you:
    - May want to include nervous disorders,
    - May want to condition on skill; what is a limitation for a truck driver may not bother an office worker,
    - Self-reports may provide the right “sufficient statistic” that combines skill, and physical and mental condition.
    - Quite a bit of evidence that self-reports are unbiased.
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## II. Data: disability severity

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- In the PSID, after the question on the presence of disability, a follow up question is asked about the condition: “How much does it limit your work?”  
The possible responses are (in rough order of severity):

### Not Severe

1. Not at all
2. Just a Little/Not Limiting
3. Somewhat

### Severe

4. A Lot
5. Severely
6. Completely
7. Can do nothing

Table 3  
Disability Transition Matrix

t-1	t	t+1			t+2		
		Non-disabled	Not Severe	Severe	Non-disabled	Not Severe	Severe
Non-disabled	Non-disabled	0.967	0.023	0.007	0.954	0.029	0.011
Non-disabled	Not Severe	0.586	0.336	0.075	0.619	0.300	0.074
Non-disabled	Severe	0.309	0.255	0.431	0.345	0.253	0.388
Not Severe	Non-disabled	0.752	0.203	0.041	0.726	0.202	0.067
Not Severe	Not Severe	0.252	0.647	0.094	0.323	0.546	0.118
Not Severe	Severe	0.124	0.314	0.552	0.173	0.309	0.514
Severe	Non-disabled	0.647	0.196	0.145	0.609	0.211	0.165
Severe	Not Severe	0.194	0.464	0.342	0.212	0.397	0.386
Severe	Severe	0.066	0.129	0.796	0.099	0.160	0.728

## II. Disability persistence and severity

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- We combine persistence and severity into a single classification.
  - One-Time: No disability in the next 10 years after initial onset. We require 2 consecutive negative limitation reports immediately after onset.
  - Temporary: Up to 2 positive disability reports in the 10 years after onset.
  - Chronic (Not-severe): 3 or more positive disability reports in the 10 years after onset.
  - Chronic Severe: Chronic and disability severe a majority of years.
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## II. Data: disability rates

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- Lifetime disability rates (whether ever been disabled) are more interesting than point in time rates.
  - We use the middle years of our data so that we have many years over which a disability could begin and many years after to determine its persistence and severity.
  - Biases on rates likely downward: required years after onset cause us to lose those who die or exit from headship; disabilities prior to age 18 missed
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**Table 4**  
**Prevalence of Disability by Age**

<b>Age</b>	<b>Number of Male Heads</b>	<b>Any Disability</b>	<b>Currently Disabled</b>	<b>One-Time</b>	<b>Temporary</b>	<b>Chronic Not Severe</b>	<b>Chronic Severe</b>
30	607	0.217	0.086	0.043	0.065	0.074	0.036
32	1009	0.216	0.077	0.042	0.064	0.077	0.032
34	1214	0.244	0.090	0.057	0.059	0.090	0.038
36	1272	0.245	0.099	0.058	0.057	0.096	0.033
38	1112	0.268	0.082	0.063	0.069	0.107	0.029
40	1009	0.266	0.088	0.054	0.071	0.112	0.029
42	902	0.283	0.108	0.061	0.071	0.120	0.030
44	743	0.300	0.120	0.048	0.100	0.120	0.032
46	583	0.330	0.132	0.051	0.106	0.113	0.060
48	554	0.341	0.128	0.047	0.091	0.139	0.064
50	542	0.360	0.163	0.056	0.079	0.133	0.092
52	555	0.354	0.169	0.061	0.072	0.120	0.102
54	538	0.382	0.191	0.061	0.076	0.128	0.118
56	545	0.414	0.215	0.064	0.073	0.131	0.146
58	383	0.605	0.303	0.084	0.104	0.210	0.206
60	352	0.614	0.304	0.081	0.101	0.188	0.245

# III. Estimation

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## ■ Fixed Effects Regressions

$$y_{it} = \alpha_i + \gamma_t + X_{it}\beta + \sum_h \sum_k A_{hit}^k \delta_h^k + \varepsilon_{it}$$

$y_{it}$  : Outcome of Interest

$\alpha_i$  : Individual fixed effect

$\gamma_t$  : Indicator variable for year t

$X_{it}$  : Explanatory variables: education, marital status, state of residence, age, age<sup>2</sup>, # of children, educ x age and age<sup>2</sup>, educ x time and time<sup>2</sup>

$A_{hit}^k$  : Indicator variable, for individual i in year t, belonging to disability group h and in the k<sup>th</sup> year from disability onset

$\varepsilon_{it}$  : Error term

# III. Estimation

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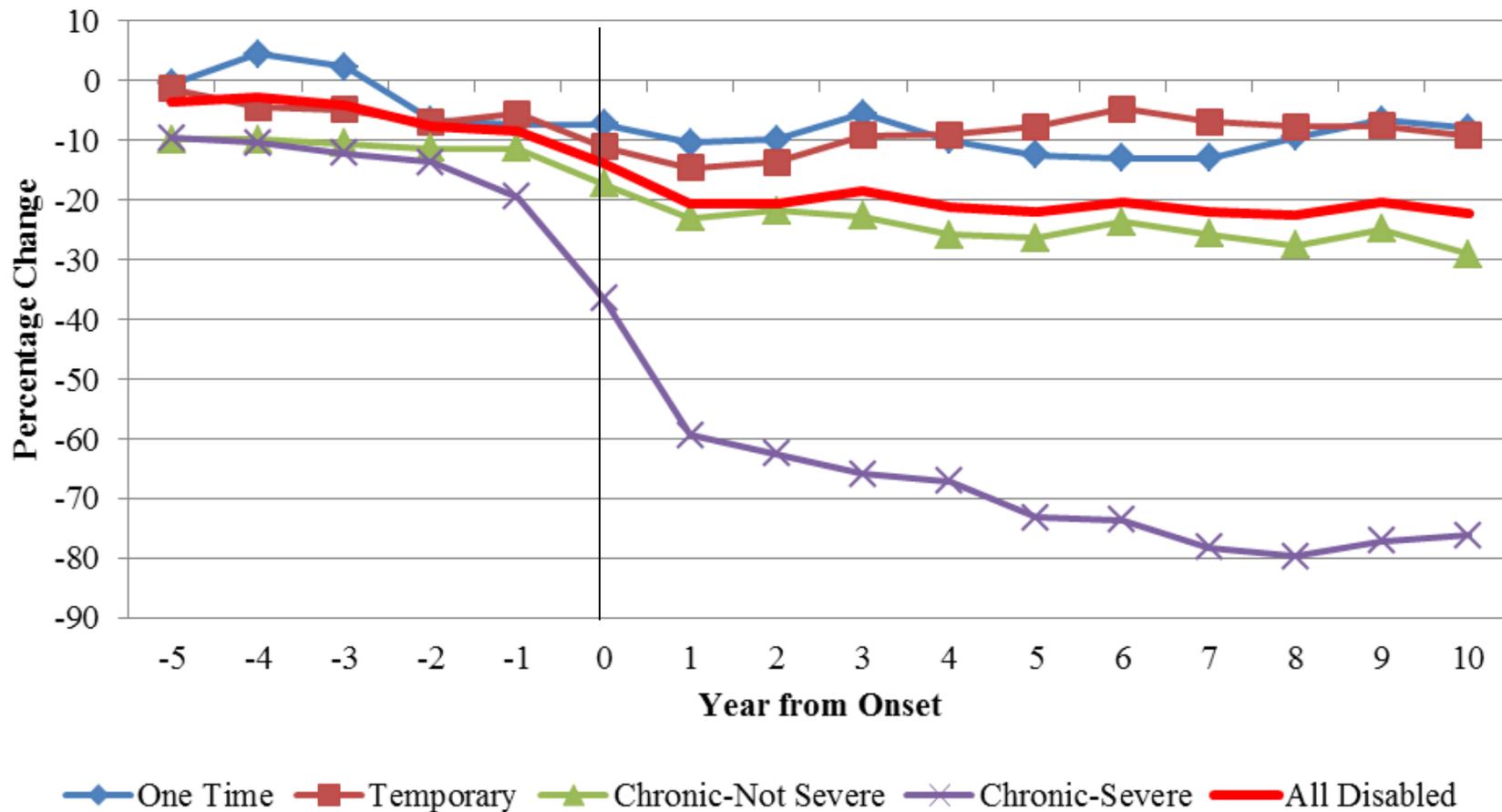
## ■ Fixed Effects Regressions

$$y_{it} = \alpha_i + \gamma_t + X_{it}\beta + \sum_h \sum_k A_{hit}^k \delta_h^k + \varepsilon_{it}$$

- We focus on the effect of disability 5 years before and 10 years after disability onset, thus  $k \in \{-5, 10\}$  in  $\Sigma$ .
- Sample is those with  $k \leq 10$  and non-disabled.
- The coefficients of interest are the  $\delta_h^k$ , the changes in the dependent variable for people in disability group  $h$  in the  $k^{\text{th}}$  year relative to onset compared to the same individuals more than five years prior to disability onset (i.e.  $k < -5$ ).

# Figure 1

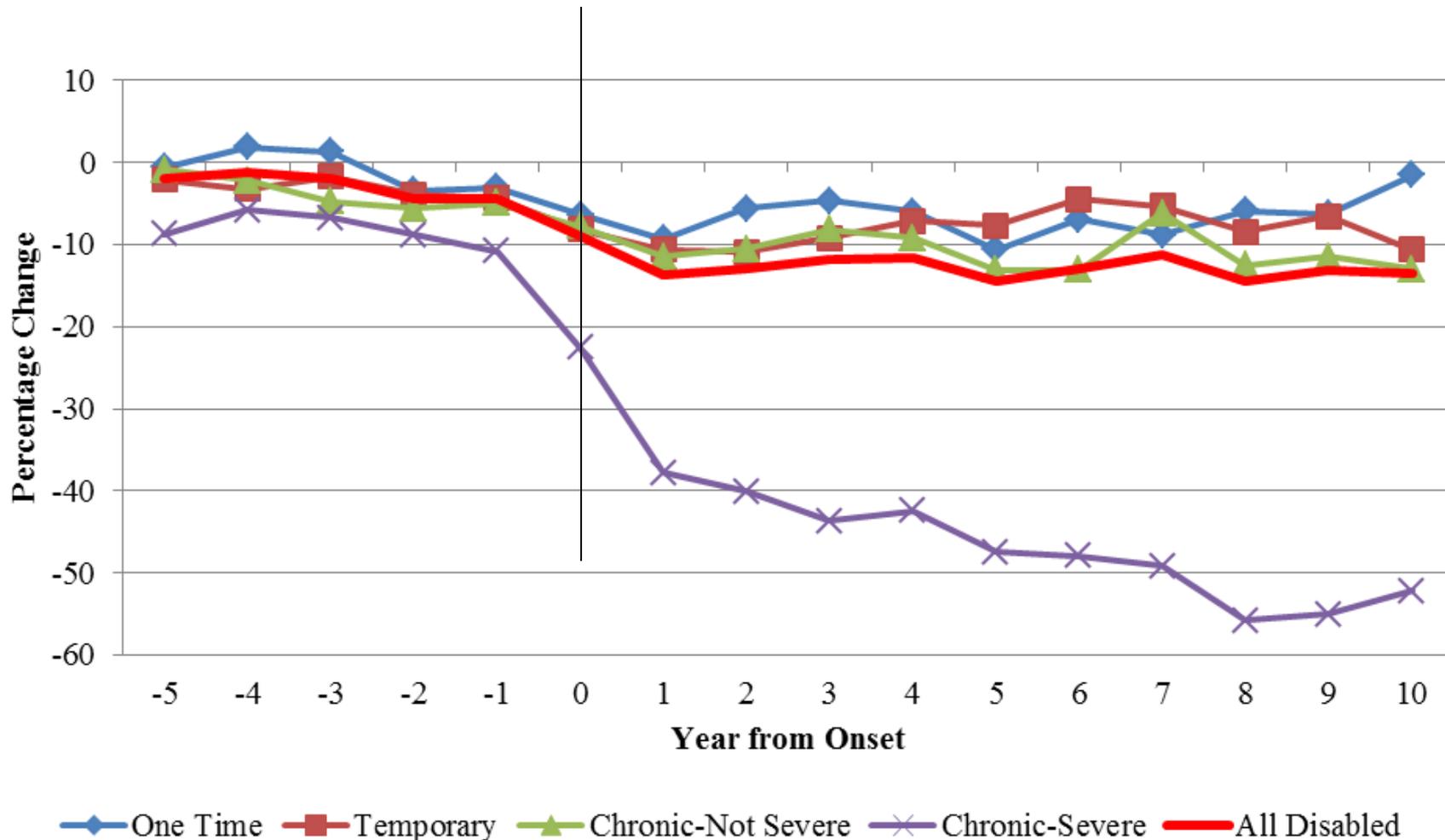
## Percentage Change in Annual Earnings Before and After Disability Onset, Extent of Disability Groups and All Disabled



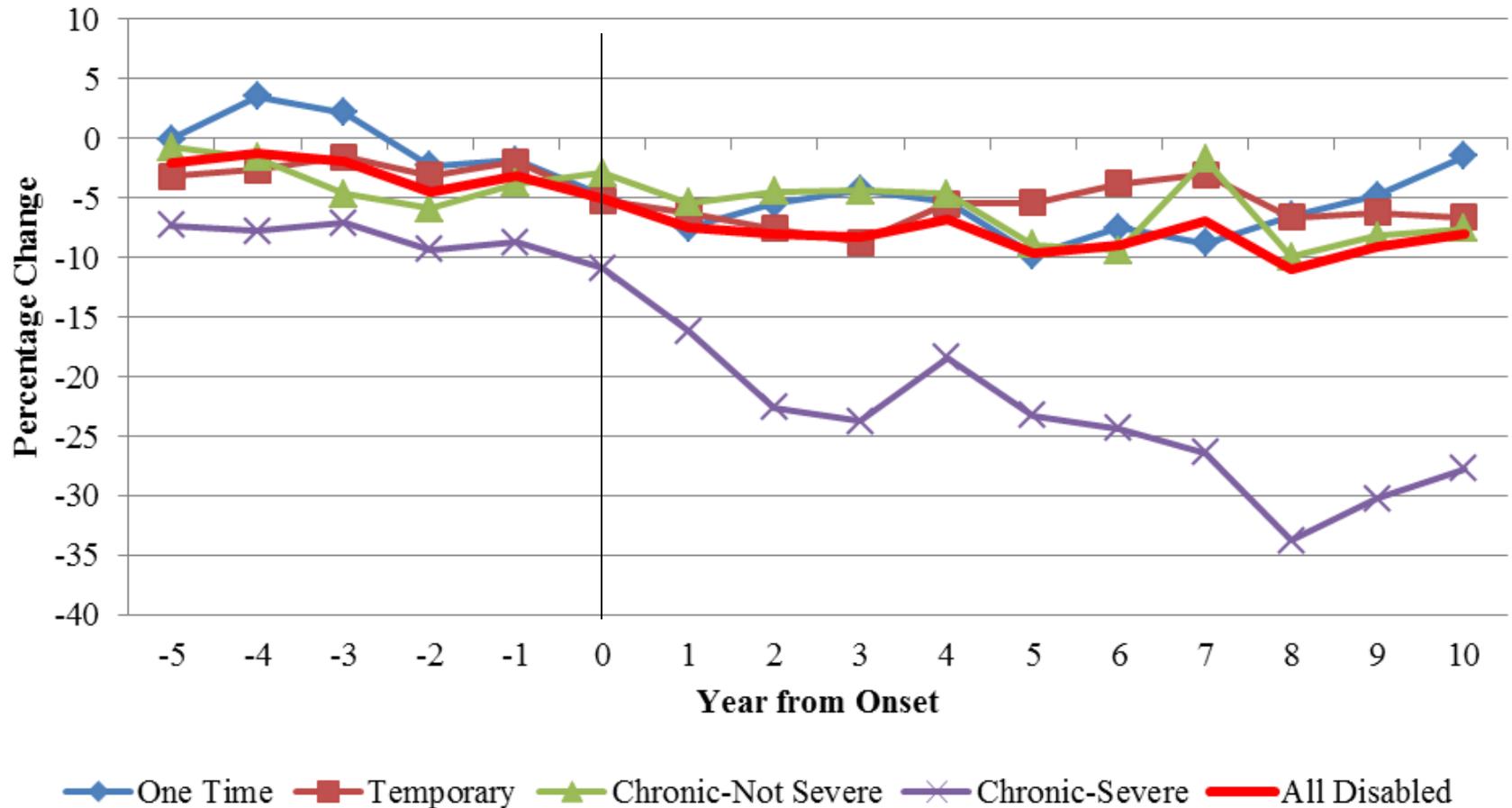
## IV. Outcomes: income

- We look at two alternative income measures:
  - After-Tax Pre-Public Transfer Income = Income – Taxes – Public Transfers
  - After-Tax Post-Public Transfer Income = Income – Taxes + Food Stamps + Value of Public Housing. AFDC/TANF, Social Security, SSI, UI, WC and Food Stamps are scaled up according to the under-reporting rates of Meyer, Mok and Sullivan (2008). This adjustment assumes non-reporting recipients look like recipients.
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**Figure 5**  
**Percentage Change in After-Tax Pre-Public Transfer Income**  
**Before and After Disability Onset,**  
**Extent of Disability Groups and All Disabled**



**Figure 6**  
**Percentage Change in After-Tax Post-Transfer Income**  
**Before and After Disability Onset,**  
**Extent of Disability Groups and All Disabled**



