Topic 11: Disability Insurance

Nathaniel Hendren

Harvard

Spring, 2018

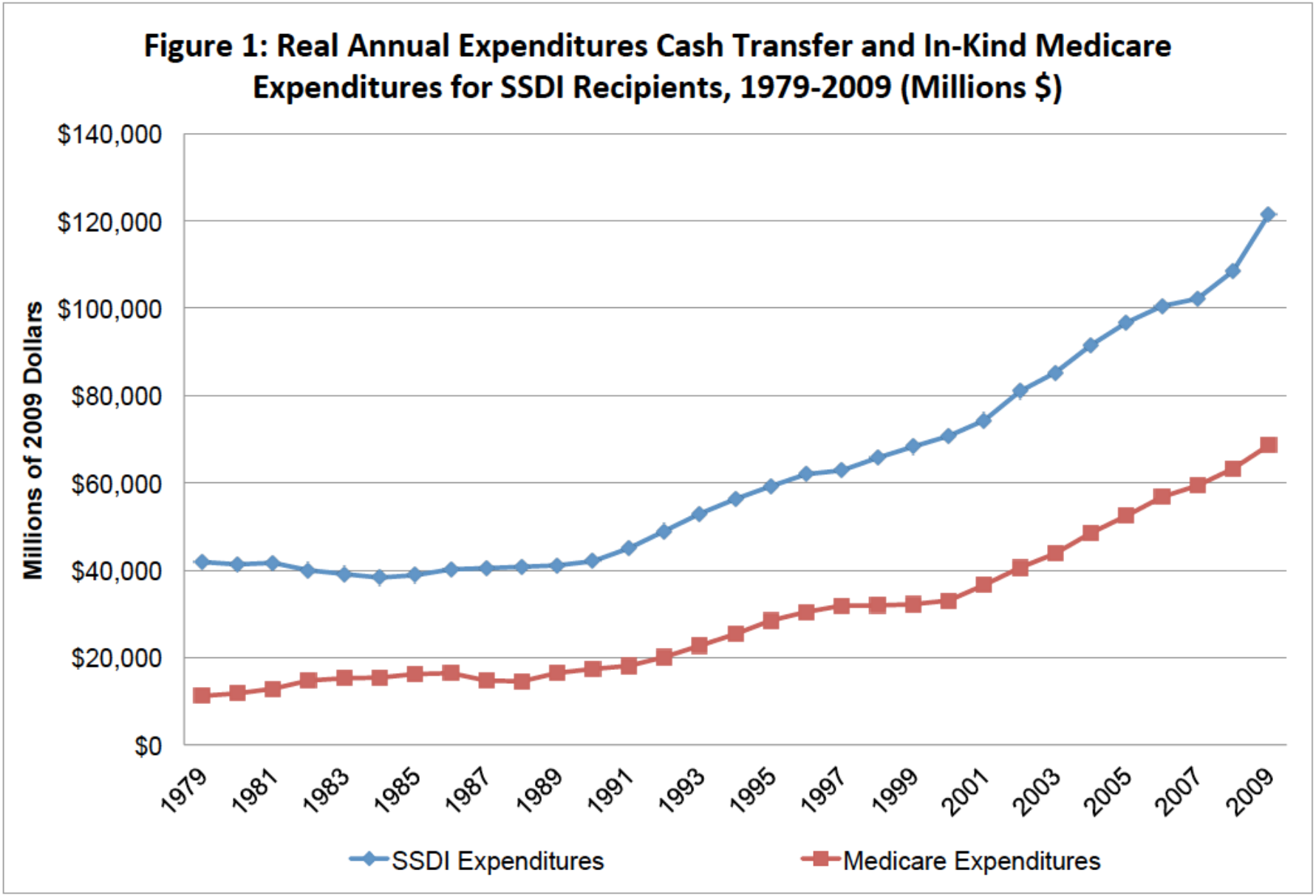
Disability Insurance

- Disability insurance in the US is one of the largest government expenditures
  - Fixing market failure from adverse selection?
- This lecture:
  - Trends in DI Spending
  - Impacts of DI on labor supply
  - Intergenerational aspects of program participation
  - Models of DI and welfare analyses