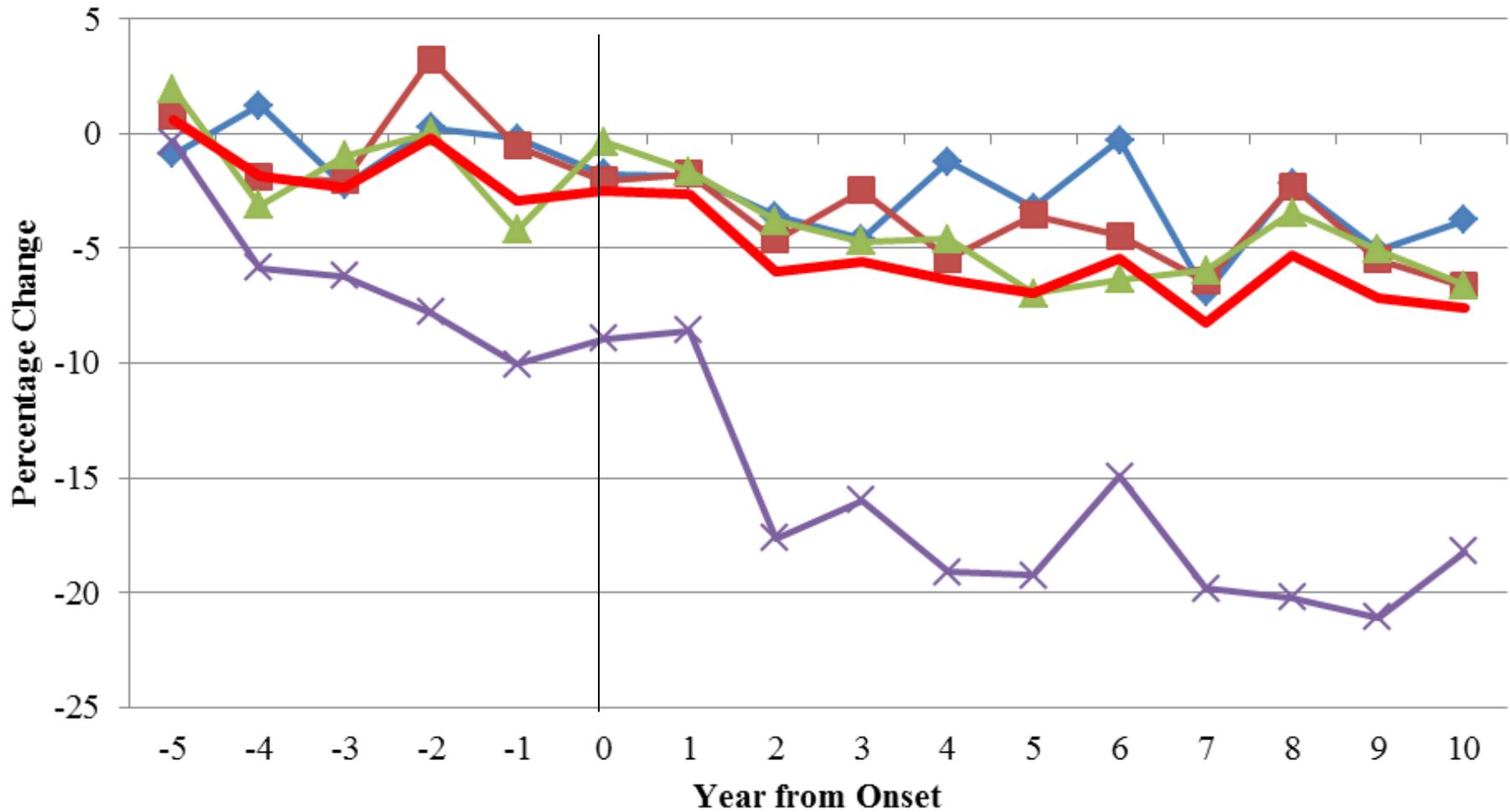
## IV. Outcomes: consumption

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- We look at the change in food and housing consumption following disability.
  - Food consumption = Value of food consumed at home, food eaten outside, plus the value of food stamps.
  - Housing consumption = rent paid (or rental equivalent if don't pay), value of subsidized housing (based on characteristics of unit), and for home owners, 6% of the home's current value.
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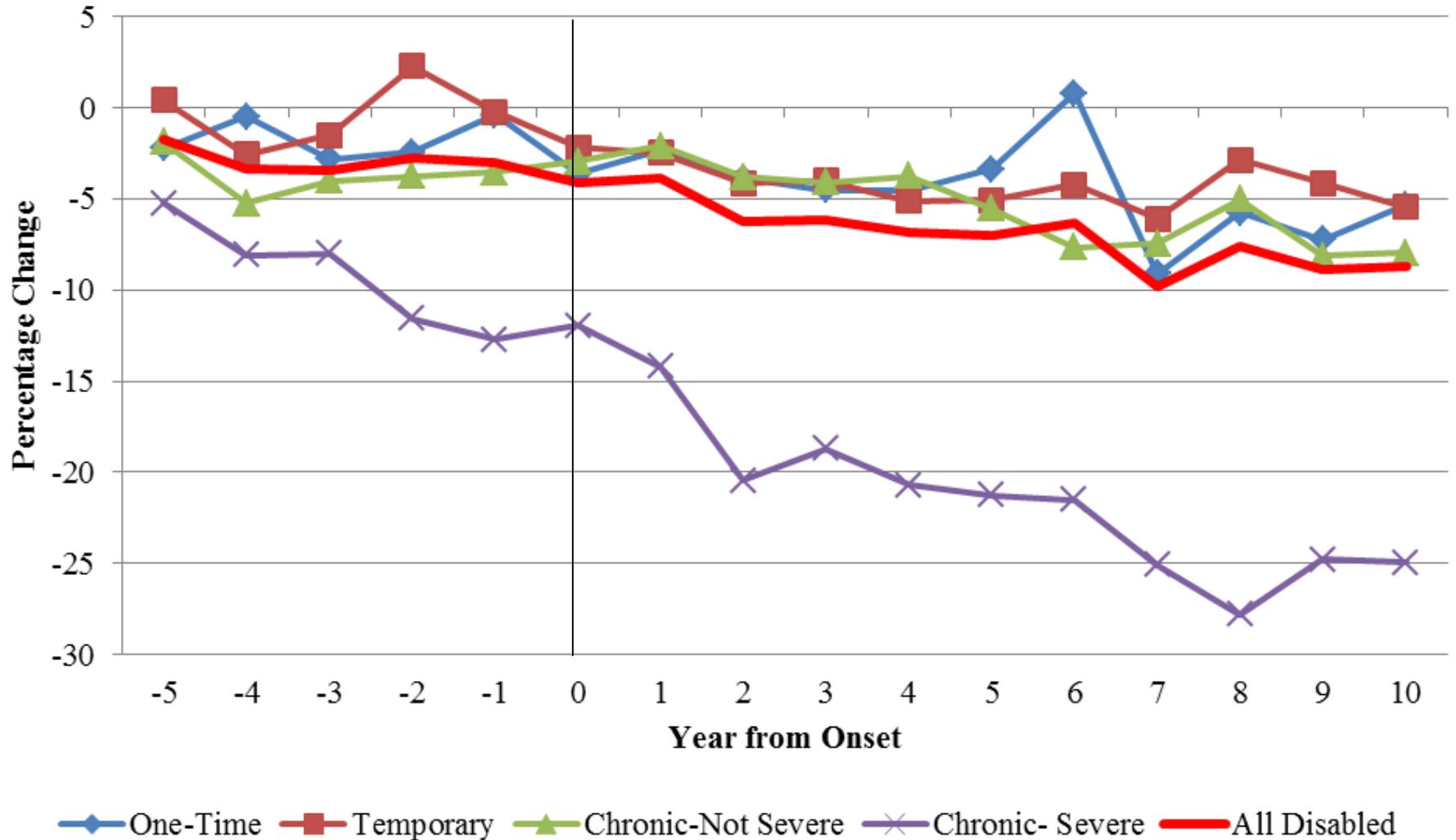
**Figure 9**

**Percentage Change in Food Consumption Before and After Disability Onset, Extent of Disability Groups and All Disabled**

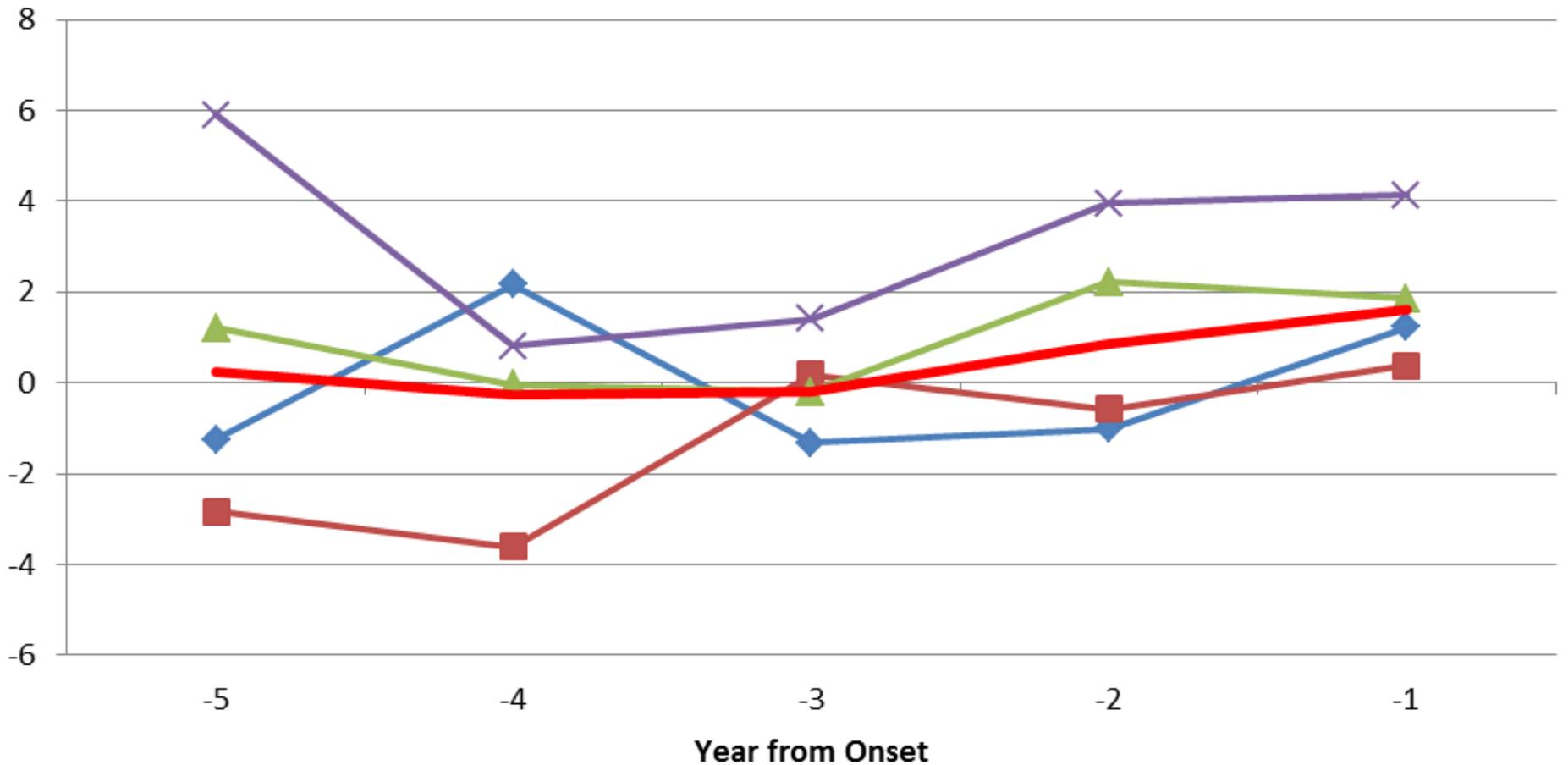


◆ One-Time   ■ Temporary   ▲ Chronic-Not Severe   ✕ Chronic-Severe   — All Disabled

**Figure 10**  
**Percentage Change in Food + Housing Consumption**  
**Before and After Disability Onset,**  
**Extent of Disability Groups and All Disabled**

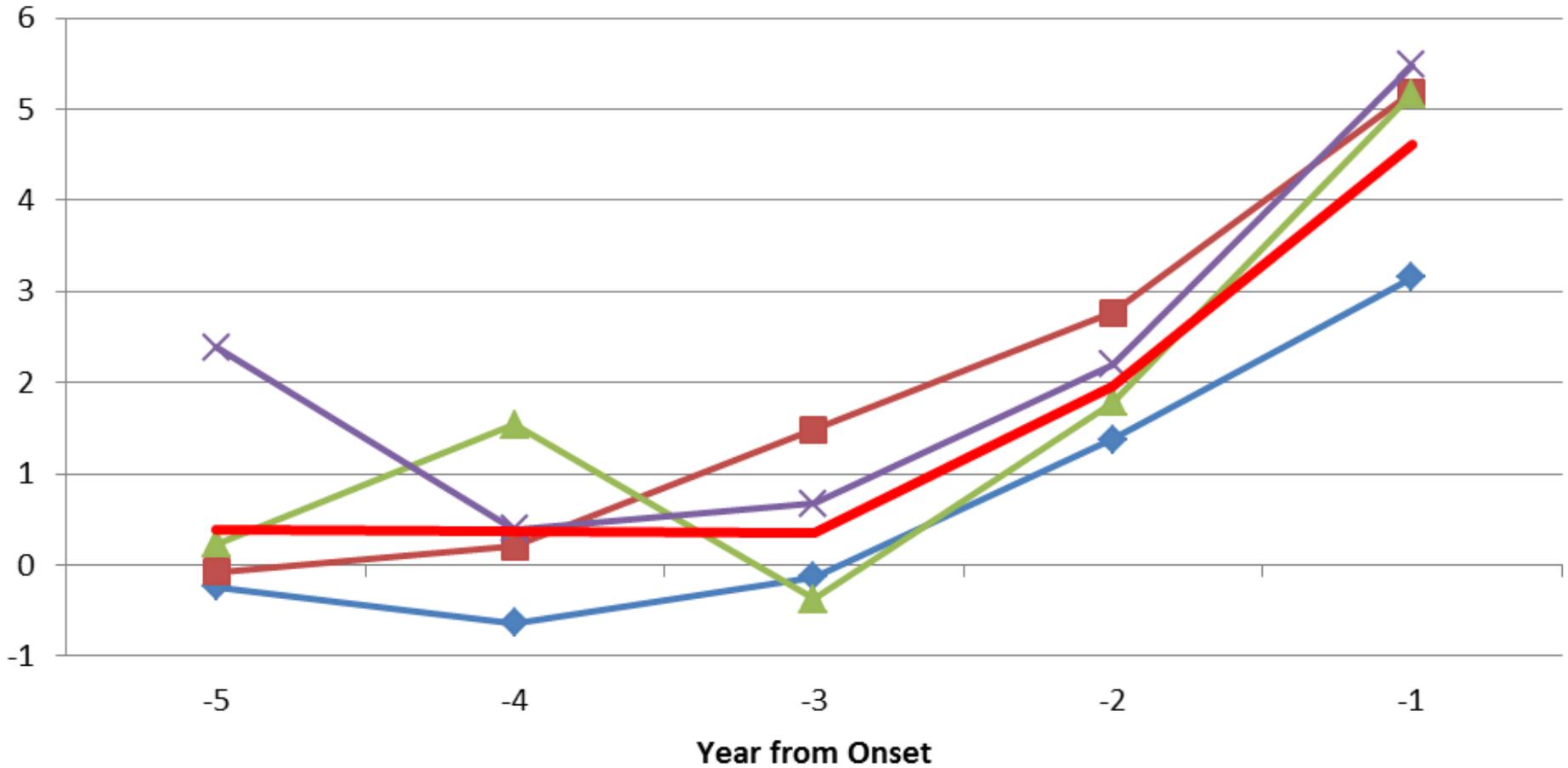


**Appendix Figure 1**  
**Change in Number of Days of Unemployment in Year,**  
**By Extent of Disability Groups**



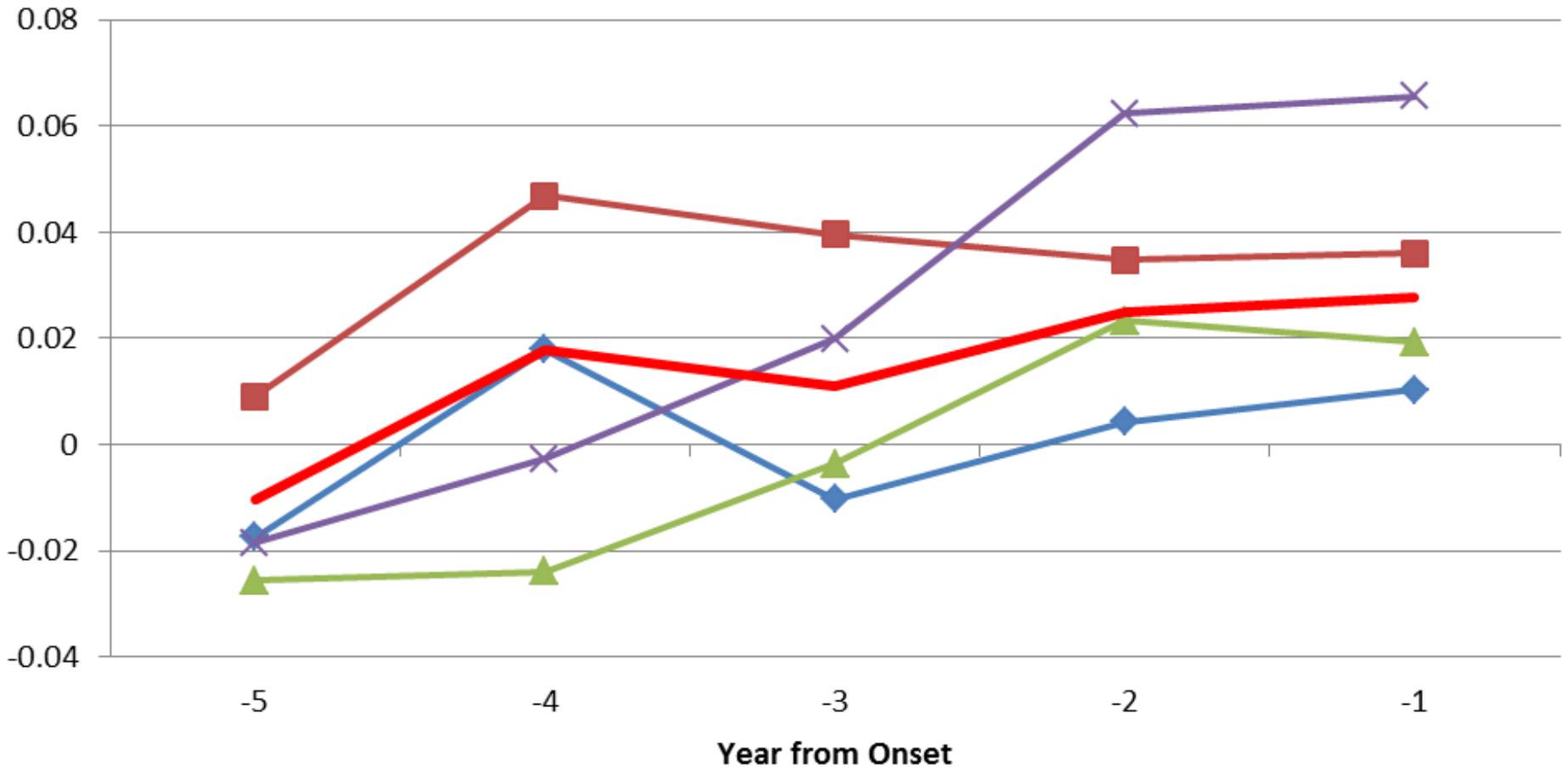
◆ One Time   ■ Temporary   ▲ Chronic-Not Severe   ✕ Chronic-Severe   — All Disabled

**Appendix Figure 2**  
**Change in Number of Days of Work Missed due to Illness in Year,**  
**By Extent of Disability Groups**



◆ One Time   ■ Temporary   ▲ Chronic-Not Severe   ✕ Chronic-Severe   — All Disabled