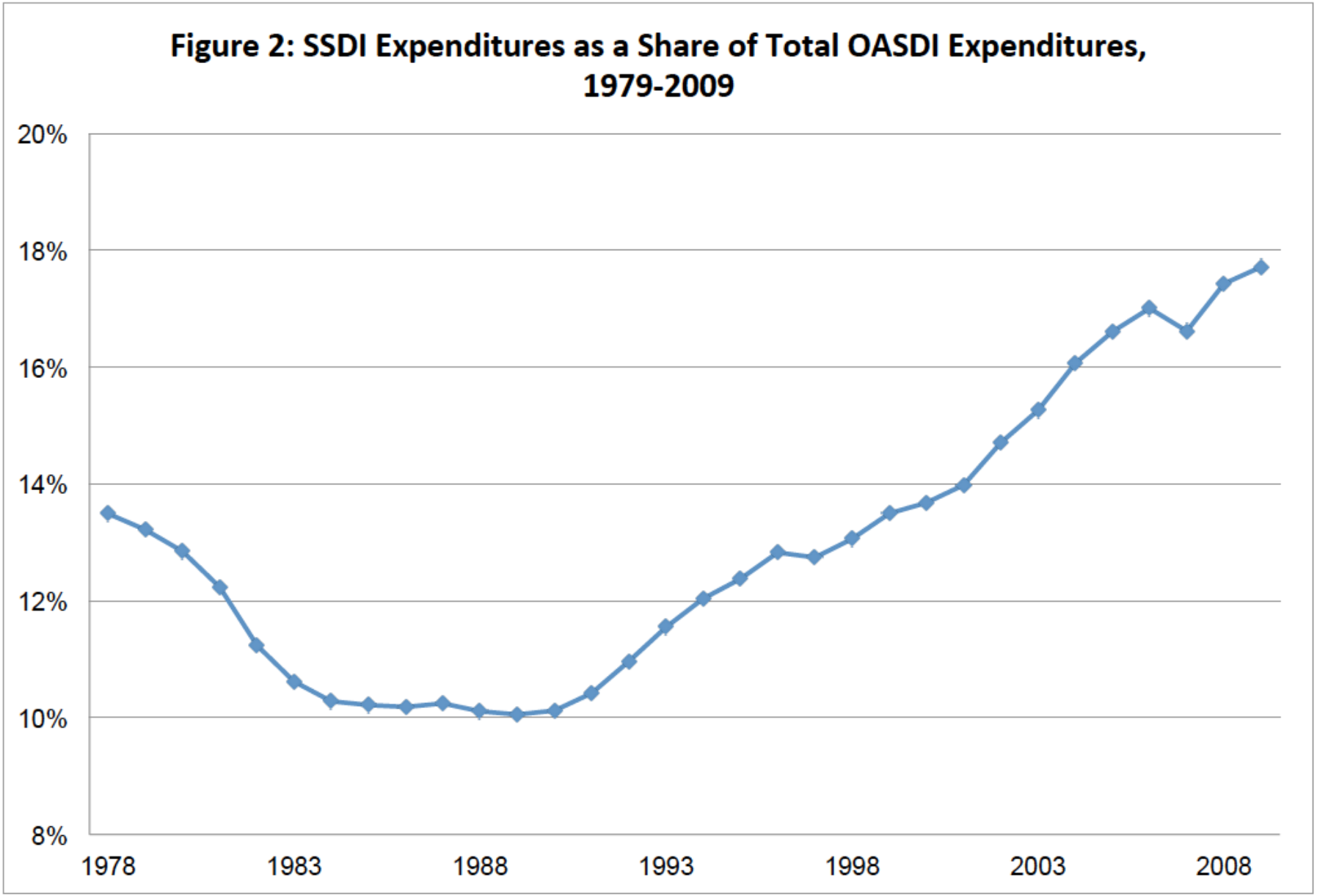
Greater Share of Govt Expenditure

- Dramatic recent increases in government expenditures
  - David Autor (2015) "The Unsustainable Rise of the Disability Rolls in the United States: Causes, Consequences, and Policy Options"
  - See also Autor and Duggan (2006, JEP)

Rising Costs in SSDI

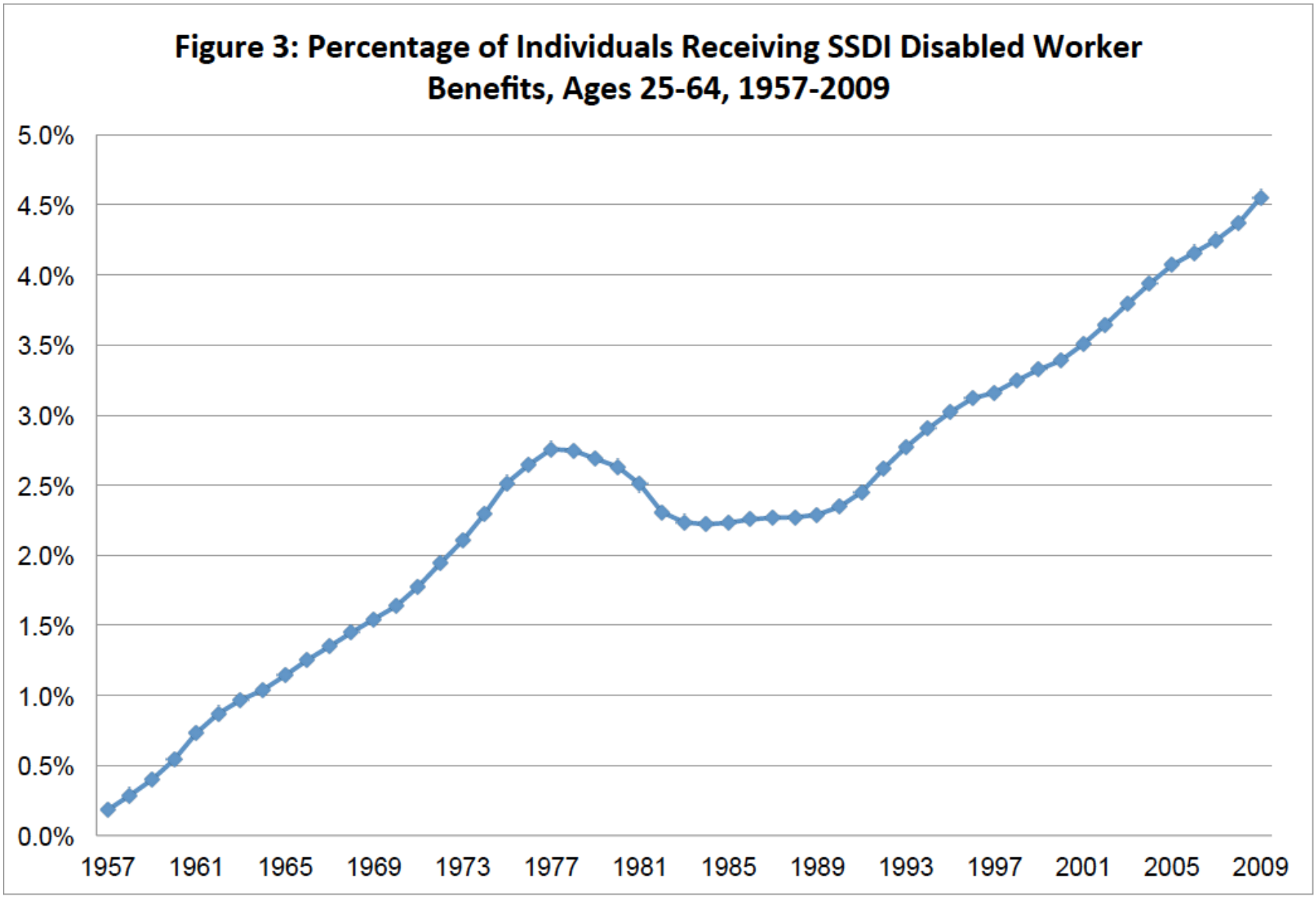


Greater Share of Govt Expenditure



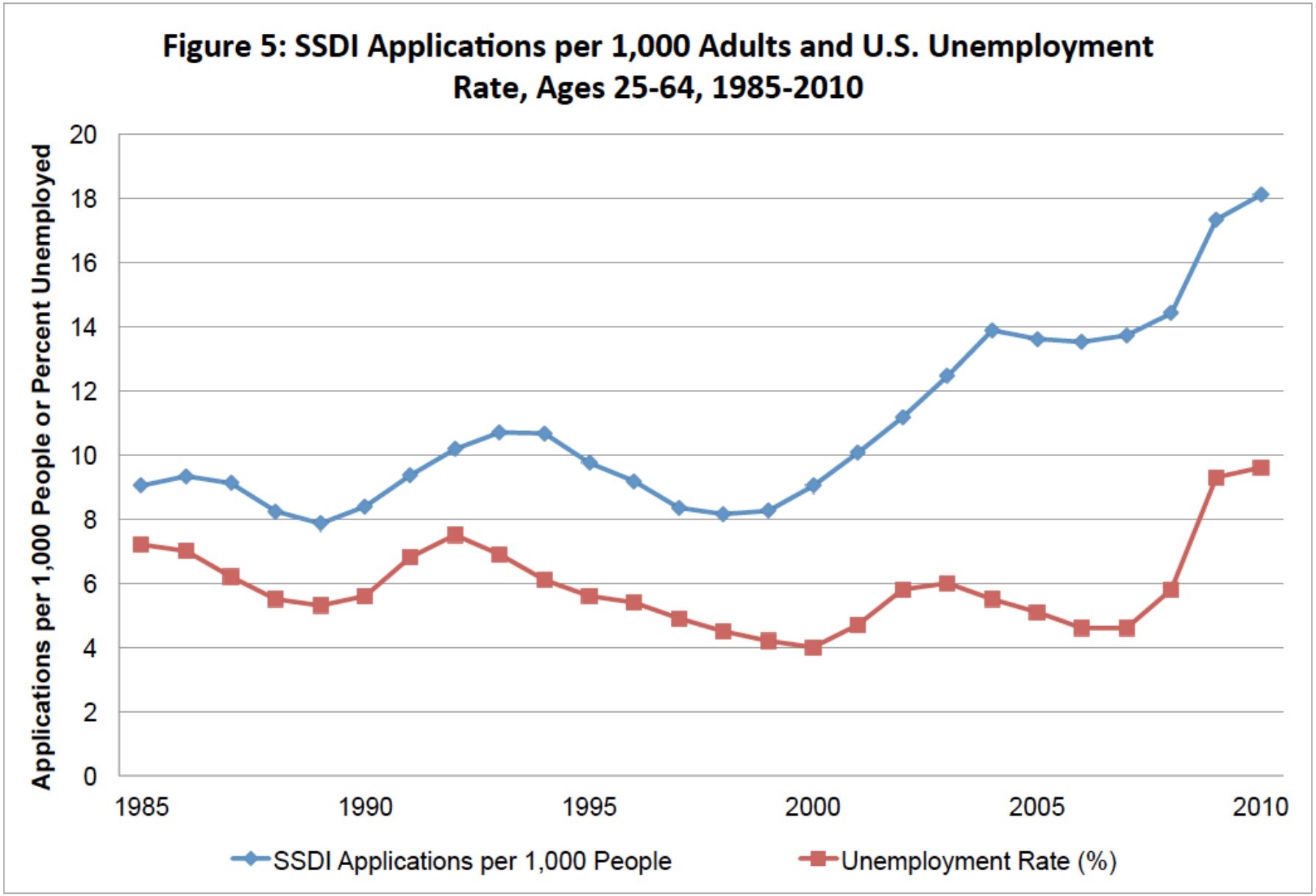
- Source: Autor (2015)

Driven by Greater Enrollment



- Source: Autor (2015)

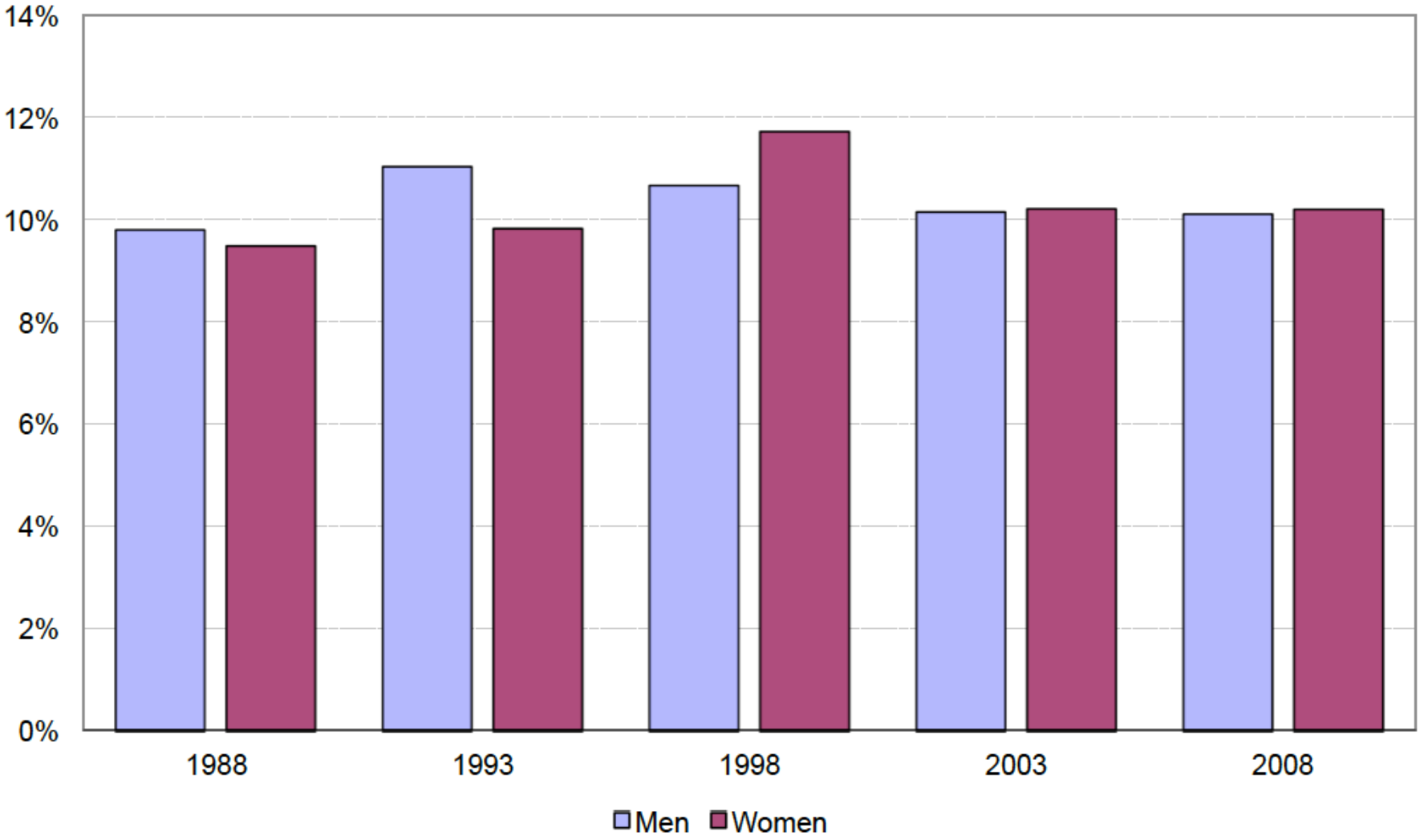
Correlated with Unemployment Rate...