**Appendix Figure 3**  
**Change in Share in Poor or Fair Health,**  
**By Extent of Disability Groups**



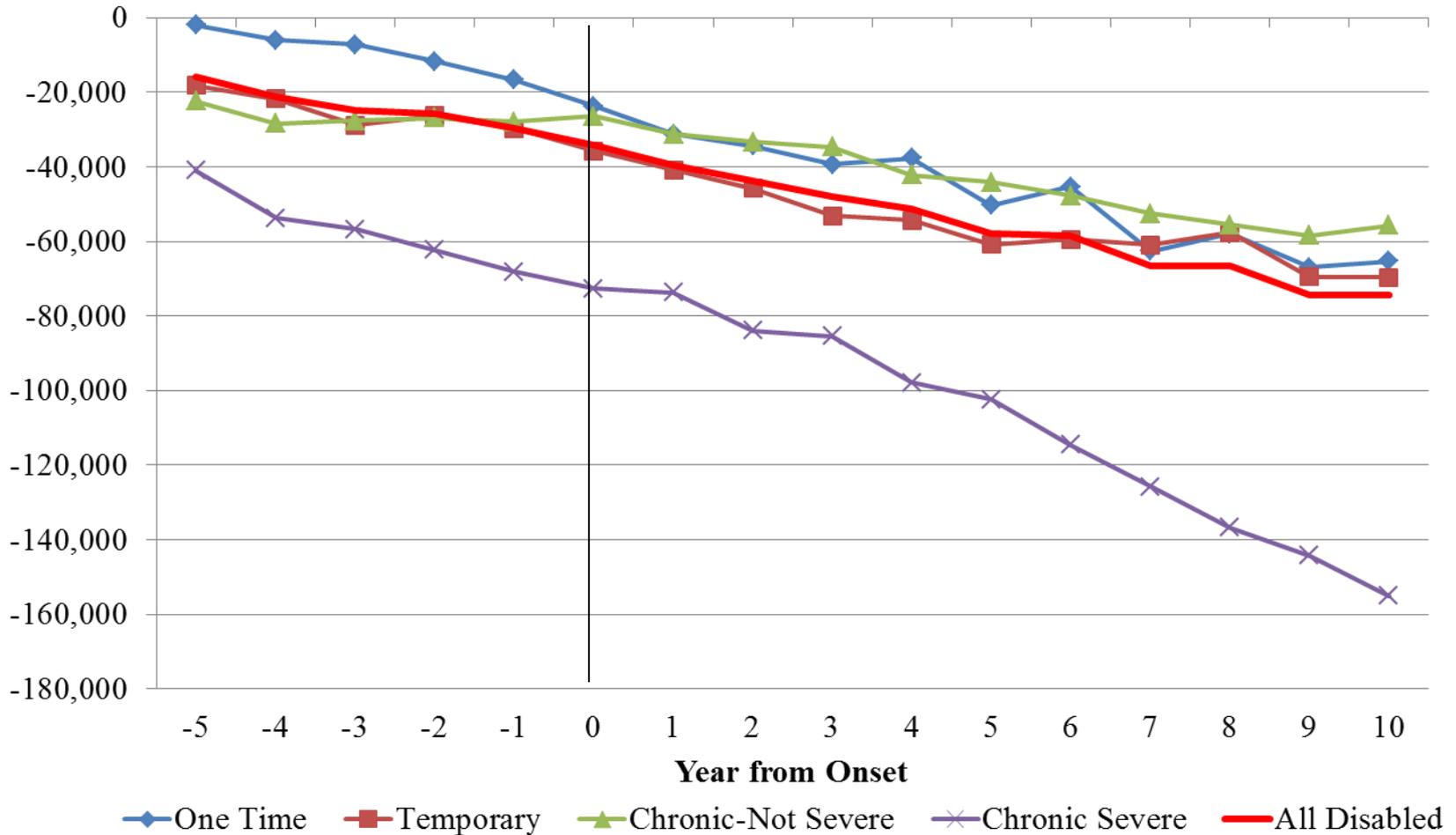
◆ One Time   ■ Temporary   ▲ Chronic-Not Severe   ✕ Chronic-Severe   — All Disabled

# V. Does dissaving explain the gap?

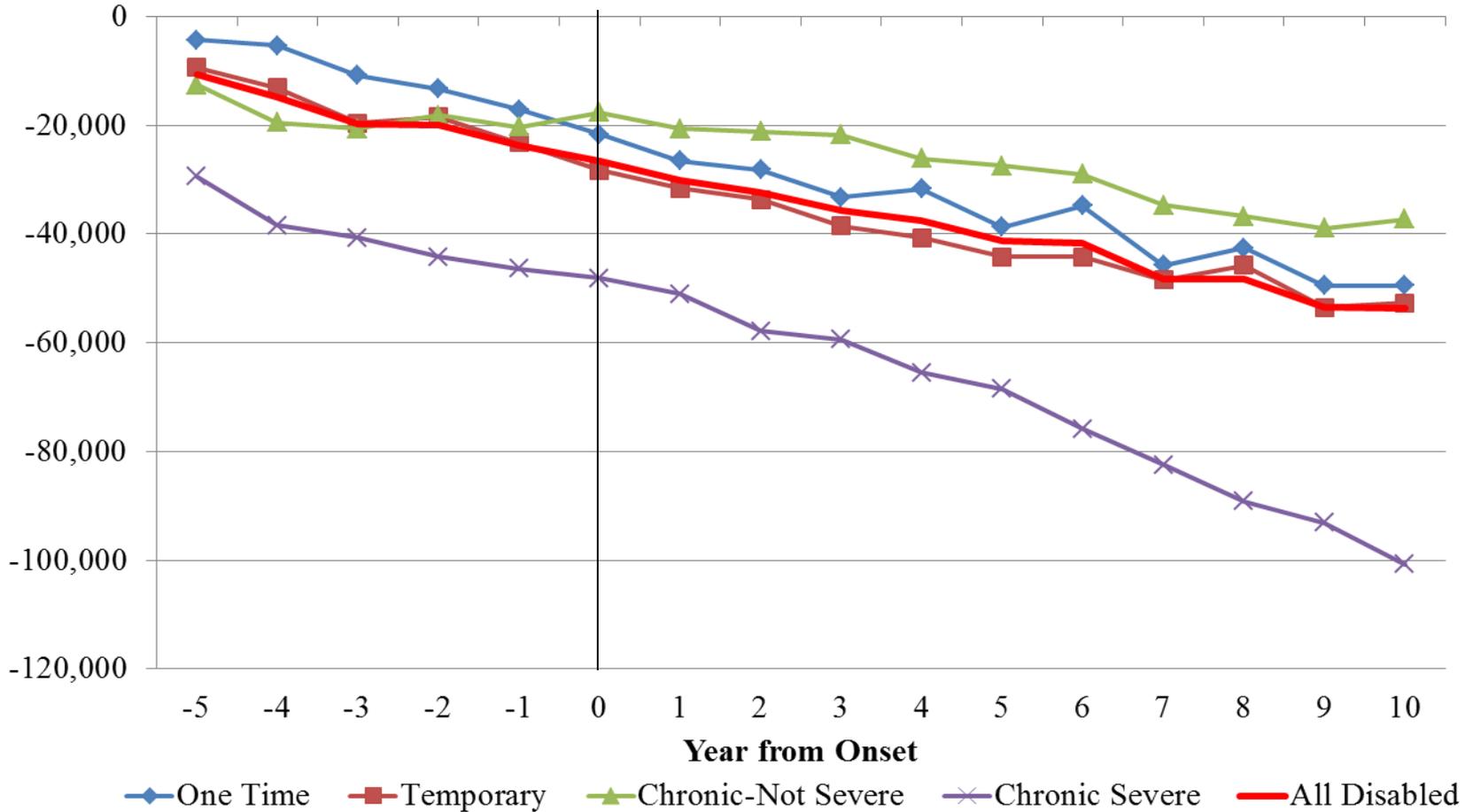
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- Wealth declines significantly for the chronic-severe disabled, but pinning down its exact magnitude is hard given outliers.
  - Median wealth falls absolutely and relative to other disabled groups.
  - In regressions with individual fixed effects that allow for the counterfactual growth (or decline) with age and year we censor the top and bottom 5 or 10 percent of observations.
  - The annualized magnitudes are very roughly consistent with the income consumption gap.
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# Level Change in Family Net Wealth Before and After Disability Onset, Extent of Disability Groups and All Disabled (5% censoring) (2010 Dollars)



## Level Change in Family Net Wealth Before and After Disability Onset, Extent of Disability Groups and All Disabled (10% censoring) (2010 Dollars)



# V. Summary of Outcome Changes

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- Individual earnings fall about 75 percent.
  - Pooling of family incomes and accounting for taxes, leads family income to fall about 50 percent before transfers.
    - Increased marital dissolution and reduced spousal work moves income in the opposite direction.
  - Family income after transfers falls about 30 percent
    - Mostly DI, SSI
  - Family consumption falls 18-25 percent
    - Draw down of wealth can explain the difference
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## VI. Findings: interpreting the consumption fall

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- What is the marginal utility of consumption of a family with a disabled head?
  - The marginal utility of consumption could rise or fall with disability.
  - The family unit here is larger than in the retirement case. Average family size about 3.5 to 4.0 depending on years from onset. Thus, the change in marginal utility function (at the household level) must be small.
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# Investigating Fall in Food Consumption

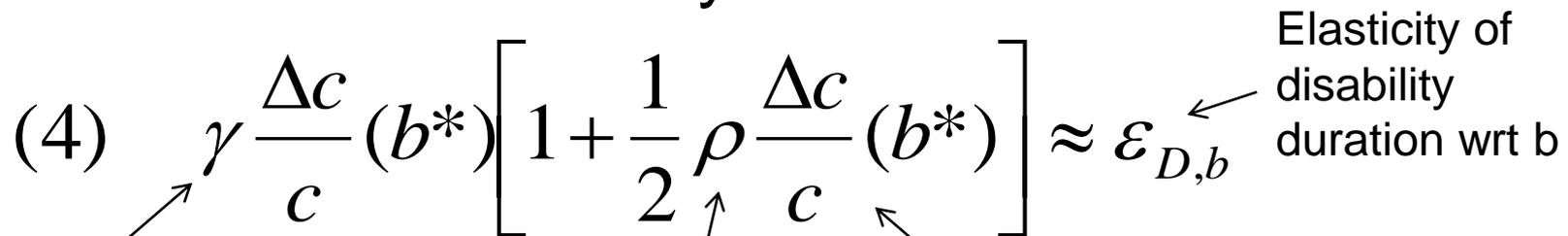
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- Aguiar and Hurst (2005): A Fall in Expenditure on Food, may not be the same as a fall in consumption due to:
    - More time spent preparing food, and
    - More time spent shopping (searching for bargains).
  - We investigate these issue using
    - Continuing Survey of Food Intake of Individuals (CSFII) – Dataset on quantities (not \$) of food consumed
    - American Time Use Survey (ATUS) – Time Use
  - For the disabled, we find worse nutrition and no greater time spent preparing food.
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# VIII. Optimality

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- Consider an individual lives for one unit of time and faces disability with probability  $p$ .
- Receives wages  $w$  if not disabled, pays taxes  $t$
- He chooses disability duration  $D$ , receives benefits  $b$
- Under such setting, Chetty (2006) derived an optimality condition, where the social planner chooses  $b$  and  $t$  to maximize the utility of the individual:

$$(4) \quad \gamma \frac{\Delta c}{c}(b^*) \left[ 1 + \frac{1}{2} \rho \frac{\Delta c}{c}(b^*) \right] \approx \varepsilon_{D,b}$$


Coefficient of relative risk aversion

Drop in consumption if benefit optimal

Coefficient of relative prudence

# VIII. Optimality

- Chetty (2006) also derives another optimality condition under a more general setting
- Agents make a vector of decisions in a continuous time dynamic setting facing persistent risk of adverse event, contingent on a vector of state variables at t
- Proposition 2 of Chetty (2006) gives:

$$(5) \quad \left\{ \left[ \frac{\Delta \bar{c}}{\bar{c}} (b^*) \gamma \left[ 1 + \frac{\rho}{2} \frac{\Delta \bar{c}}{\bar{c}} (b^*) \right] + 1 \right] F - 1 \right\} = \frac{\varepsilon_{D,b}}{1-D}$$

- where  $F = (1 + \gamma \rho s_d^2) / (1 + \gamma \rho s_n^2)$ ,  $s_d$  is the coefficient of variation of consumption in the disabled state and  $s_n$  is the coefficient of variation of consumption in the non-disabled state.

# VIII. Optimality

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$$(5) \quad \left\{ \left[ \frac{\Delta \bar{c}}{\bar{c}} (b^*) \gamma \left[ 1 + \frac{\rho}{2} \frac{\Delta \bar{c}}{\bar{c}} (b^*) \right] + 1 \right] F - 1 \right\} = \frac{\varepsilon_{D,b}}{1-D}$$

- Proportional drop in consumption 0.25
  - We use our disability rates by age to calculate the share of life disabled, obtaining  $D=0.12$
  - DI: Bound and Burkauer (1999) median elasticity 0.49, and they say likely to be biased upward.
  - WC: median elasticities under 0.6
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**Table 7**  
**Estimates of  $\varepsilon_{D,b}$  for Current Disability Compensation Programs to be Optimal**

		Coefficient of Relative Risk Aversion, $\gamma$				
		1	2	3	4	5
Coefficient of Relative Prudence, $\rho$	0	0.2253	0.4506	0.6758	0.9011	1.1264
	1	0.2439	0.4850	0.7239	0.9610	1.1966
	2	<b>0.2635</b>	0.5236	0.7814	1.0377	1.2928
	3	0.2839	<b>0.5649</b>	0.8444	1.1228	1.4005
	4	0.3049	0.6082	<b>0.9107</b>	1.2127	1.5144
	5	0.3265	0.6529	0.9792	<b>1.3056</b>	1.6320

## VIII. Main findings

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- While preference parameters are not settled in the literature, over a substantial range current benefits are less than optimal.
  - Disability rates are high. At age 56, 15% have had a chronic and severe disability begin (9% by age 50).
  - By the tenth year after onset, earnings fall about 22 percent for the full sample of disabled, about 76 percent for the chronic and severe group.
  - Heterogeneity in outcomes across disability groups
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## VIII. Main findings

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- After-Tax Income falls by about 52 percent for the chronic and severe group, about 28 percent after transfers by 10 years after onset.
- Consumption falls about 18-25 percent.
- There is also a fall in wealth, but its magnitude is harder to pin down.
- Some outcomes, including consumption, fall well before disability onset. Suggests partial predictability and or delay in deciding that disabled.
- Incomplete insurance despite high rate of program receipt. A little more than half on SSDI or SSI.

# VIII. Extensions to Women

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- Data: Starting in 1981 information for heads and wives. Earlier information on heads
- Point in time rates slightly higher for women, severity tends to be slightly lower though.
- Rates of most severe disabilities, Chronic Severe ones, slightly lower
- Earnings fall similar for Chronic Severe men and women
- Income (at family level) falls less on average for women
- Consumption fall half as big or less for women

# EXTRA SLIDES

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## II. Data: no alternative to self reports, cont.

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- The use of program receipt would have major problems.
    - One can't address whether programs are reaching the disabled.
    - Receipt is directly determined by changes in eligibility, benefit levels.
    - Misses those who are screened out which is done with substantial error, as well as those who are too proud or well off to apply.
    - Misses those who don't report program receipt.
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## II. Data: validation of self reports

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- Benitez-Silva et al. (2004): Self-reported disability is an unbiased indicator of the SSA's disability decision.
  - Stern (1989): Only weak evidence of endogeneity of disability variables. Where there is evidence the effect is the opposite of that hypothesized in the literature. He finds that work leads to stress that causes a decline in health.
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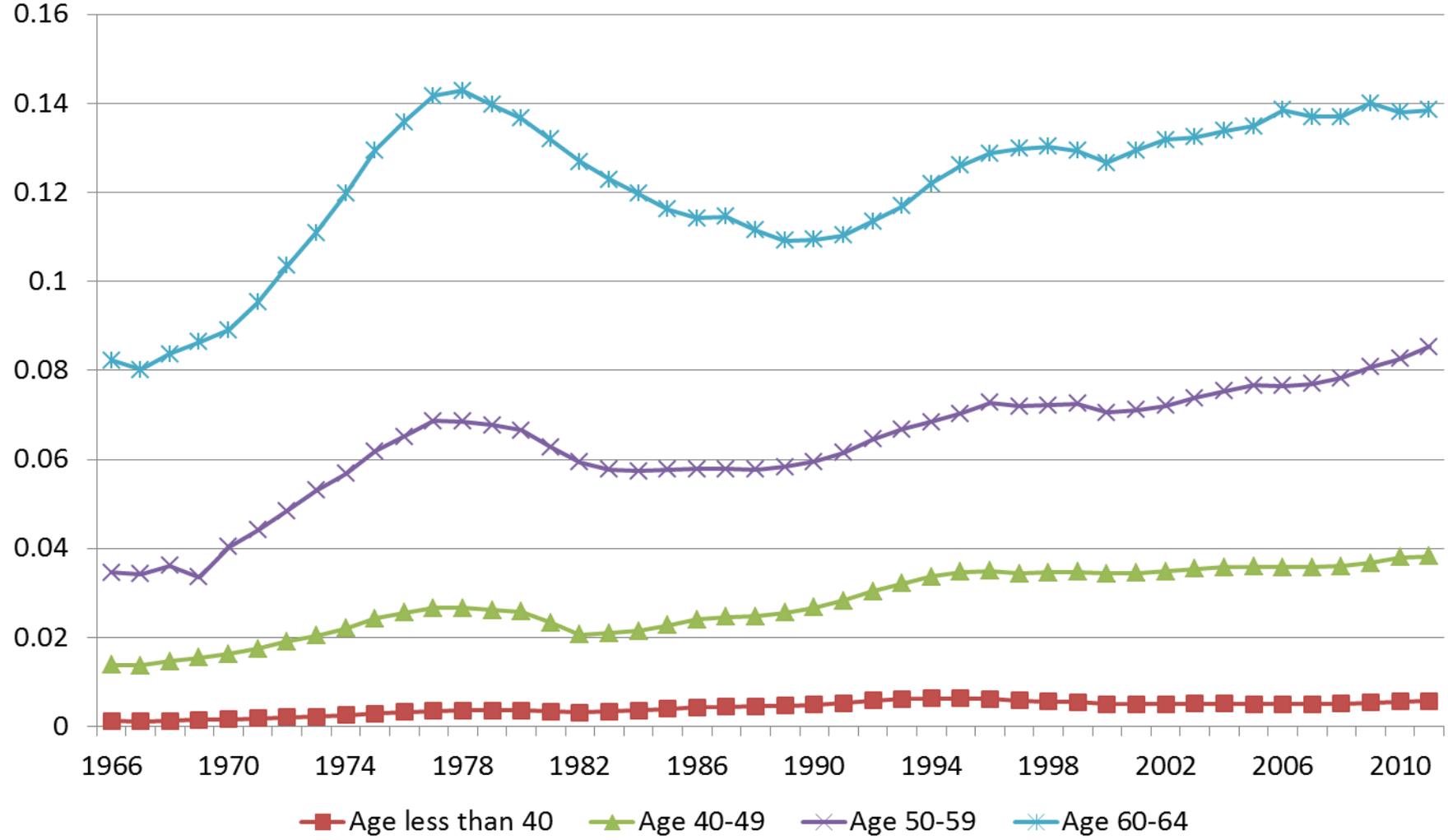
**Appendix Table 2**  
**Severity and Health Limitations – Average of 1999-2009 Surveys**

	Percentage with Condition					
	B. Currently Limiting Daily Activities			C. Currently Limiting Daily Activities A Lot		
	Non-disabled (4)	Not Severe (5)	Severe (6)	Non-disabled (7)	Not Severe (8)	Severe (9)
Health Limitation						
Stroke	0.002	0.027	0.084	0.000	0.005	0.058
High Blood Pressure or Hypertension	0.023	0.166	0.298	0.001	0.013	0.106
Diabetes or High Blood Sugar	0.014	0.087	0.146	0.001	0.017	0.070
Cancer, Malignant Tumor, Skin Cancer	0.003	0.021	0.054	0.001	0.005	0.034
Lung Disease	0.005	0.046	0.116	0.001	0.009	0.072
Heart Attack	0.003	0.051	0.106	0.000	0.005	0.064
Heart Disease	0.006	0.074	0.134	0.001	0.010	0.080
Emotional, Nervous or Psychiatric	0.013	0.109	0.260	0.001	0.024	0.140
Arthritis	0.033	0.254	0.393	0.002	0.039	0.230
Asthma	0.016	0.083	0.113	0.001	0.013	0.035
Loss of Memory or Mental Ability	0.001	0.033	0.131	0.000	0.010	0.076
Learning disorder	0.008	0.040	0.099	0.001	0.006	0.050
Other Serious or Chronic conditions	0.033	0.264	0.430	0.004	0.062	0.322
Any of the Above	0.111	0.613	0.819	0.009	0.126	0.614
Total Number of Conditions	0.143	1.119	2.144	0.011	0.185	1.174

**Appendix Table 3**  
**Prevalence of Disability by Year – 50-59 Years Old**

<b>Year</b>	<b>N</b>	<b>Any disability</b>	<b>Currently Disabled</b>	<b>One-Time</b>	<b>Temporary</b>	<b>Chronic Not Severe</b>	<b>Chronic Severe</b>
1980	395	0.3992 (0.0277)	0.2355 (0.0238)	0.0434 (0.0117)	0.0613 (0.0126)	0.1387 (0.0198)	0.1558 (0.0200)
1982	402	0.4184 (0.0281)	0.2108 (0.0233)	0.0519 (0.0129)	0.0634 (0.0129)	0.1466 (0.0202)	0.1565 (0.0205)
1984	406	0.4236 (0.0284)	0.2112 (0.0233)	0.0568 (0.0132)	0.0721 (0.0143)	0.1706 (0.0217)	0.1241 (0.0186)
1986	390	0.4415 (0.0293)	0.1967 (0.0235)	0.0747 (0.0158)	0.0751 (0.0149)	0.1434 (0.0208)	0.1483 (0.0211)
1988	376	0.4431 (0.0301)	0.2037 (0.0242)	0.0991 (0.0186)	0.0882 (0.0165)	0.1395 (0.0207)	0.1163 (0.0193)
1990	347	0.4571 (0.0323)	0.2315 (0.0280)	0.0743 (0.0168)	0.1002 (0.0191)	0.1365 (0.0223)	0.1460 (0.0231)
1992	365	0.4798 (0.0315)	0.1960 (0.0253)	0.0837 (0.0178)	0.1243 (0.0205)	0.1593 (0.0229)	0.1125 (0.0199)

# Male SSDI Recipient (as Disabled Workers) to Population Ratios, 1966-2011, by Age Groups



Source: Annual Statistical Supplement of the Social Security Bulletin (Various years)

### III. Estimation

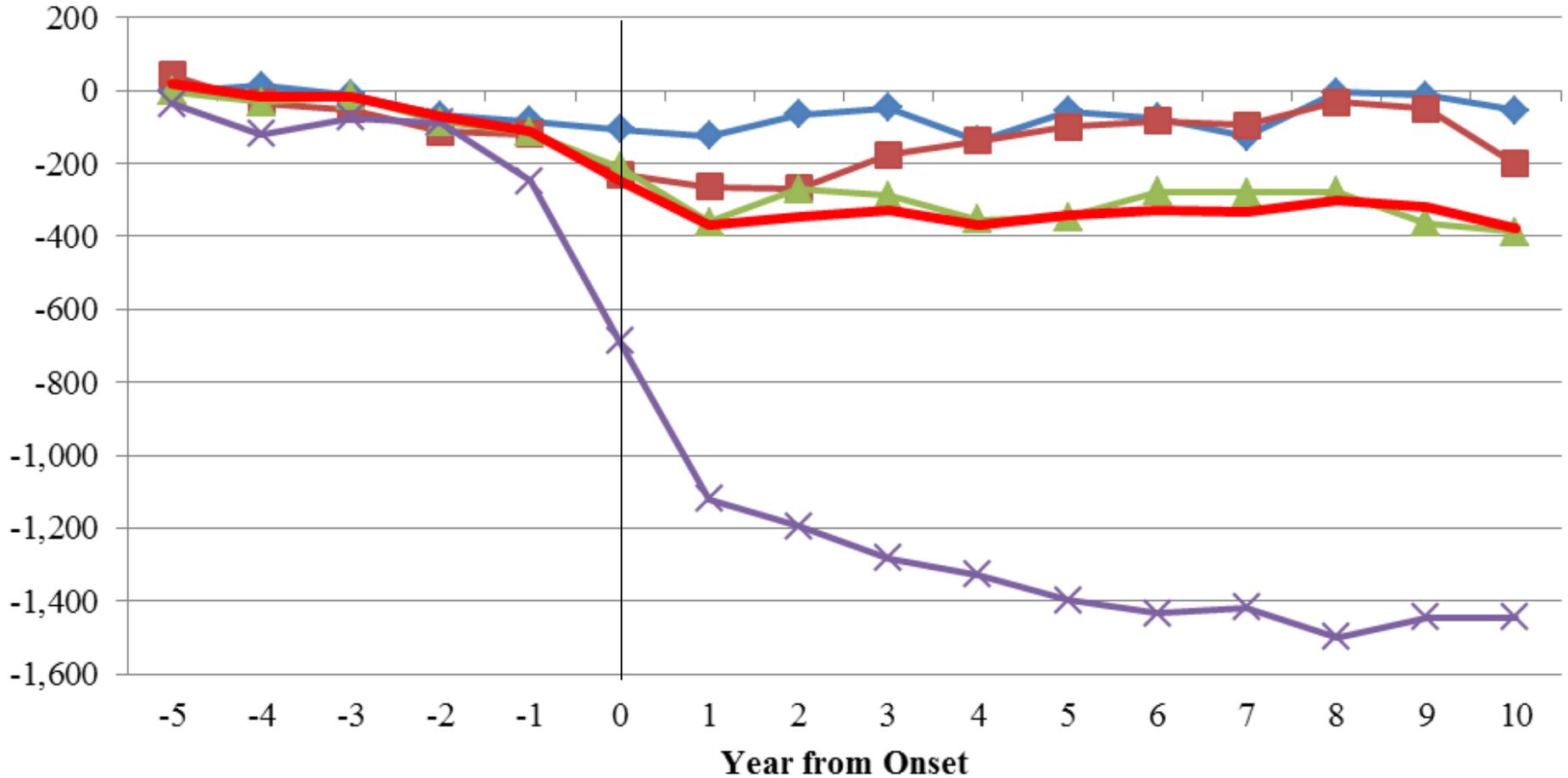
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- For variables where zeros are important or we think that a proportional effect of Xs is more plausible, we estimate Poisson Regressions with Individual Fixed Effects:

$$y_{it} = \exp(\alpha'_i + \gamma'_t + X_{it}\beta' + \sum_h \sum_k \delta'_h{}^k A_{hit}^k + \varepsilon'_{it})$$

- Estimated percentage change in the outcome from a one-unit change in the dependent variable are calculated as  $\exp(b)-1$ , where b is the estimated coefficient of interest.
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# Change in Annual Hours of Work Before and After Disability Onset, Extent of Disability Groups and All Disabled

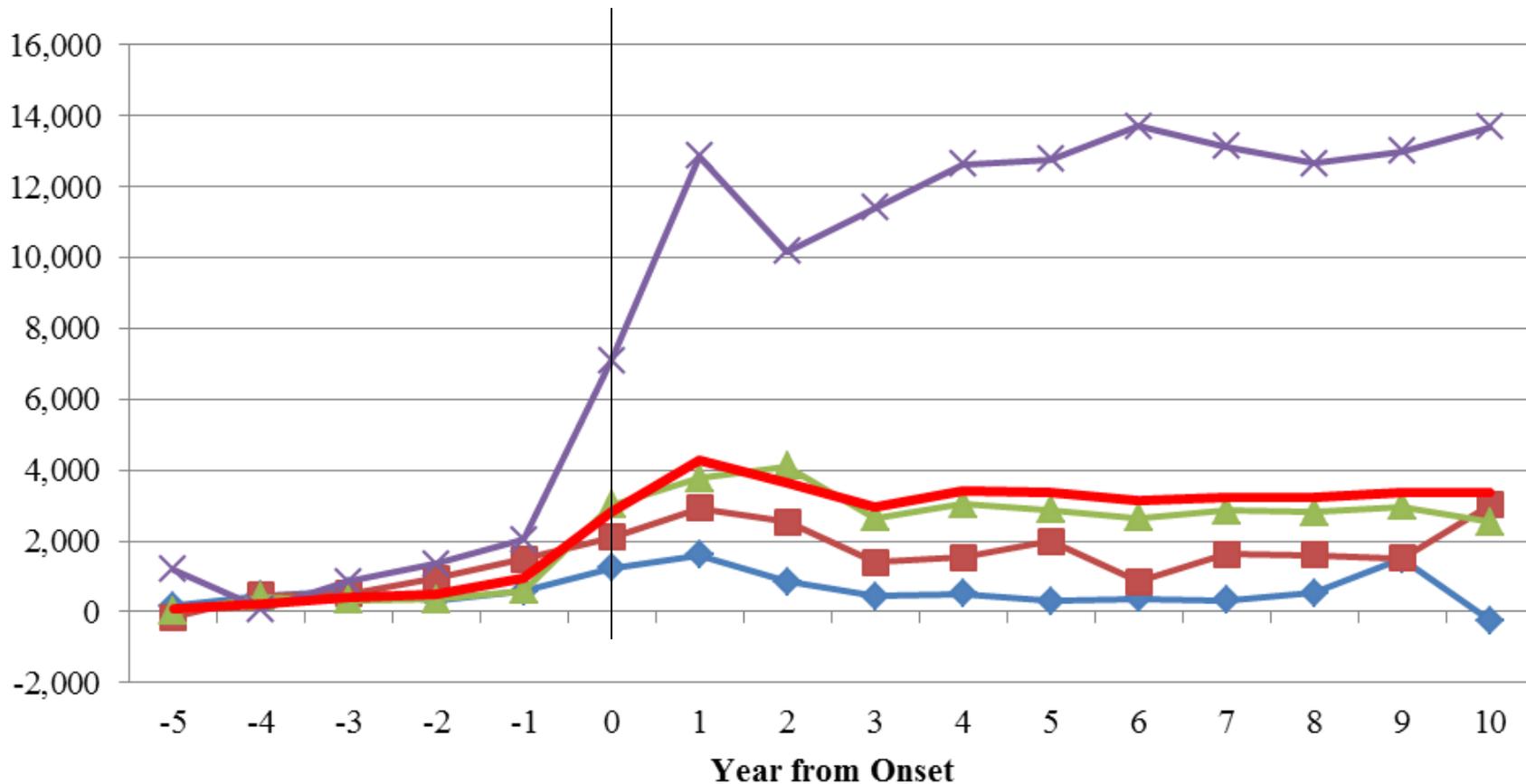


◆ One Time   
 ■ Temporary   
 ▲ Chronic-Not Severe   
 × Chronic Severe   
 — All Disabled

# Figure 8

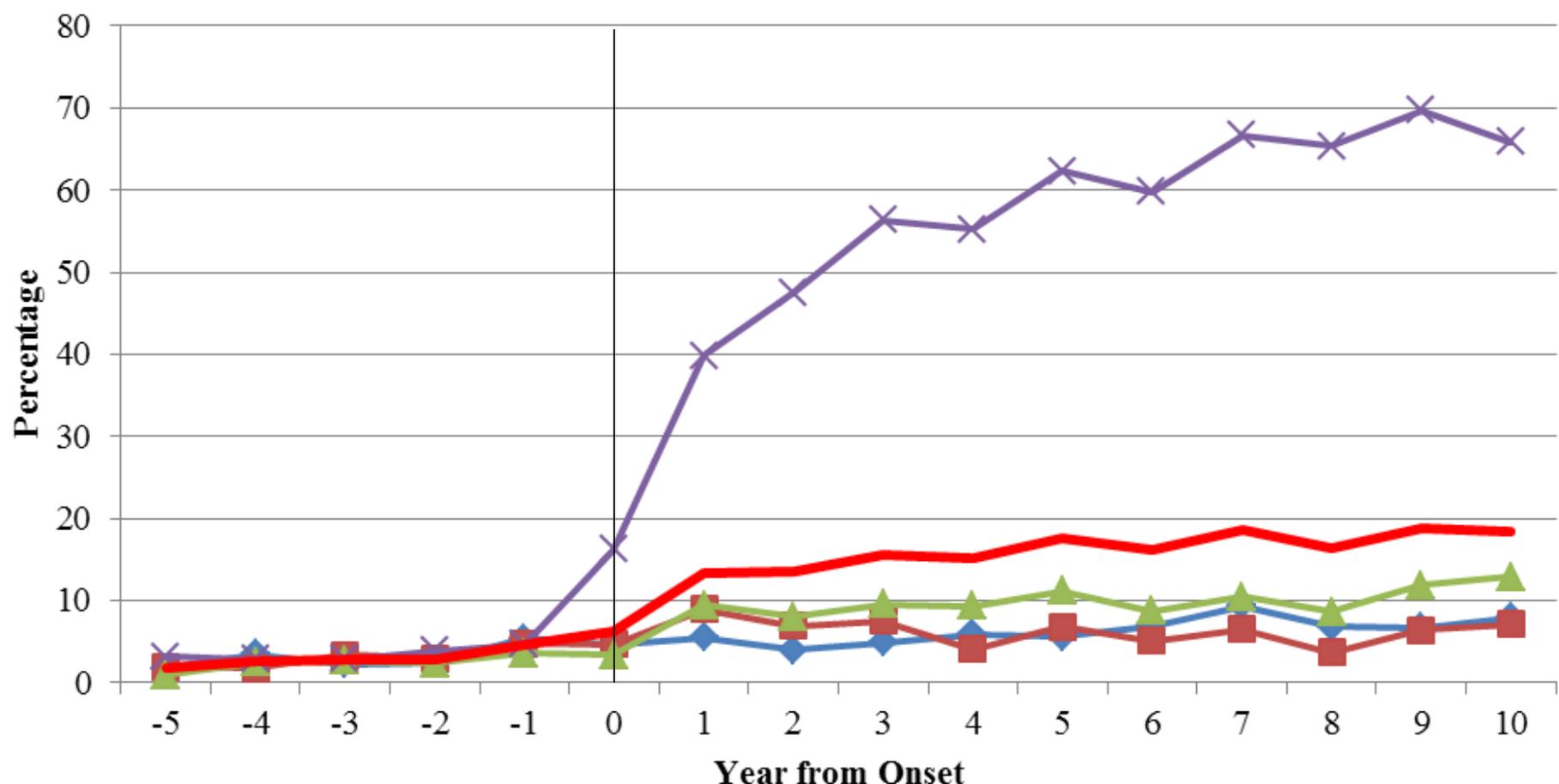
## Change in Under-reporting Adjusted Public Transfer income Before and After Disability Onset, Extent of Disability Groups and All Disabled

2010 dollars



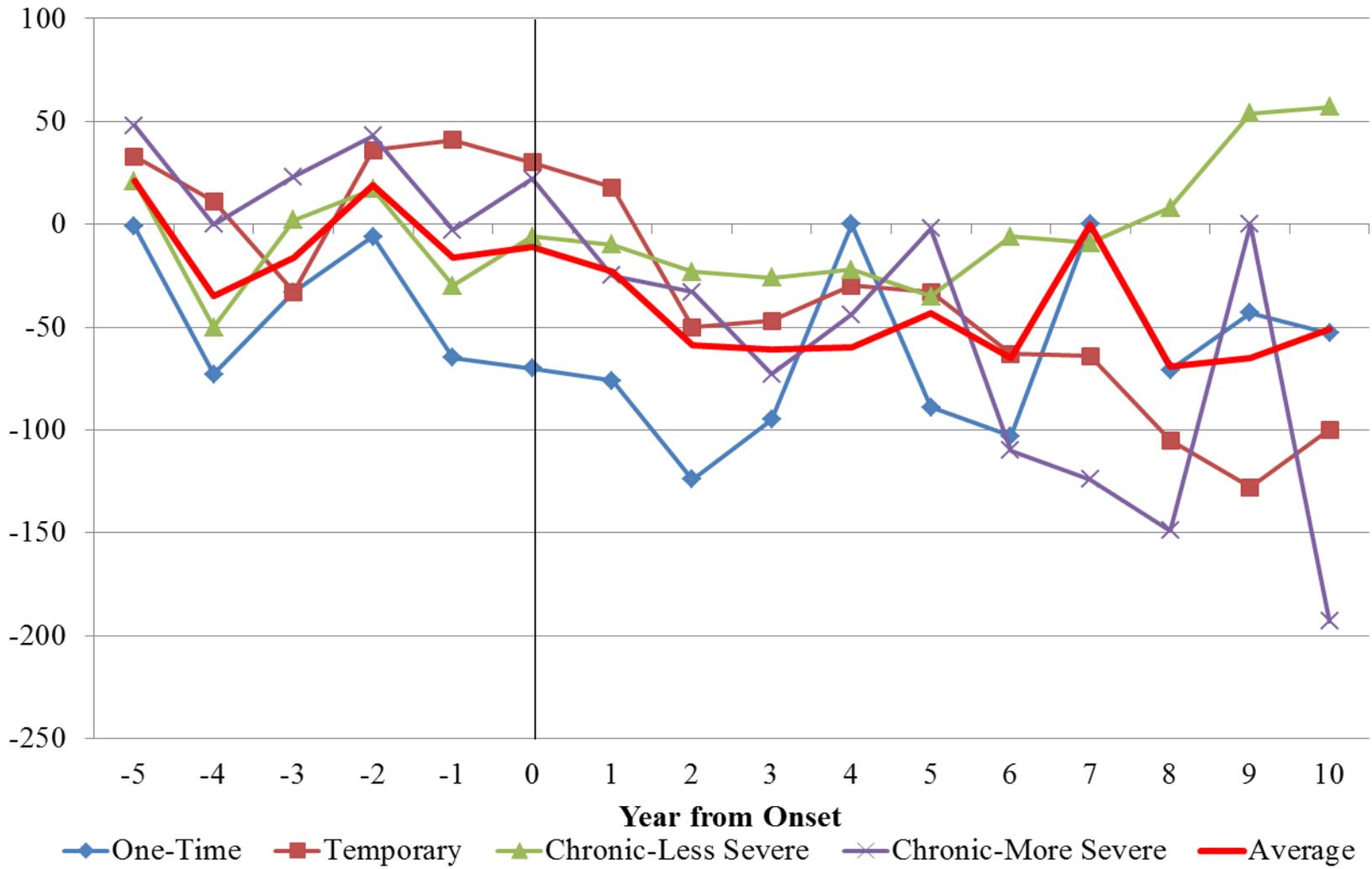
◆ One-Time   
 ■ Temporary   
 ▲ Chronic-Not Severe   
 × Chronic-Severe   
 — All Disabled

# Percentage of People with Zero Hours of Work Before and After Disability, Extent of Disability Groups and All Disabled



◆ One Time   
 ■ Temporary   
 ▲ Chronic-Not Severe   
 × Chronic Severe   
 — All Disabled