- Source: Autor (2015)

Not by Increases in Measured Disabilities

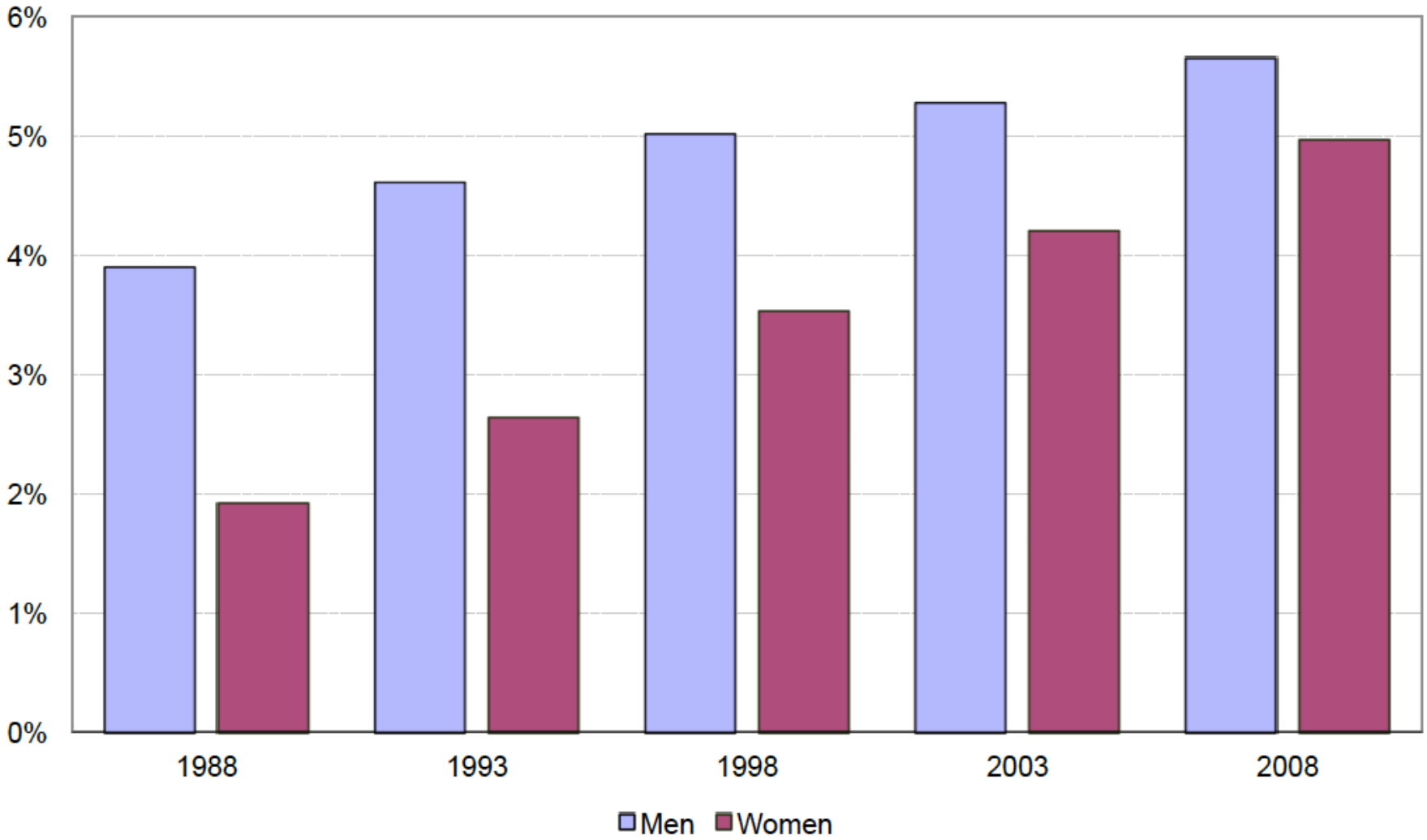
Figure 6: Percentage of People Reporting a Work-Limiting Health Condition or Disability, Ages 40-59



- Source: Autor (2015)

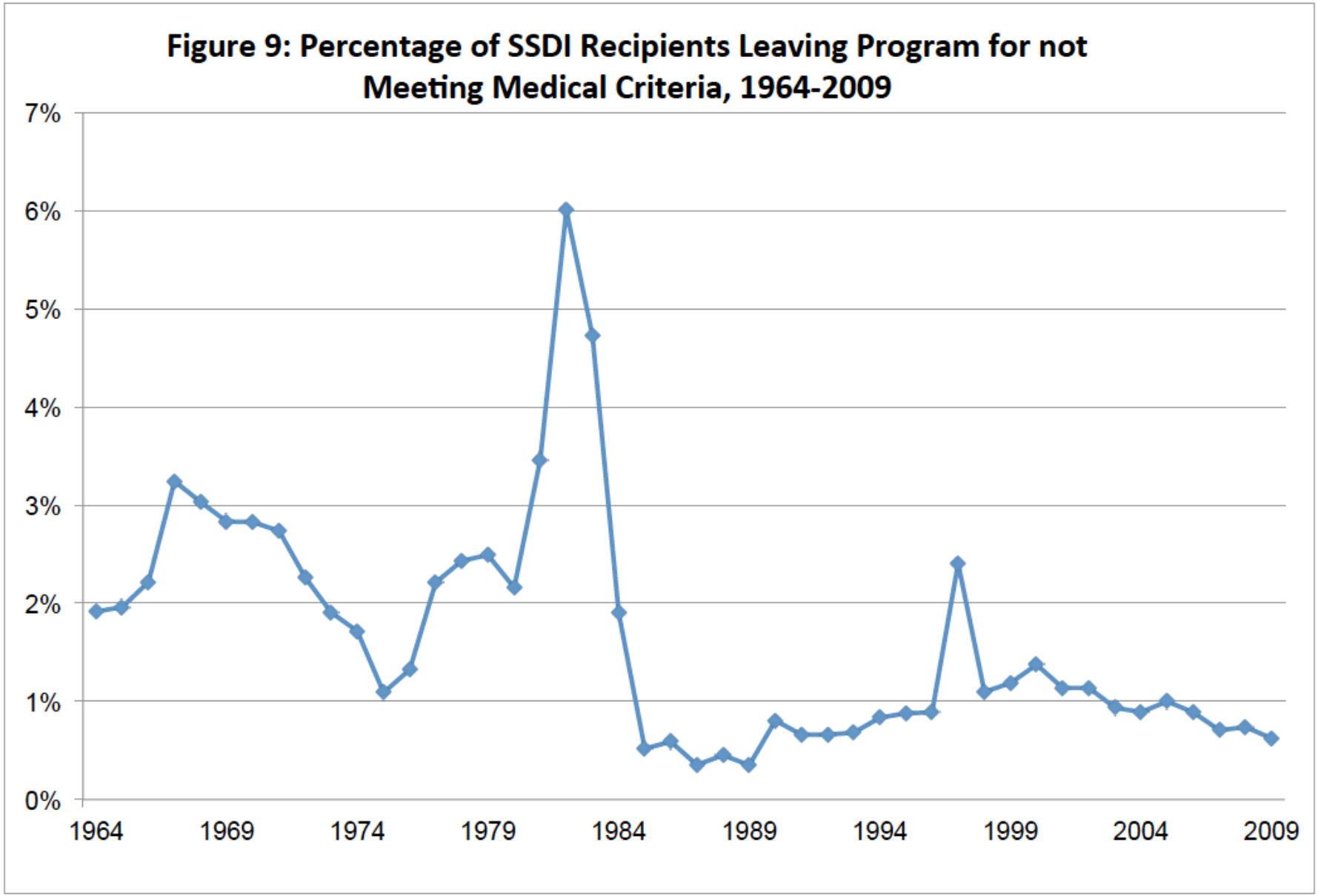
Increases for Both Men and Women

Figure 7: Fraction of Individuals Receiving SSDI Benefits
Ages 40-59, 1988-2008



- Source: Autor (2015)