# Spousal Work Hours, By Extent of Disability Groups

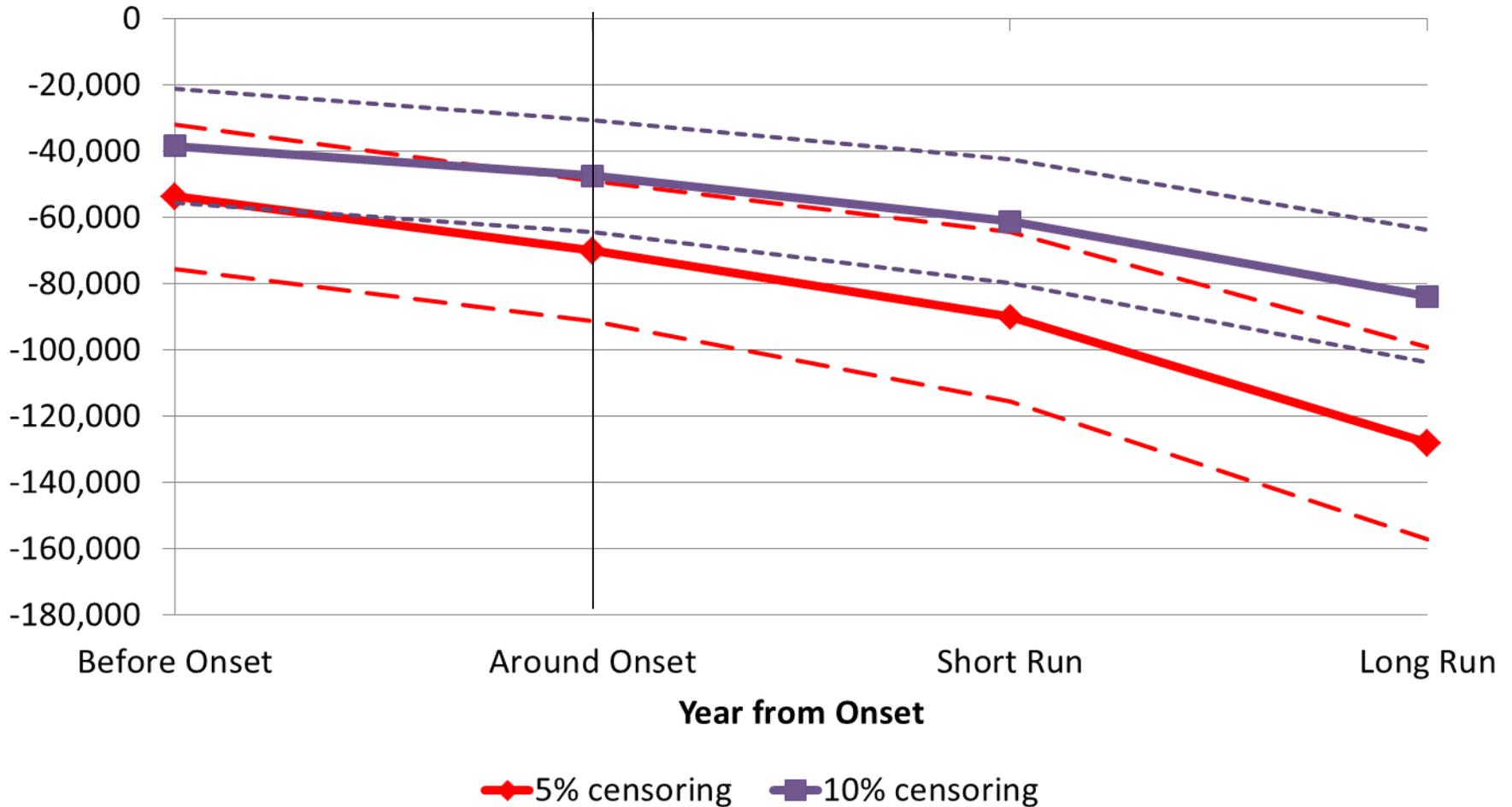


## Appendix Table 10

### Net Wealth of the Disabled

	<b>All Disabled (1)</b>	<b>One- Time (2)</b>	<b>Temporary (3)</b>	<b>Chronic Not Severe (4)</b>	<b>Chronic Severe (5)</b>
Median Pre-onset Net Wealth	\$40,747	\$40,498	\$44,142	\$39,287	\$41,361
Median Net Wealth 6-10 years post-onset	\$66,743	\$89,894	\$63,960	\$67,916	\$25,875

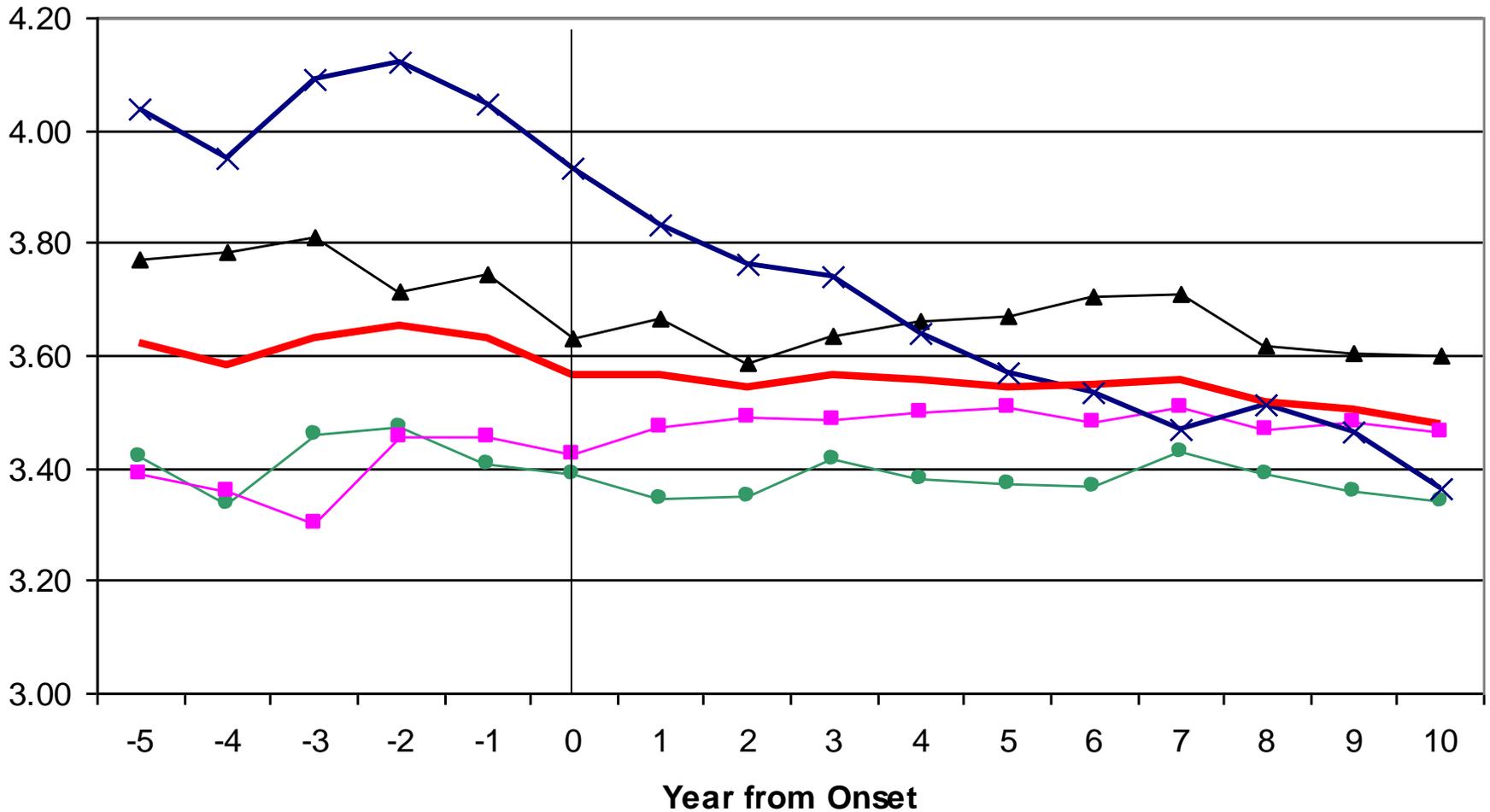
# Level Change in Family Net Wealth Before and After Disability Onset, Chronic-Severe Disabled



## Yearly decline in Family Net Wealth of the Chronic-Severe Disabled

<b>Average length between <math>J \leq -6</math> and the Long run</b>	<b>Based on 5% censoring of net wealth data</b>	<b>Based on 10% censoring of net wealth data</b>
<b>17</b>	-7,529	-4,923
<b>18</b>	-7,110	-4,649
<b>19</b>	-6,736	-4,405
<b>20</b>	-6,399	-4,184
<b>21</b>	-6,095	-3,985

# Number of Family Members, By Extent of Disability Groups



● One-Time    ■ Temporary    ▲ Chronic-Not Severe    × Chronic-Severe    — All Disabled

# Time Spent on Food Prep, Shopping

---

- We use American Time Use Survey (ATUS)
  - No evidence that the disabled, or their wives, spend more time on shopping
  - A disabled head is estimated to spend only 0.7 hours per week more on food preparation
  - Thus, there is a clear decline in the standard of living for the most disabled.
-

# Time Use of the Disabled

---

- Look at how the disabled spend most of their non-labor hours
  - We use ATUS again
  - Finding: The disabled spend more time watching TV, relaxing, sleeping and getting medical care
-

# V. Additional Results

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- Earnings and Consumption by SSA program receipt.
  - Earnings higher for non-recipients, but consumption fall similar



# V. Did spending down wealth fill the gap?

---

- For the Chronic-Severe, mean net wealth drops by \$83,000-\$128,000 over the 17-21 years from the period well before disability onset to the long run relative to a forecast using age, year, etc.
  - This translates to a yearly decline of \$4,000 - \$7,500 (8%-16% of their mean before onset after-tax after transfer income)
  - Medians fall much less.
  - We also observe drops in net wealth for the Chronic-Severe prior to disability onset
-

## Appendix Table 1

### Severity and Activities Limitation – using the 1986 Health Supplement

	Non- disabled	Not Severe	Severe
Walking/Stairs	0.04	0.41	0.79
Bending/Lifting	0.06	0.53	0.82
Driving	0.00	0.09	0.35
Assistance for Travel	0.00	0.03	0.23
Stay Indoors	0.00	0.04	0.30
Bed/Chair Confinement	0.00	0.04	0.25
Any Limitation	0.08	0.63	0.92
Total Number of Limitations	0.11	1.15	2.74
N	3,823	319	131

# CSFII

---

- Estimate the change in food spending and the nutritional intake of the disabled.
- $Y = a + b \cdot D + c \cdot X + e$

Where  $Y$  = dependent variable of interest

$D$  = disability indicator variable

$X$  = Control variables including age, age<sup>2</sup>, race, education, number of children, number of adults, regions, year

---

### Appendix Table 8 (Continued)

## Sample Means and Regression Estimates of Changes in Food Expenditure and Food Shopping Frequency by Disability Status

### B. Regression Coefficient on Disabled Indicator

	Full Sample	Exclude Low Income
Log calories	-0.049* (0.025)	-0.005 (0.030)
Log Vitamin A	-0.145* (0.057)	-0.130 (0.074)
Log Vitamin C	-0.156** (0.053)	-0.165* (0.065)
Log Vitamin E	-0.107** (0.038)	-0.077 (0.047)

## Appendix Table 8

### Sample Means and Regression Estimates of Changes in Food Expenditure, Food Shopping Frequency by Disability Status

	A. Sample Means		B. Regression Coefficient on Disabled Indicator	
	Non- disabled	Disabled	Full Sample	Exclude Low Income Sample
Total food expenditure	3,747 (2,252)	3,304 (1,863)	-0.182** (0.031)	-0.123** (0.038)
Expenditure on Food eaten at Home	2,667 (1,419)	2,476 (1,277)	-0.116** (0.030)	-0.072 (0.037)
Expenditure on Food outside Home	1,080 (1,326)	828 (953)	-0.813** (0.145)	-0.504** (0.166)
Shop for food at least once a week	0.628 (0.483)	0.605 (0.489)	-0.010 (0.008)	-0.014 (0.010)

**Appendix Table 9**  
**Time Spent on Food Preparation, Food Shopping**  
**and All Shopping Activities (in Hours per Week)**

	A. Sample Means		B. Coefficient on Head's Disabled Indicator Variable
	Non-disabled Head	Disabled Head	
Male Household Heads:			
Food Preparation	1.93 (4.00)	2.53 (5.13)	0.66 (0.34)
Shopping for Food	0.83 (2.56)	0.96 (2.90)	0.14 (0.21)
All Shopping	4.23 (8.46)	4.38 (9.97)	0.31 (0.68)
N	4,334	316	

**Appendix Table 9 (continued)**  
**Time Spent on Food Preparation, Food Shopping**  
**and All Shopping Activities (in Hours per Week)**

	A. Sample Means		B. Coefficient on Head's Disabled Indicator Variable
	Non-disabled Head	Disabled Head	
Wives:			
Food Preparation	6.41 (7.25)	6.96 (7.21)	0.12 (0.67)
Shopping for Food	1.59 (3.44)	1.16 (2.38)	-0.38 (0.25)
All Shopping	7.35 (11.09)	6.08 (8.86)	-0.96 (1.03)
N	3,526	132	

**Appendix Table 15**  
**Regression of Changes in Leisure and Time Use by Disability Status**

	A. Sample Means		B. Regression Coefficient on the Disabled Indicator
	Non-disabled	Disabled	
<b>Market Work</b>	42.49 (35.07)	12.54 (26.03)	-27.71** (2.36)
<b>Leisure (Narrow)</b>	36.20 (26.25)	58.37 (30.08)	18.23** (2.41)
Watching TV	14.84 (16.20)	29.03 (25.89)	10.64** (1.66)
Socializing, Social Events	6.01 (12.18)	7.55 (12.98)	1.89* (0.93)
Relaxing	2.04 (6.20)	6.16 (15.96)	3.21* (1.46)
Games and Computer	1.74 (6.42)	3.30 (9.21)	1.87* (0.75)

**Appendix Table 15 (Continued)**  
**Regression of Changes in Leisure and Time Use by Disability Status**

	A. Sample Means		B. Regression Coefficient on the Disabled Indicator
	Non-disabled	Disabled	
<b>Leisure (Broad)</b>	105.75 (30.81)	134.34 (30.21)	24.28** (2.43)
Eating	9.05 (7.19)	8.62 (8.24)	-0.06 (0.66)
Sleeping	56.28 (14.47)	63.75 (16.82)	6.79** (1.31)
Personal Care	4.22 (4.23)	3.61 (5.15)	-0.67 (0.41)
<b>Vacation (Days per Month)</b>	1.33 (3.15)	0.83 (2.93)	-0.32 (0.21)
<b>Use of Medical Services</b>	2.04 (18.74)	8.76 (40.10)	7.15* (2.85)
<b>N</b>	<b>4,334</b>	<b>316</b>	

## VIII. Main findings

---

- There is a decline in the nutritional quality of the diet of the average disabled.
  - The disabled (and their spouses) do not increase sharply their time spent on food production and shopping.
  - The disabled spend more time watching TV, sleeping and obtaining medical care.
-

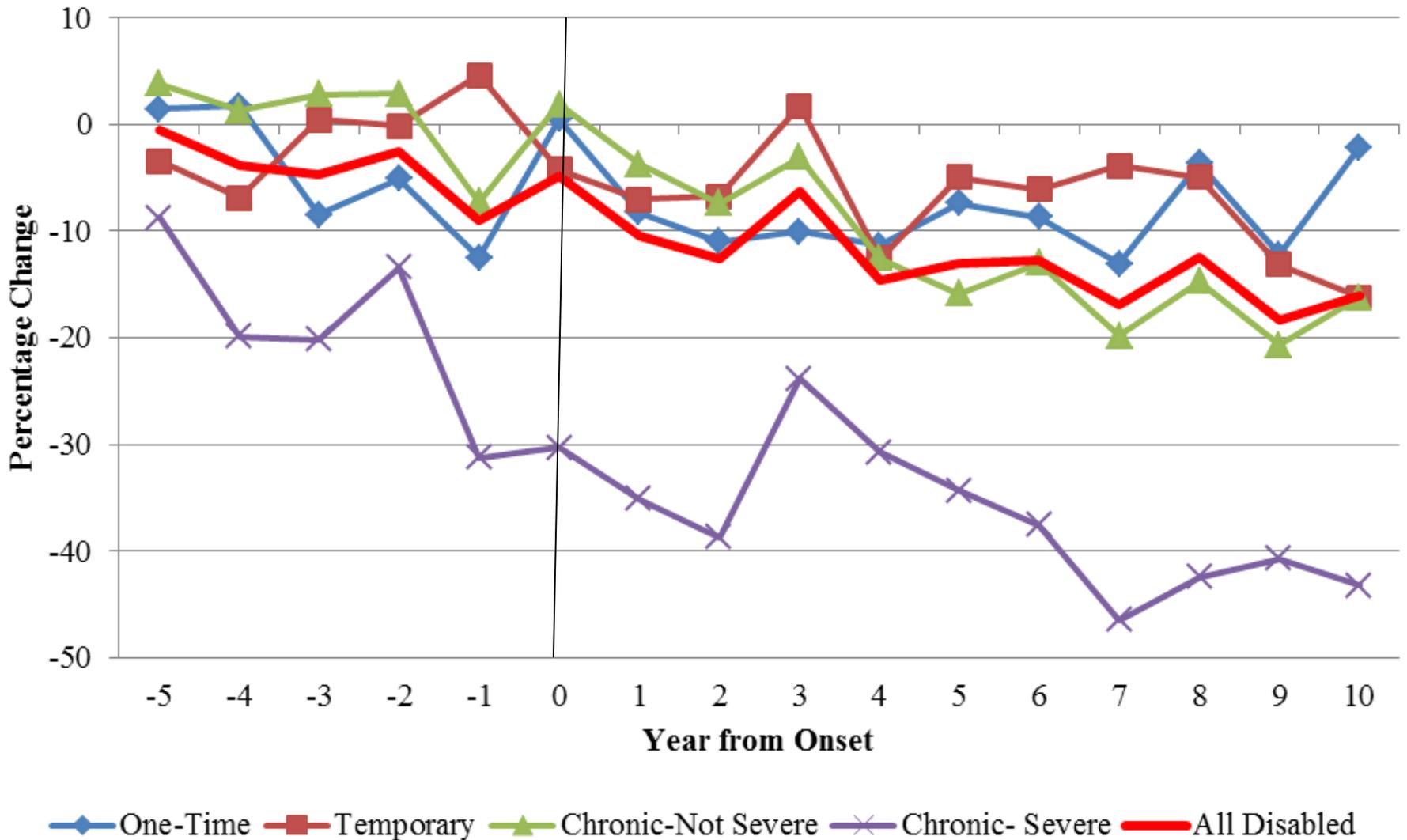
## VIII. Main findings

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- Disability is a major problem in the U.S.
  - Current policies to insure the disabled, despite their disincentive effects, may be insufficient.
  - The results indicate that the stakes are high when reforming DI.
-