Fewer People Leaving SSDI



- Source: Autor (2015)

1 Trends in DI spending

2 Causal Impact of DI on Outcomes

3 Modeling DI

Disability Insurance

- Large debate: to what extent does disability insurance deter labor supply?
  - "Can't these people work anyway"?
- Research begins with the "Bound-Parsons" debate

Bound-Parsons Debate

- Early estimates of impact of DI on labor supply ran regressions of the form:

$$L = \beta DI\% + \gamma X + \epsilon$$

  - X is a set of control variables
  - L is labor force participation
  - $DI\%$ is the fraction of earnings that DI system replaces
    - DI replacement rate is higher for low-income workers

- Finds $\beta < 0$

- Conclusion (Parsons 1980, 1982) : DI reduces labor supply

Bound-Parsons Debate

- Problem: disabled may have lower historical income
  - Implies higher DI replacement rate
  - National program implies only variation in income generates variation in $DI\%$
  - Omitted variable bias generates $\beta < 0$?
- Solution?: look at rejected DI applicants (Bound, 1989)

Bound-Parsons Debate

- Bound (1989, AER)
- Data from 1971 and 1977 surveys
- Shows that less than 50% of rejected DI applicants work
  - Argument: lower LFP can't be explained by DI

Bound (1989)

TABLE 2—EMPLOYMENT, EARNINGS, AND OTHER CHARACTERISTICS OF REJECTED DISABILITY INSURANCE APPLICANTS

	1972			1978		
	Population	Rejected Applicants	Beneficiaries	Population	Rejected Applicants	Beneficiaries
Labor Supply						
Percent Employed	77.7	32.6	3.2	69.3	28.7	2.3
Percent Worked 71/77	91.9	45.0	7.5	86.7	40.4	5.5
Percent Full Year (≥ 50 Weeks)[a]	76.8	47.4	31.4	83.5	41.2	22.2
Percent Full Time (≥ 35 Hours)[a]	95.4	75.9	25.0	92.4	79.6	38.3
Earnings Among Positive Earners						
Median Annual Earnings, 71/77[b]	$9000	$4000	$700	$14000	$5300	$1000
Median Weekly Earnings[b]	175	120	25	300	218	70
Demographics						
Median Age	58.7	57.9	58.1	53.8	55.6	58.3
Median Education	11.0	8.1	8.1	11.7	9.2	9.1
Percent Nonwhite	8.9	17.6	11.2	10.4	13.2	12.4
Percent Married	87.8	77.3	83.6	87.2	74.3	79.9
Percent Reporting Work Limitations						
Percent Severely Disabled	12.0	50.5	92.7	14.3	64.0	97.0
Percent Partially Disabled	14.8	39.2	6.9	13.2	26.4	1.9
Percent Capable of the Same Kind of Work as Before Health Limitation	–	14.5	0.7	–	11.0	0.8
Percent with Health Condition						
Musculoskeletal	22.3	40.0	41.1	17.6	58.6	51.3
Cardiovascular	28.8	56.4	60.4	21.0	58.6	67.4
Mental/Nervous	6.8	16.4	27.4	5.1	26.3	31.0
Respiratory	6.7	22.7	26.7	6.0	26.3	28.2
Digestive	9.6	21.3	24.7	9.1	15.0	21.3
Neurological	0.7	2.2	6.7	0.6	1.5	3.2
Urogenital	2.4	4.9	6.5	3.0	6.8	7.5
Cancer	3.7	6.2	6.9	2.8	2.3	7.7
Endocrine	6.9	8.8	9.9	4.6	11.3	15.9
Blind	3.8	10.7	11.1	2.3	13.5	13.4
Median Year Applied for DI	–	68.7	67.0	–	74.5	74.4
Number of Observations	2779	273	590	1272	136	1722

Bound (1989)

TABLE 3—FINAL DETERMINATIONS OF DISABILITY AND THE CLINICAL TEAM EVALUATIONS OF WORK CAPACITY OF APPLICANTS

	Final Determinations					
	Allowance		Denial		Total	
Work Capacity	No.	Percent	No.	Percent	No.	Percent
Fit for Work Under Normal Conditions	–	–	9	1.0	9	0.4
Fit for Specific Jobs, Including Former Job, Under Normal Conditions	23	1.5	142	15.0	165	6.7
Fit for Specific Jobs, Excluding Former Job, Under Normal Conditions	94	6.2	167	17.7	261	10.6
Fit for Work Under Special Conditions	92	6.1	90	9.5	182	7.4
Can Work Part-Time Under Normal Conditions	82	5.4	84	8.9	166	6.8
Can Work Under Sheltered Conditions	134	8.9	87	9.2	221	9.0
Can Work at Home Only	66	4.4	29	3.1	95	3.1
Not Fit for Work	1019	67.5	336	35.6	1355	55.2
Total	1510	100.0	944	100.0	2454	100.0

Source: Derived from Saad Z. Nagi, *Disability and Rehabilitation: Legal, Clinical, and Self-Concepts and Measurement*, Columbus: Ohio State University Press, 1969, p. 94.

Bound (1989)

TABLE 4—SOURCES OF INCOME FOR DISABILITY INSURANCE APPLICANTS

	1971							
			Rejected Applicants					
Income Source	Population		Worked in 1971		Did not Work 1971		Beneficiaries	
	Percent	Mean	Percent	Mean	Percent	Mean	Percent	Mean
Total Family Income	100.0	13413	100.0	9765	100.0	4087	100.0	5745
Earnings[a]	92.0	12787	100.0	8296	36.9	3579	45.4	3640
Own Earnings	91.9	10826	100.0	6732	0.0	–	7.5	1854
Wife's Earnings	42.5	5110	48.4	3102	32.9	3909	39.0	3856
Public Income Maintenance	25.7	3086	52.9	3463	83.2	4039	99.0	6131
Social Security	8.9	1742	25.6	1373	52.4	1750	98.0	2300
P.I.M. Net of Social Security	19.9	2404	33.1	2714	51.0	2683	46.7	3822
Veterans Benefits	8.5	1384	13.2	2177	22.2	1833	30.0	2116
Workers' Compensation	2.2	619	3.3	1374	2.0	2154	4.3	1971
Welfare	2.0	1740	8.3	1854	28.2	2026	9.5	2949
APTD	1.0	998	4.1	1117	18.8	1148	8.2	902
AFDC	0.6	1737	3.3	1417	4.0	1725	2.4	1178
Other Welfare	0.9	1121	3.3	1685	7.4	698	2.2	674
Government Disability	3.3	4207	3.3	5597	3.4	1840	5.3	2745
Unemployment Insurance	5.7	843	8.3	1052	2.0	292	0.7	1027
Private Pensions, etc.[b]	8.0	2631	8.3	1109	16.1	2668	20.3	2309
Asset Income	39.3	1371	22.9	2493	20.1	1864	22.4	1256
Number of Observations	4817		122		149		590	

Bound (1989)

1977

Income Source	Population		Rejected Applicants: Worked in 1977		Rejected Applicants: Did not Work 1977		Beneficiaries	
	Percent	Mean	Percent	Mean	Percent	Mean	Percent	Mean
Total Family Income	100.0	17784	100.0	13472	100.0	8272	100.0	10737
Earnings[a]	86.5	17337	100.0	10659	46.9	6060	46.1	6689
Own Earnings	86.5	14486	100.0	7027	0.0	–	5.5	2924
Wife's Earnings	41.6	6872	32.7	7230	39.5	4939	33.0	5999
Public Income Maintenance	37.5	3409	68.5	3481	90.1	4748	99.8	5796
Social Security	16.2	3329	42.6	3309	70.4	3997	99.3	4359
P.I.M. Net of Social Security	27.5	2706	37.0	2800	44.4	3390	50.2	2917
Veterans Benefits	9.6	1648	11.1	1285	16.1	2199	27.6	2039
Workers' Compensation	2.6	2806	3.7	–[c]	8.6	3790	5.6	4651
Welfare	4.3	1964	9.3	3002	17.3	2740	12.2	1573
SSI	2.8	1910	5.6	–[c]	12.4	2174	9.8	1274
AFDC	0.9	1734	7.4	–[c]	6.2	2353	2.2	1893
Other Welfare	1.2	1188	0.0	–[c]	2.5	–[c]	2.0	1120
Government Disability	2.3	6784	0.0	–[c]	4.9	–[c]	2.0	6430
Unemployment Insurance	9.7	1241	14.8	2297	3.7	–[c]	2.4	1028
Other Benefits	2.8	4332	1.9	–[c]	1.3	–[c]	7.6	3285
Private Pensions, etc.[b]	21.8	2976	23.6	1874	28.4	3121	37.4	3572
Asset Income	53.9	942	30.9	416	28.4	321	38.2	603
Number of Observations		1272		55		81		1722

Bound-Parsons Debate

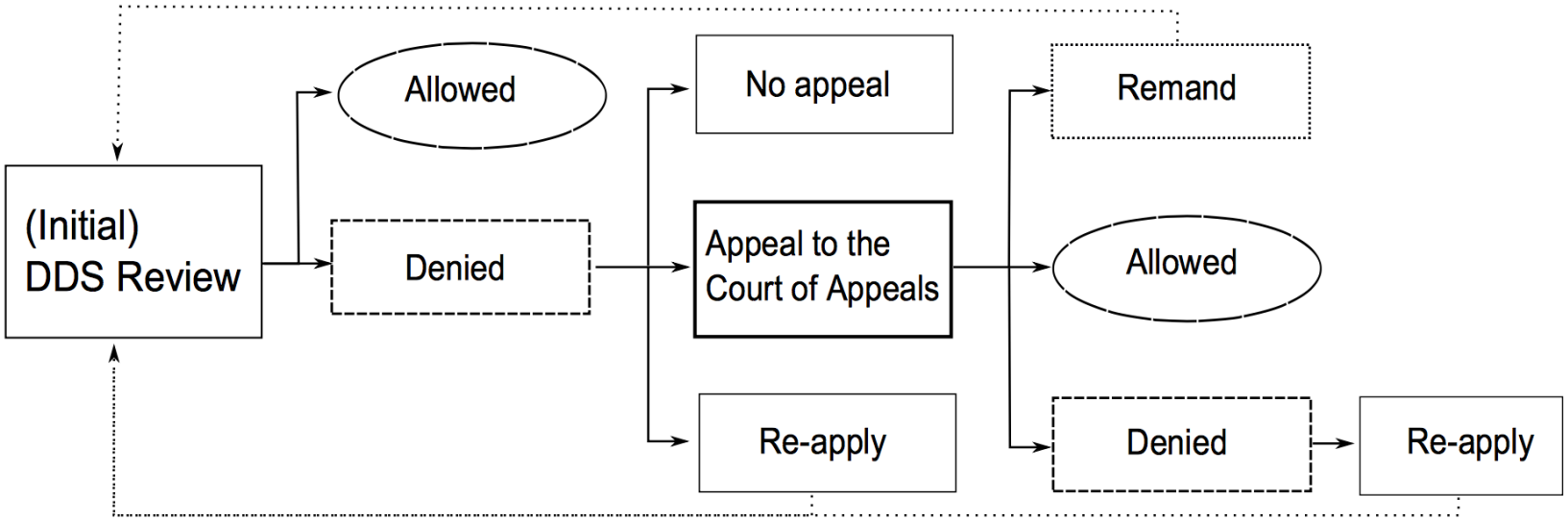
- Bound (1989) shows low LFP for rejected applicants
- Clearly illustrates violation of orthogonality condition in previous regressions
- Parsons responds:
  - DI applicants may reduce their labor supply in order to become eligible
    - Have a hard time of coming back into the labor force
    - Therefore, they are not a good counterfactual for no DI
- Large literature follows: general consensus that generosity of DI reduces labor supply but not as much as suggested in cross-sectional regressions

Autor, Kostol, and Mogstad (2015)

- Study impact of DI using administrative data in Norway
- Study impacts on:
  - Earnings
  - Income (benefit substitution)
  - Spousal labor supply
  - Consumption proxies
- Key lesson: spousal labor supply can help mitigate disability shock

DI Reduces Earnings

Figure 1: **DI Application and Appeals Process**



Notes: This figure summarizes the description of the application and appeal process in the Norwegian DI system.