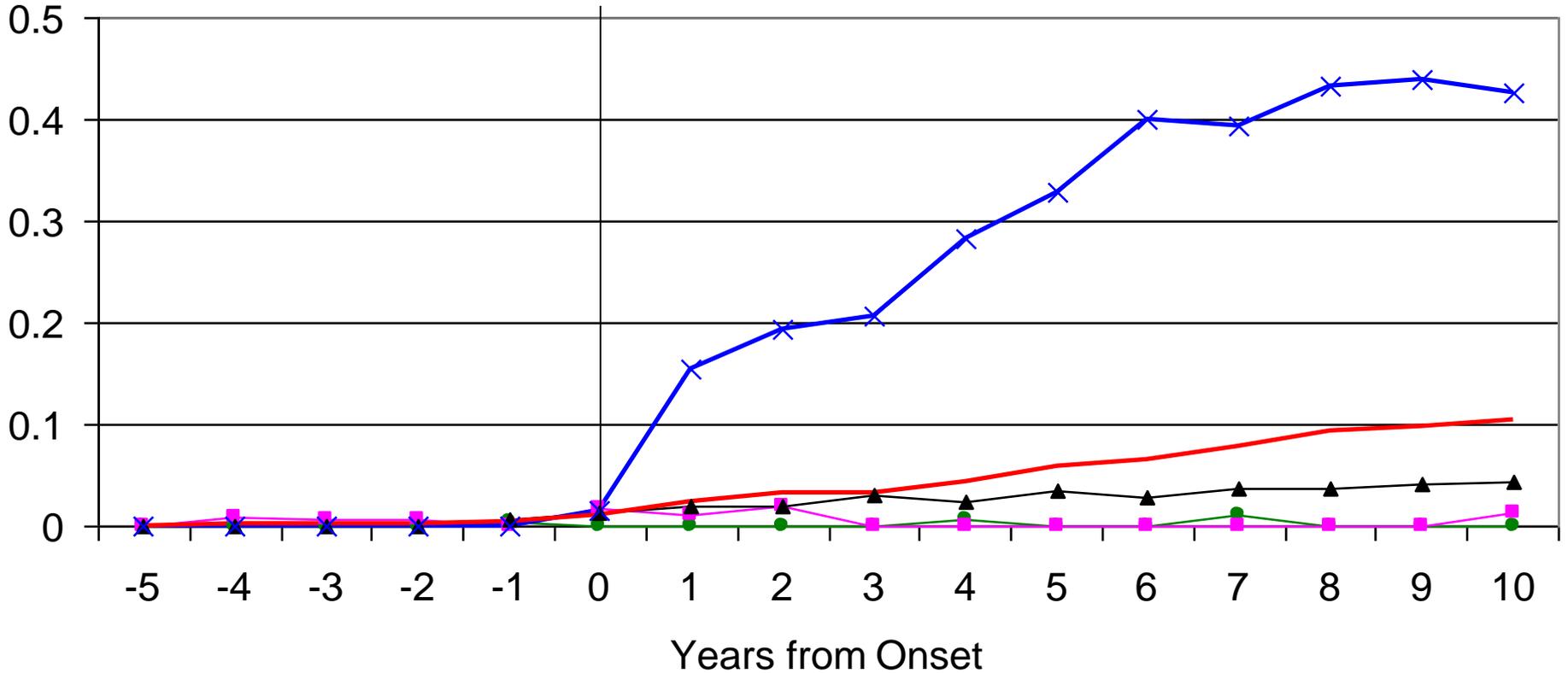
Figure 12

Percentage Change of Food Eaten Outside Home Before and After Disability Onset, Extent of Disability Groups and All Disabled



# Fraction Receiving Various Benefits

## SSDI



● One-Time

■ Temporary

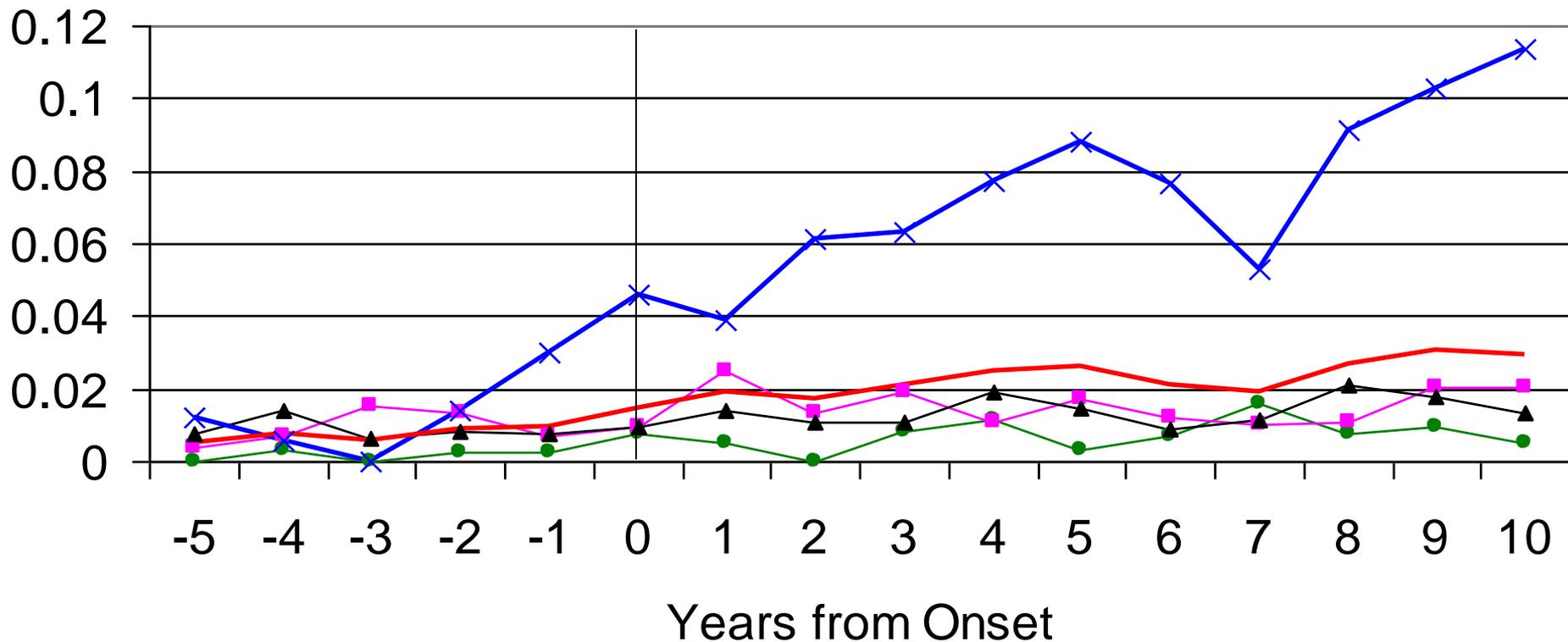
▲ Chronic-Not Severe

× Chronic-Severe

— All Disabled

# Fraction Receiving Various Benefits

## SSI



● One-Time

■ Temporary

▲ Chronic-Not Severe

× Chronic-Severe

— All Disabled

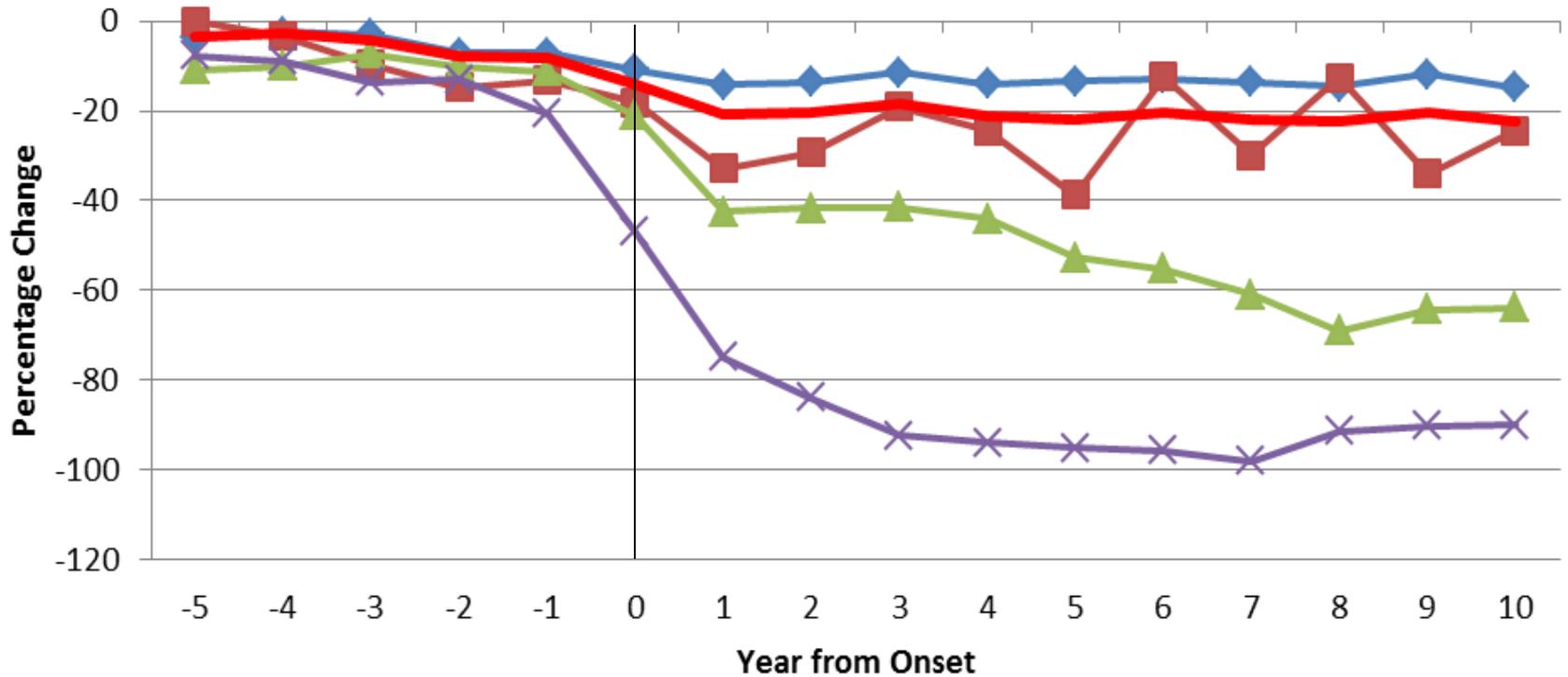
# Appendix Table 16

## Housing Consumption Decomposition

	One-Time (1)	Temporary (2)	Chronic Not Severe (3)	Chronic Severe (4)
<b>A. Housing Type</b>				
Homeowner	-0.028 (0.026)	-0.073** (0.026)	-0.006 (0.026)	-0.059 (0.037)
Publicly Subsidized	0.018 (0.010)	0.011 (0.009)	0.02 (0.011)	0.045* (0.022)
Rental	0.01 (0.025)	0.062* (0.026)	-0.014 (0.027)	0.013 (0.040)
<b>B. Housing Consumption Given Type</b>				
Homeowner	-1003.76 (599.61)	-233.37 (890.58)	-924.01 (723.18)	-3,086.54** (607.09)
Rental	-942.77* (405.11)	-1,081.96** (398.77)	-564.83 (468.94)	-1,396.83** (391.41)

## Appendix Figure 4

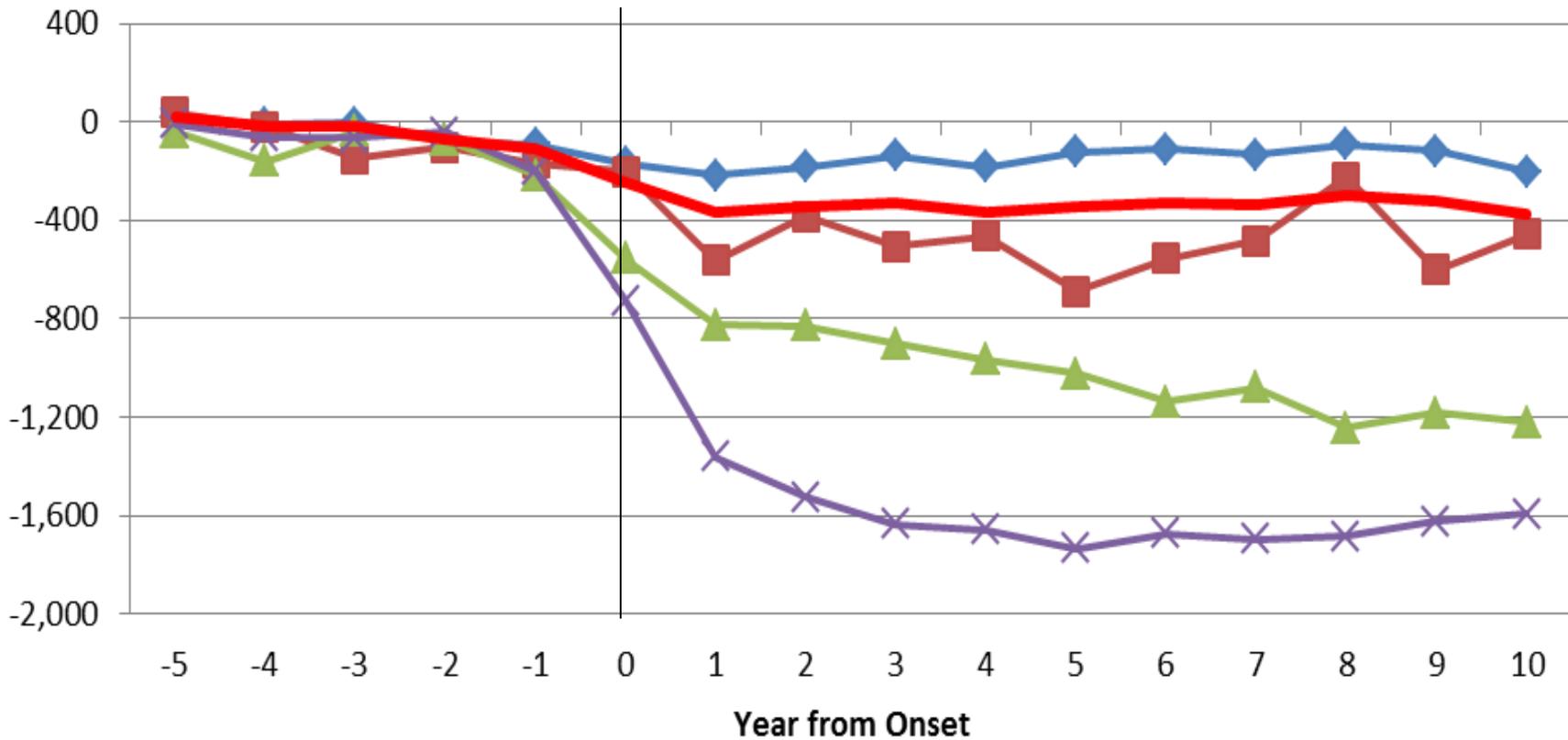
### Percentage Change in Annual Earnings Before and After Disability Onset, Groups Defined by SSA Benefit Receipt and Disability



- ◆ Non Chronic-Severe/SSA Non-Recipients
- Non Chronic-Severe/SSA Recipients
- ▲ Chronic-Severe/SSA Non-Recipients
- × Chronic-Severe/SSA Recipients
- All Disabled

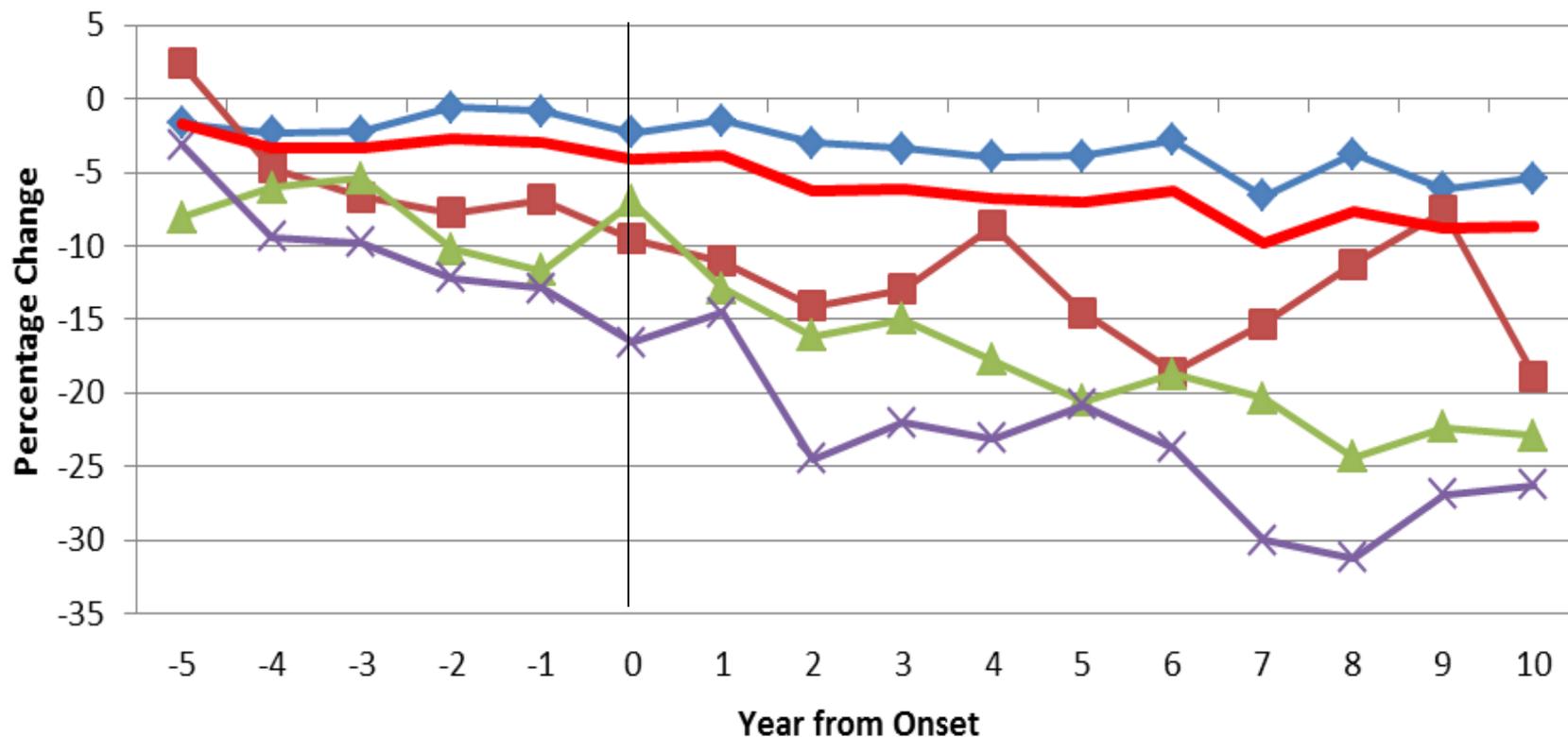
### Appendix Figure 5

**Change in Annual Hours of Work Before and After Disability Onset, Groups Defined by SSA Benefit Receipt and Disability**



- ◆ Non Chronic-Severe/SSA Non-Recipients
- Non Chronic-Severe/SSA Recipients
- ▲ Chronic-Severe/SSA Non-Recipients
- × Chronic-Severe/SSA Recipients
- All Disabled

**Appendix Figure 7**  
**Percentage Change in Food plus Housing Consumption**  
**Before and After Disability Onset,**  
**Groups Defined by SSA Benefit Receipt and Disability**



◆ Non Chronic-Severe/SSA Non-Recipients     ■ Non Chronic-Severe/SSA Recipients  
▲ Chronic-Severe/SSA Non-Recipients     × Chronic-Severe/SSA Recipients  
— All Disabled