Autor, Kostol, and Mogstad (2015)

- Exploit random assignment of applicants to judges in the appeals process for DI
- Model:

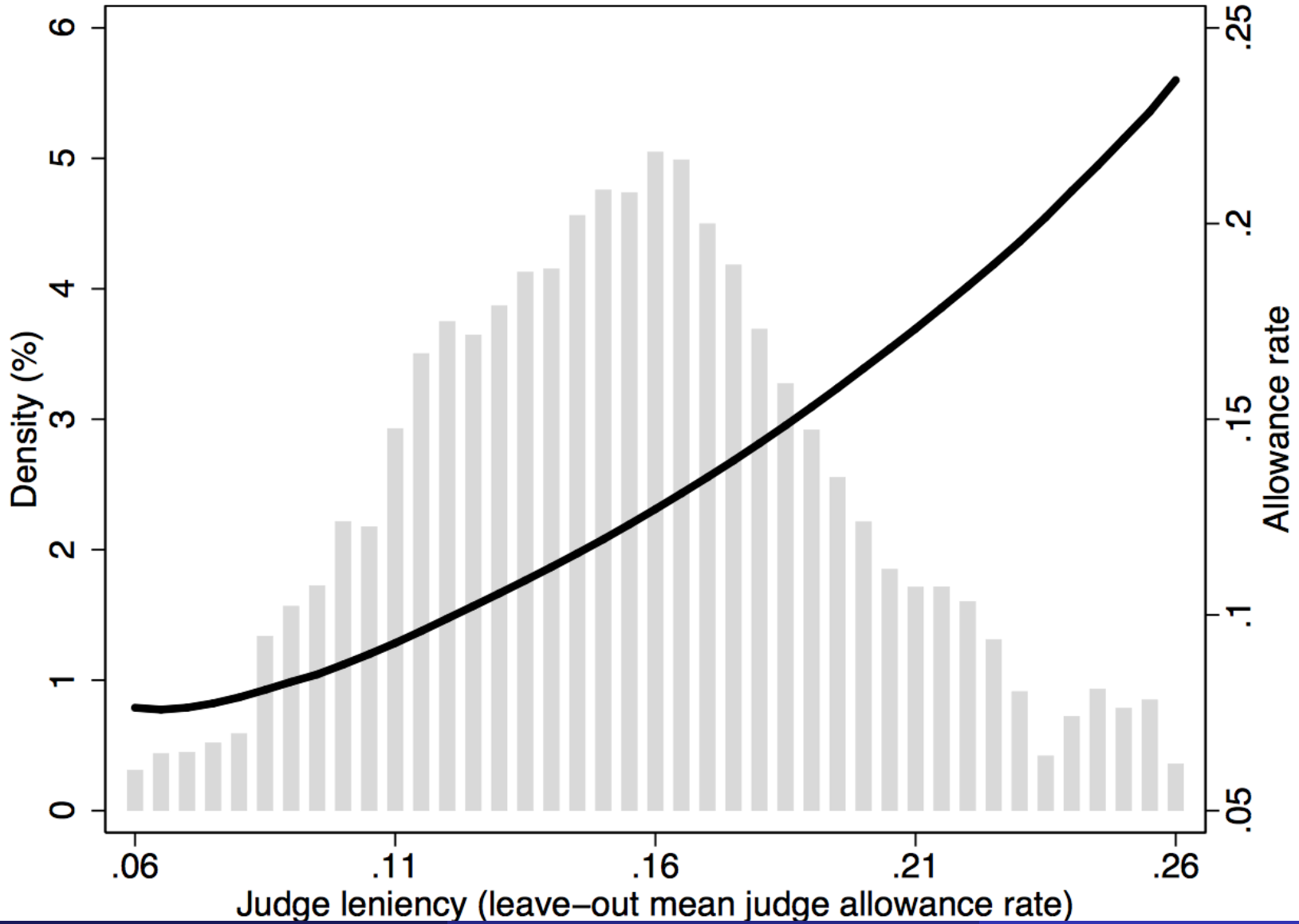
$$\begin{aligned} A_i &= \gamma Z_{ij} + X_i'\delta + \epsilon_{ij} \\ Y_{it} &= \beta_t A_i + X_i'\theta_t + \eta_{it} \end{aligned}$$

where

- A_i is an indicator for allowing DI after appeal
- Z_{ij} is the leniency measure of judge j to whom i is assigned
  - Based on previous case outcomes from the judge
- X_i is vector of controls
- Y_{it} is a dependent variable (e.g. consumption, earnings, spousal labor supply)

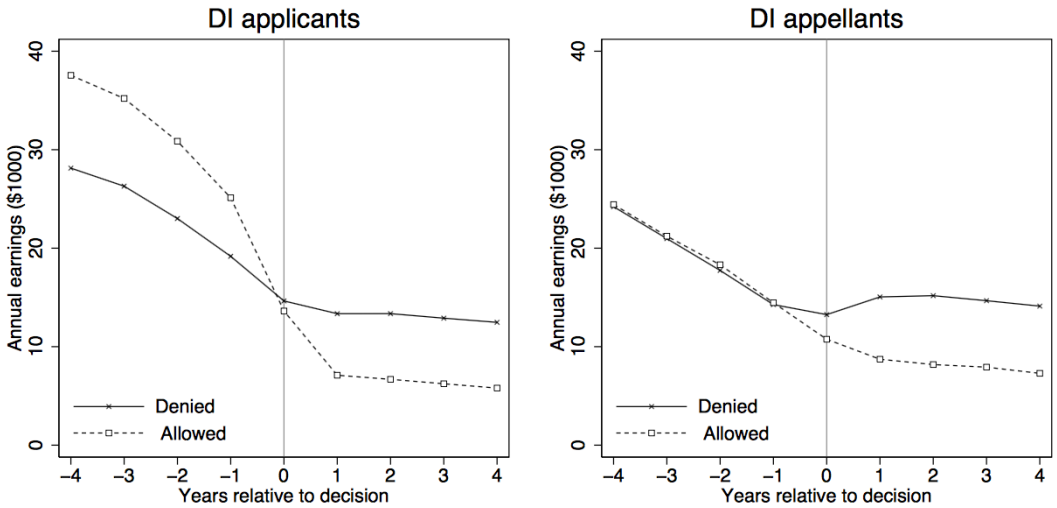
Judge Leniency Measure

Figure 4: **Effect of Judge Leniency on DI Allowance**



DI Appellents on Similar Trajectory

Figure 2: **Earnings Trajectories of Allowed and Denied DI Applicants and Appellants**



Notes: This figure displays mean real earnings for denied and allowed DI applicants (left-hand panel) and DI appellants (right-hand panel) in the nine years surrounding the initial DI determination (left-hand panel) and the initial outcome at appeal (right-hand panel). The applicant sample consists of all claims made during the period 1992-2003 by individuals who are at most 61 years of age. The appellant sample filed an appeal during the period 1994-2005 (see Section 3 for further details). Nominal values are deflated to 2005 and represented in US dollars using the average exchange rate NOK/$ = 6.