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# Consumption Index

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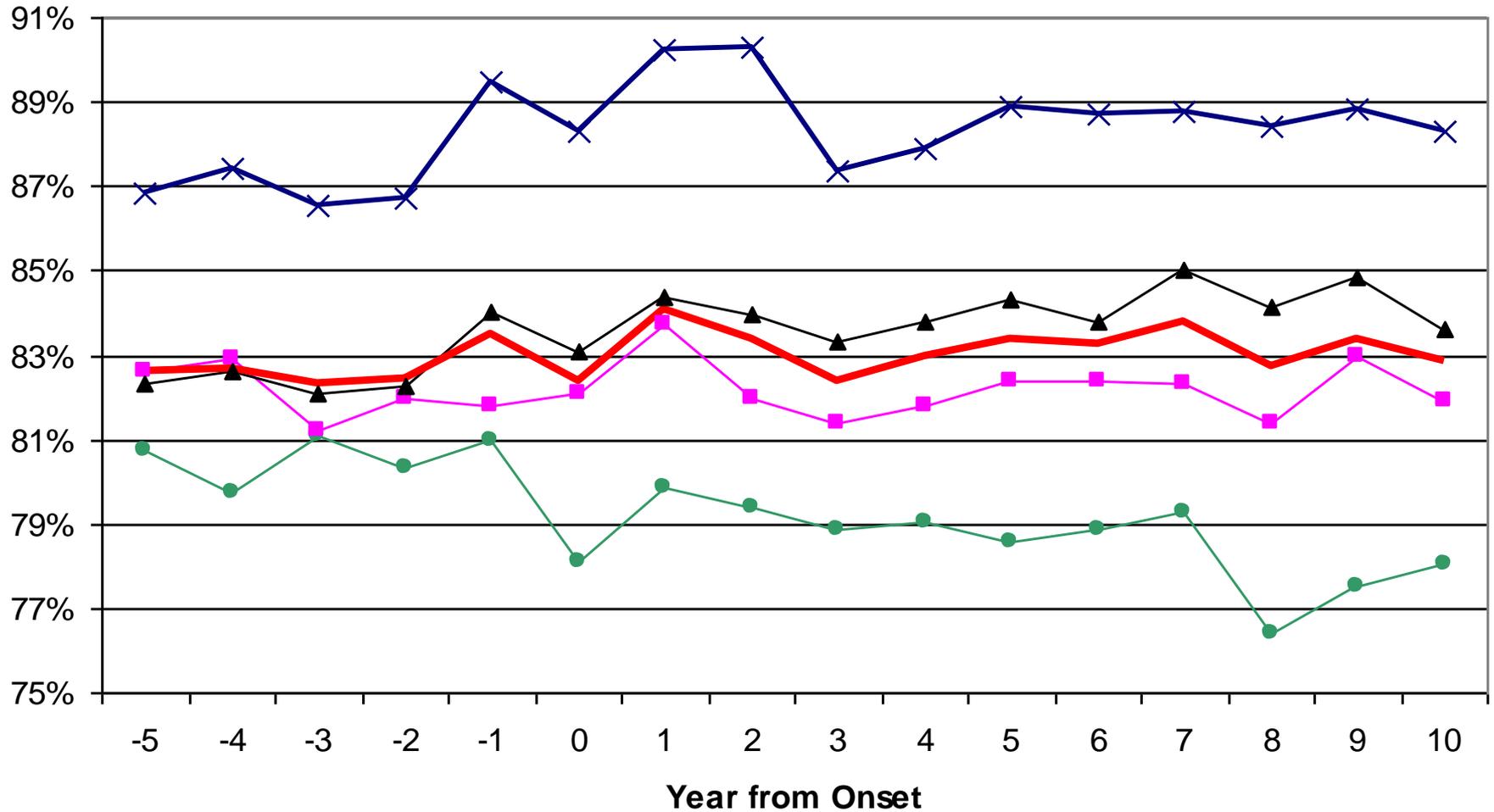
- Use the inverse of a consumption equation to aggregate components of consumption.
  - Predict permanent income using a regression of current income on year, household composition, education, educ\*occupation interaction, educ\*industry interaction.
  - Estimated using age 25-55 male household heads who are full-time employed
  - Regress predicted income on demographics, food expenditures, nutrients and food quantities purchased (in 21 or 70 categories).
-

# Consumption Index

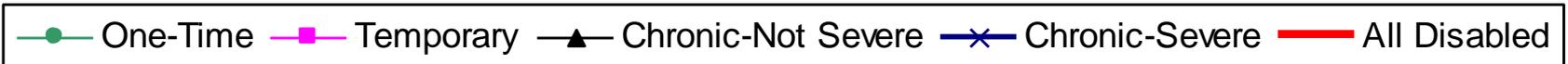
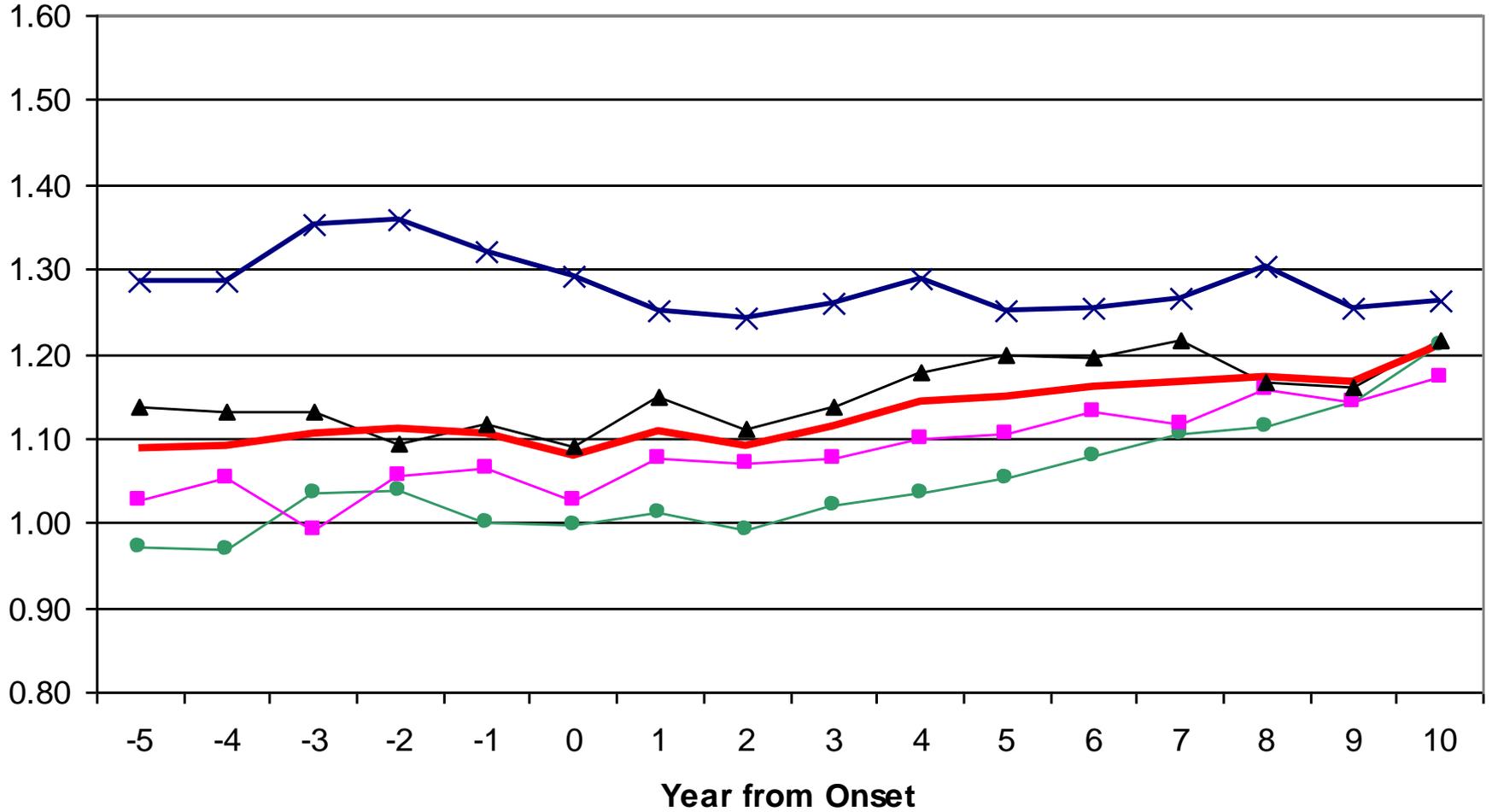
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- Use the resulting coefficients on food quantities and nutrients to form a consumption index for all household heads
  - A one percent fall in the consumption index implies that the household head is consuming as if his permanent income dropped by 1%
  - Result: Disabled male household heads are consuming as if they suffer from a 3% (standard error=1%) reduction in permanent income.
-

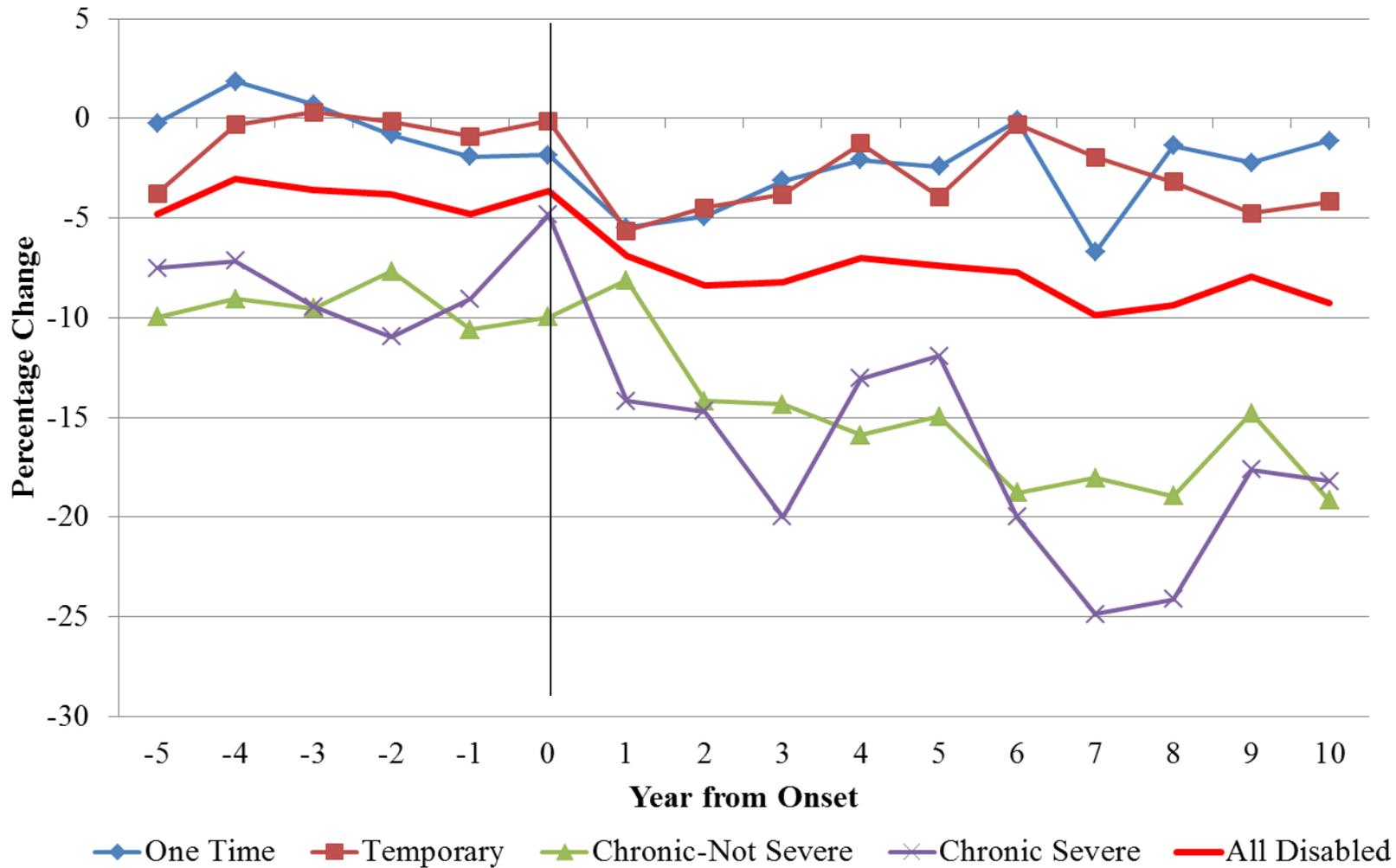
# Share of Expenditure on Food at Home relative to all Food, By Extent of Disability Groups



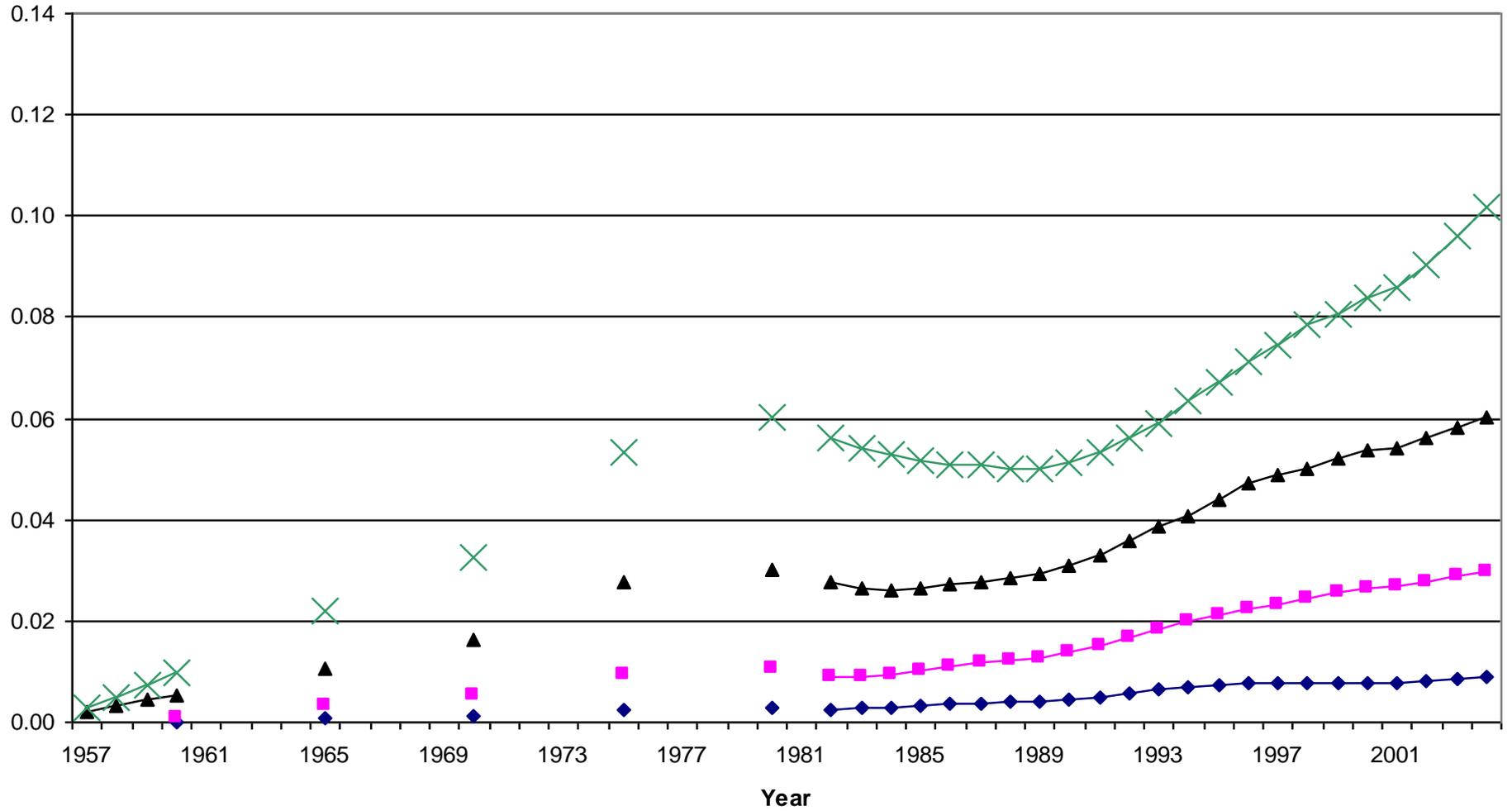
# Number of Non-head Adults, By Extent of Disability Groups



# Percentage Change in Hourly Earnings Before and After Disability, By Extent of Disability Group with Annual Hours $\geq 500$



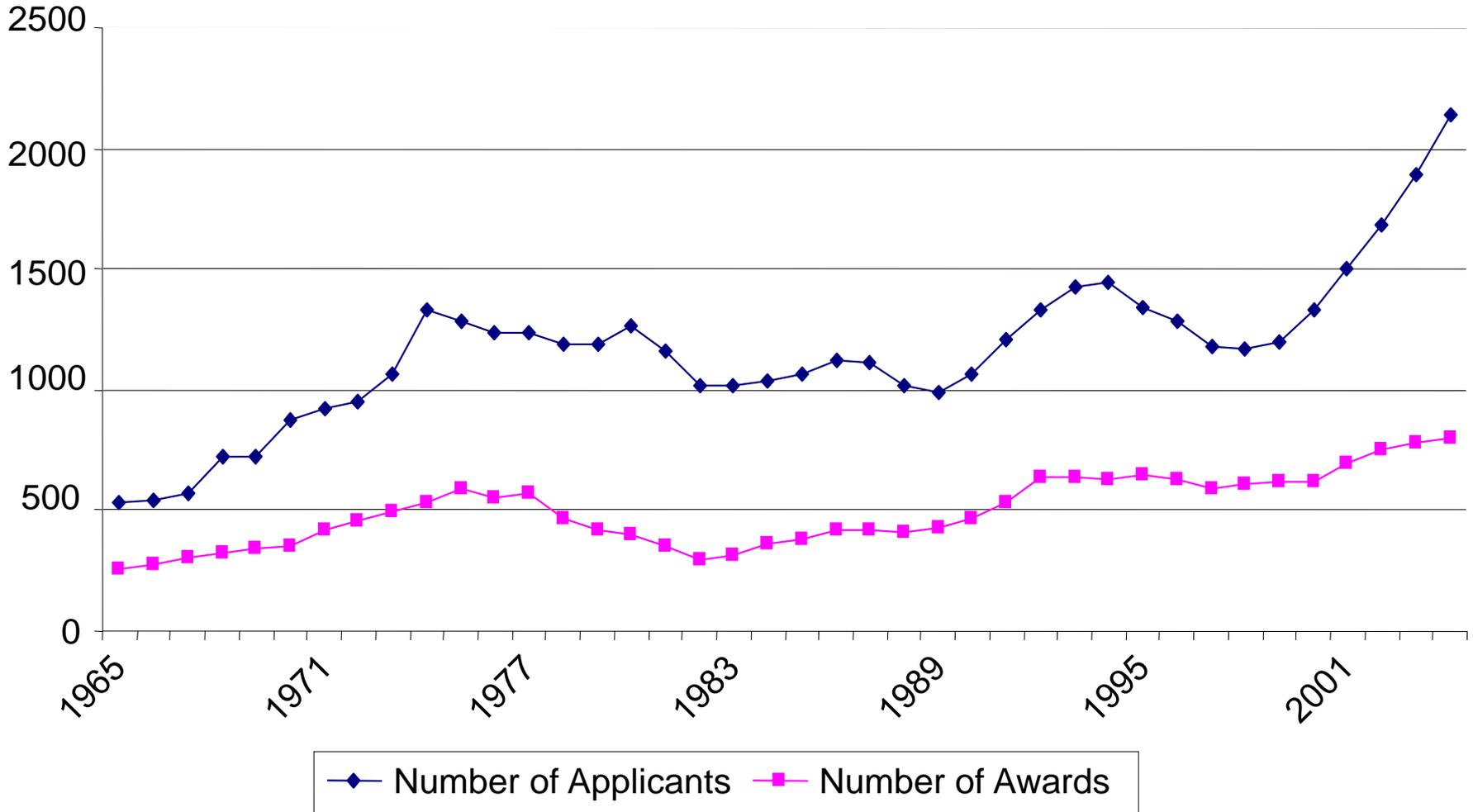
# Female SSDI Recipients and Population Ratios 1957-2004, by Age



◆ Age less than 40   
 ■ Age 40-49   
 ▲ Age 50-59   
 × Age 60-64

# Annual Applicants and Awards, Social Security Disability Insurance 1965-2005

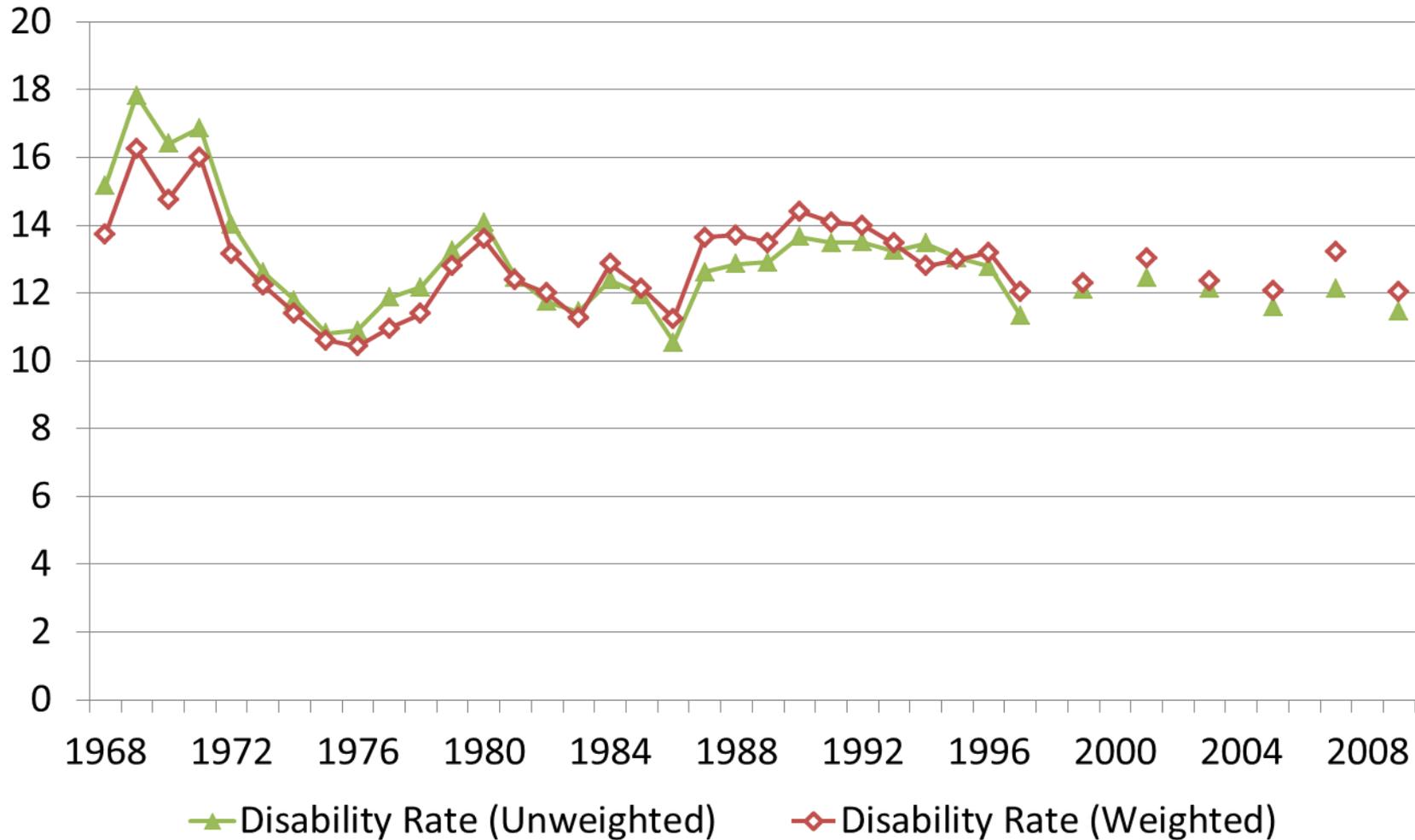
Thousands



Source: Social Security Administration Benefit and applicant statistics (Various years).

# PSID Disability Rates 1968-2009, Male Household Heads, Age 22-61

Percent



# II. Data: validation of severity responses

---

- Health Section of the 2003, 2005 PSID Questionnaire
- It asked all household heads whether they had trouble performing specific daily activities or had specific limitations:
  - Bathing or showering
  - Dressing
  - Eating
  - Getting in or out of a bed and chair
  - Walking
  - Getting outside
  - Using the bathroom
  - Preparing own meal
  - Shopping for personal items or medicines
  - Managing money
  - Using telephone
  - Doing heavy housework (scrubbing floors, washing windows)
  - Doing light housework (washing dishes, light house cleaning)

We examine how many of these problems affected those in each Severity category. Results using the 2005 Questionnaire very similar.

**Appendix Table 1 (continued)**  
**Severity and Activity Limitations – Average of 2003-2009 Surveys**

A. Average of 2003-2009 PSID			
	Non-disabled (4)	Not Severe (5)	Severe (6)
Bathing/Showering	0.00	0.03	0.21
Dressing	0.00	0.04	0.20
Eating	0.00	0.02	0.06
Getting in/out of a Bed/Chair	0.00	0.11	0.31
Walking	0.01	0.20	0.51
Getting Outside	0.00	0.03	0.17
Using Toilet	0.00	0.02	0.07
Preparing Own Meals	0.00	0.02	0.18
Shopping for Personal Items	0.00	0.03	0.22
Managing Money	0.01	0.05	0.19
Using Telephones	0.00	0.01	0.07
Heavy Housework	0.01	0.24	0.62
Light Housework	0.00	0.04	0.23
Any Limitation	0.03	0.38	0.79
Total Number of Limitations	0.04	0.82	3.00
N	17,727	1,493	885

## II. Data: disability severity

---

- Given that these severity questions are asked in almost all years, which response should we use?
  - Two natural possibilities: The Initial Severity report or some type of average.
  - The estimates turn out to be very similar using the two approaches.
  - We focus on “Average Severity”
-

## II. Data: disability severity

---

- Define the “Severity Ratio” – the fraction of the time the disabled individual reports he is severely disabled during the year of onset and the subsequent 10 years.
  - Those who never give an answer to the severity question during this 11 year period are dropped.
  - Results similar if use longer than 10 years.
-

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

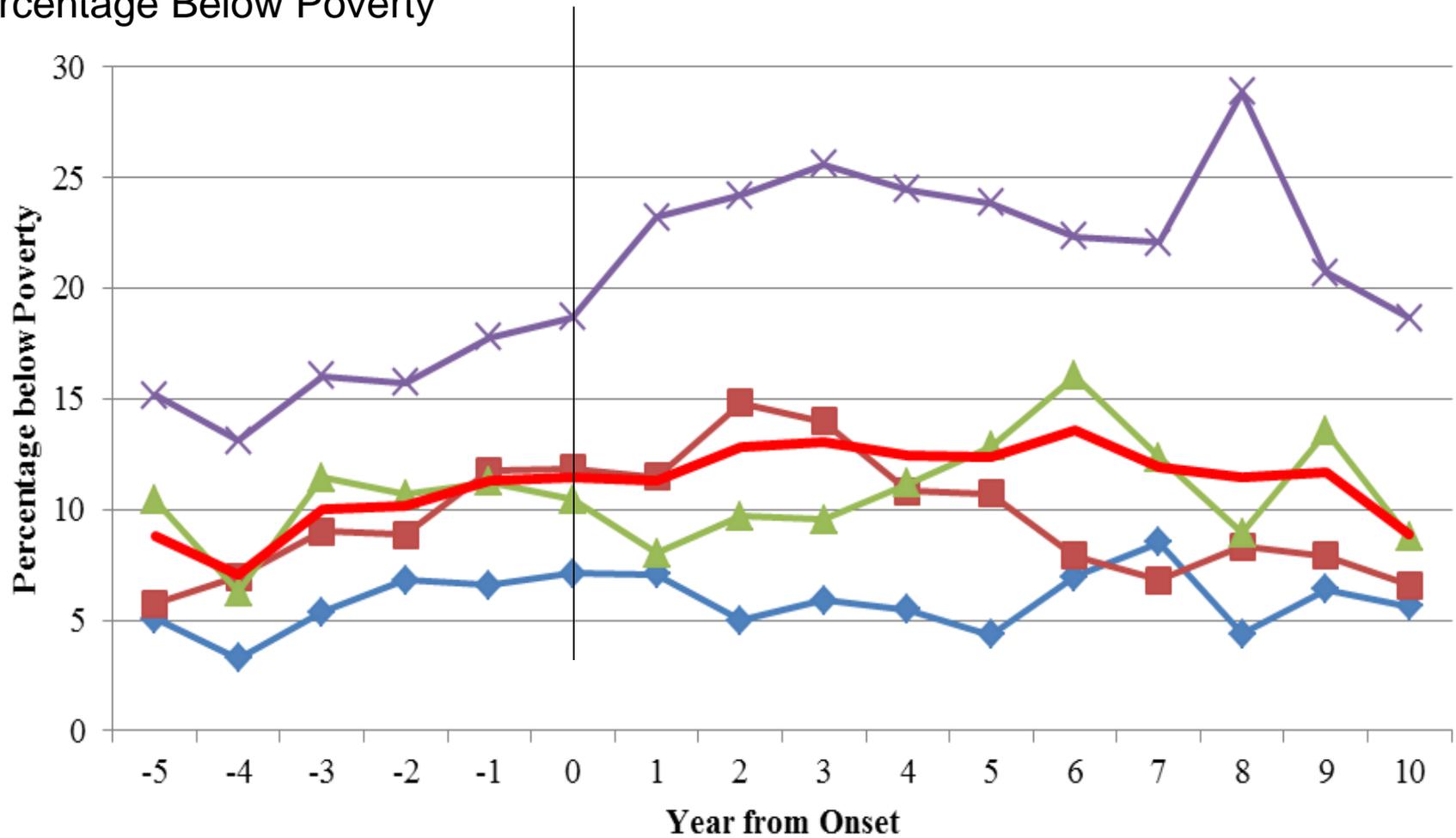
	Non-Disabled	All Disabled	Extent of Disability Groups			
			One-Time	Temporary	Chronic Not Severe	Chronic Severe
			(3)	(4)	(5)	(6)
	(1)	(2)				
Age at Disability Onset		37.0 (10.3)	35.7 (9.0)	35.6 (10.5)	37.0 (10.3)	41.7 (10.2)
Age	35.9 (7.9)	40.5 (8.7)	37.0 (6.7)	39.5 (8.4)	42.1 (8.6)	44.9 (9.2)
White	0.667 (0.471)	0.670 (0.470)	0.716 (0.451)	0.657 (0.475)	0.752 (0.432)	0.489 (0.501)
Married	0.802 (0.317)	0.799 (0.312)	0.786 (0.319)	0.797 (0.307)	0.816 (0.299)	0.792 (0.331)
Number of Years In Survey	13.7 (8.0)	19.3 (8.1)	19.4 (8.0)	19.2 (8.3)	20.6 (7.9)	17.5 (8.0)
Highest Level of Educ-High School	0.347 (0.476)	0.315 (0.465)	0.347 (0.476)	0.331 (0.471)	0.336 (0.473)	0.264 (0.442)
Highest Level of Educ-College	0.461 (0.499)	0.355 (0.479)	0.462 (0.499)	0.360 (0.480)	0.358 (0.480)	0.191 (0.394)

**Table 2 (continued)**  
**Sample Means and Standard Deviations,**  
**Non-disabled and Extent of Disability Groups**

	Extent of Disability Groups					
	Non-Disabled (1)	All Disabled (2)	One-Time (3)	Temporary (4)	Chronic Not Severe (5)	Chronic Severe (6)
Years in Survey after Onset		13.7 (8.6)	10.2 (6.7)	13.8 (9.3)	16.5 (8.5)	13.9 (8.2)
Number of Consecutive Positive Limitation Reports		1.919 (4.225)		0.444 (0.631)	3.339 (5.193)	4.933 (6.167)
Number of Non-missing Reports of Disability Status from Onset to the 10th Year after Onset		7.471 (2.495)	6.794 (2.599)	7.218 (2.542)	8.210 (2.196)	7.653 (2.392)
Number of Positive Limitation Reports from Onset to the 10th Year after Onset		2.993 (2.912)		1.402 (0.491)	5.363 (2.113)	6.155 (2.339)
Severity Ratio		0.277 (0.371)	0.129 (0.336)	0.207 (0.307)	0.121 (0.164)	0.837 (0.168)
Age in the Last Interview	45.2 (11.7)	54.8 (13.4)	50.2 (11.8)	53.6 (13.7)	57.6 (13.1)	58.5 (13.4)
Number of Observations	4,804	1,937	465	595	548	329

**Figure 7**  
**Percentage of Families with After-Tax Post Transfer Income**  
**Below the Poverty Threshold,**  
**Extent of Disability Groups and All Disabled**

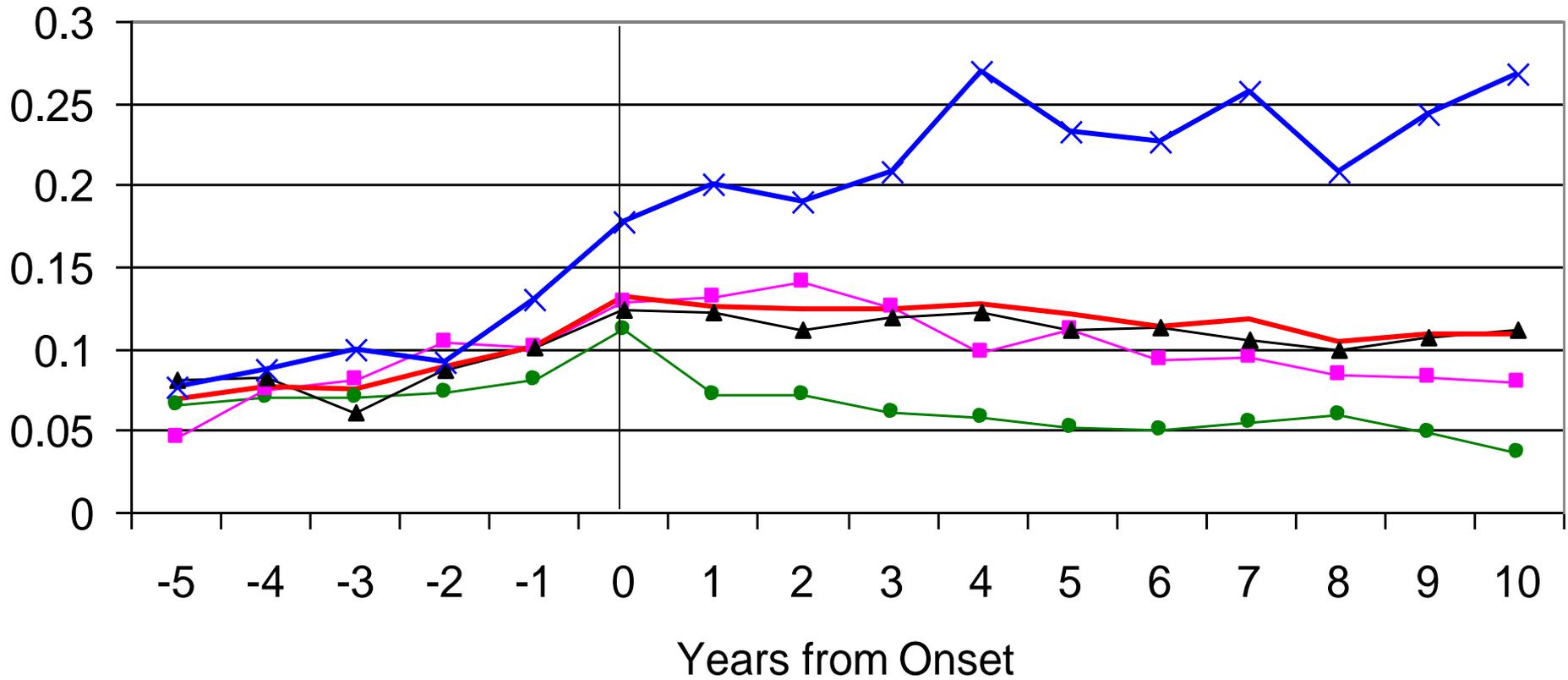
Percentage Below Poverty



◆ One-Time   ■ Temporary   ▲ Chronic-Not Severe   ✕ Chronic-Severe   ■ All Disabled

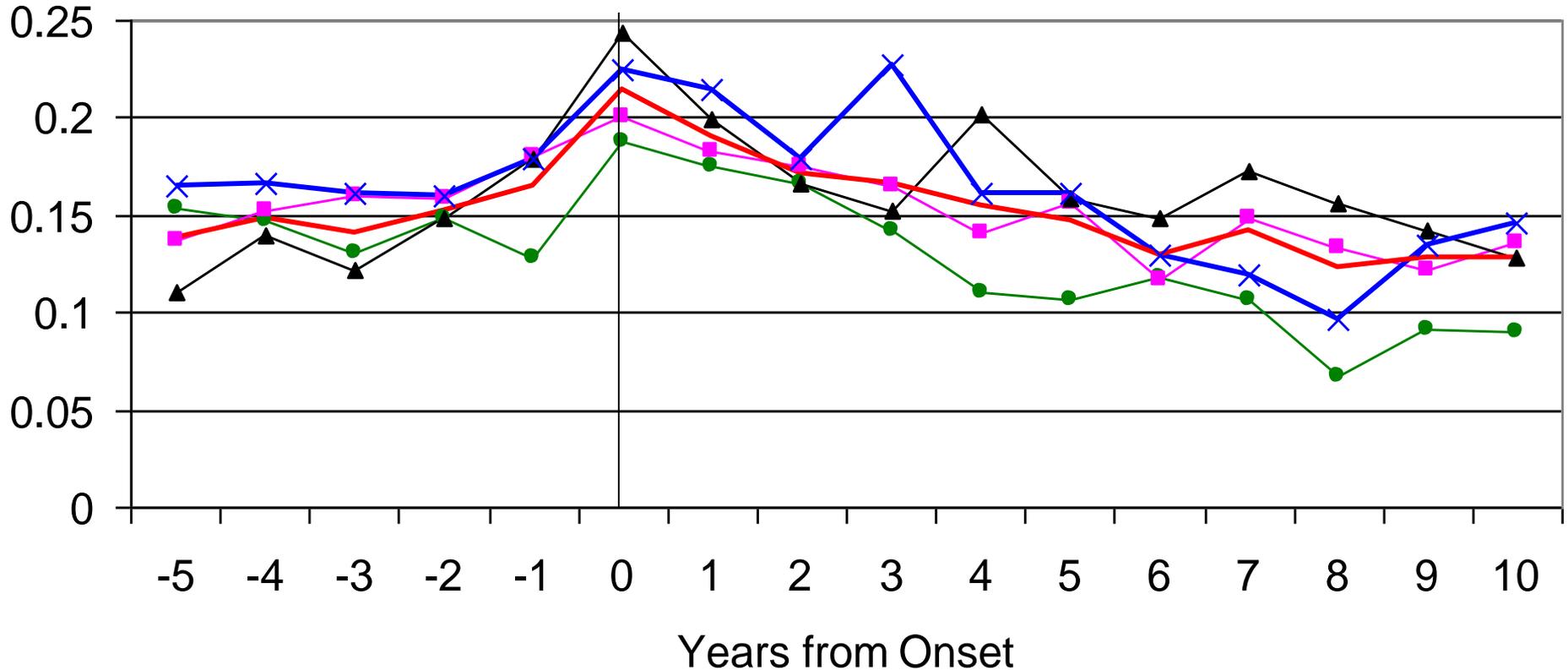
# Fraction Receiving Various Benefits

## Food Stamps



# Fraction Receiving Various Benefits

## UI or WC or Public/Subsidized Housing



**Figure 11**  
**Percentage Change of Food Eaten at Home Before and After Disability Onset, Extent of Disability Groups and All Disabled**