Judge IV: Spousal Earnings and Benefit Substitution

Table 7: **Effect of DI Allowance on Spousal Earnings and Transfer Payments**

	Years after decision			
	1	**2**	**3**	**4**
Panel A.	**Married appellant labor earnings ($1000)**			
Allowed DI	-4.924	-0.917	-4.686	-4.387
	(3.503)	(4.132)	(4.042)	(3.831)
Dependent mean	15.006	14.800	14.201	13.563
Panel B.	**Married appellant total transfers ($1000)**			
Allowed DI	9.478**	6.896	5.392	5.752
	(3.868)	(4.265)	(3.561)	(3.627)
Dependent mean	16.614	17.342	17.905	18.468
Panel C.	**Appellant spouse labor earnings ($1000)**			
Allowed DI	-5.963	-18.305**	-16.166*	-17.806**
	(8.627)	(8.777)	(8.290)	(8.328)
Dependent mean	40.927	39.472	38.751	37.442
Panel D.	**Appellant spouse total transfers ($1000)**			
Allowed DI	0.170	6.241*	6.307	8.620*
	(3.292)	(3.601)	(4.178)	(4.608)
Dependent mean	11.212	11.958	12.654	13.404
Observations	7,813	7,699	7,594	7,480

***p< 01, **p< 05, *p< 10. Standard errors (in parentheses) are clustered at the judge level

Judge IV: Impact on Income only for Unmarried

Table 10: **Effects of DI allowance on Household Disposable Income and Consumption**

	A. Unmarried and single		**B. Married**	
	Yearly disp. income (per capita)	Yearly consumption (per capita)	Yearly disp. income (per capita)	Yearly consumption (per capita)
Allowed DI	9.086***	9.835*	-1.615	-0.830
	(3.132)	(5.340)	(2.077)	(2.892)
Dependent mean	24.857	25.934	25.681	26.256
Observations	4,993	4,993	5,929	5,929

***p<.01, **p<.05, *p<.10. Standard errors (in parentheses) are clustered at the judge level.

Cost-Benefit Ratios?

Table 9: **Effects of DI Allowance on Fiscal Costs**

	A. Full sample		B. Restricted sample	
	Yearly fiscal costs (per allowed)	Benefit-to-cost ratio: ΔHH income/ ΔFiscal cost	Yearly fiscal costs (per allowed)	Benefit-to-cost ratio: ΔHH income/ ΔFiscal cost
Allowed DI	16.475***	0.44	15.631***	0.63
	(4.408)		(4.784)	
Dependent mean	19.611		21.529	
Observations	14,077	14,077	10,933	10,933

***p<.01, **p<.05, *p<.10. Standard errors (in parentheses) are clustered at the judge level.

Autor, Kostol, and Mogstad (2015)

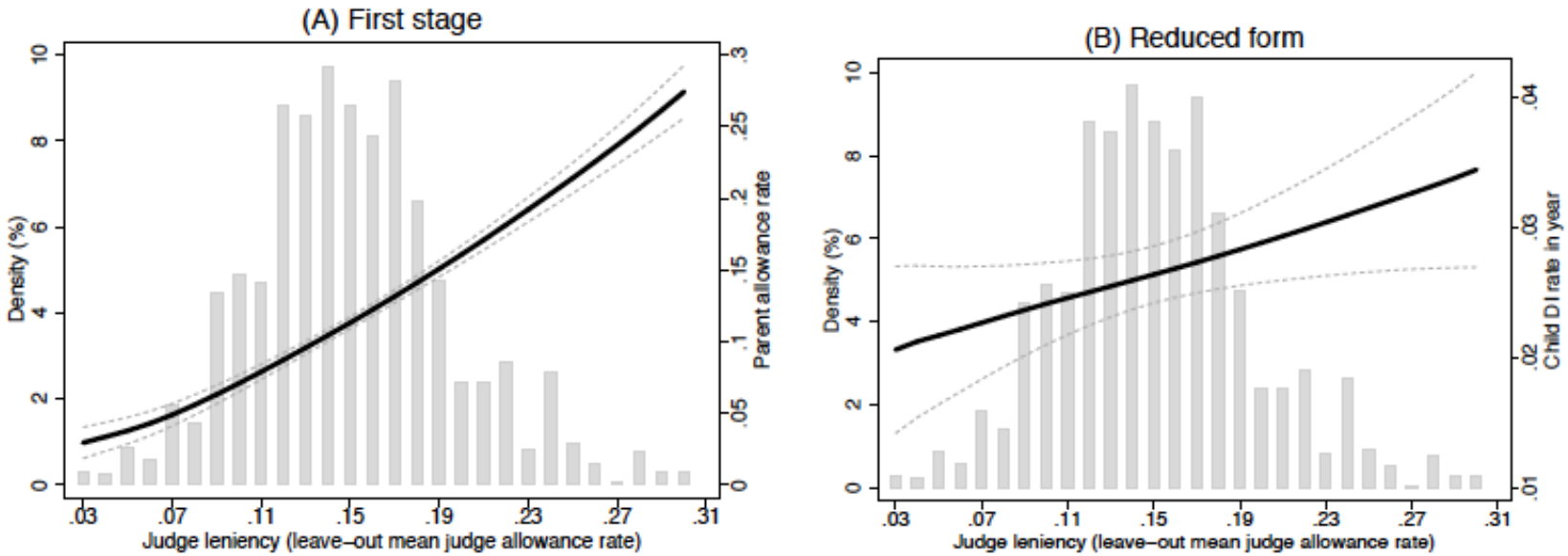
- Key lessons:
  - In Norway, benefit substitution is huge (many transfers to low-income)
  - Spousal labor earnings offset much of the reduction in earnings
  - Paper goes on to simulate welfare impacts
    - Key: depends on spousal labor supply elasticity
  - Larger welfare impact of DI for singles?

Dahl, Kostol, and Mogstad (2014)

- Dahl, Kostol, and Mogstad (2014): "Family Welfare Cultures"
- Study intergenerational persistence in welfare participation in Norway
- Main question: does DI receipt by parents cause children to be on welfare
- Empirical strategy: exploit random assignment to judges

First Stage and Reduced Form

Figure 3: Effect of Judge Leniency on Parents (First Stage) and Children (Reduced Form).



First Stage and Reduced Form

Table 3: Estimates of Intergenerational Welfare Transmission.

		Child on DI 5 years after parent's appeal decision		*Child ever on DI after parent's appeal decision*	
	First stage	Reduced form	IV	Reduced form	IV
A. No additional controls					
Parent's judge leniency	0.909***	0.055***		0.107***	
	(0.112)	(0.020)		(0.030)	
Parent allowed DI			0.061***		0.118***
			(0.022)		(0.033)
B. With additional controls					
Parent's judge leniency	0.869***	0.052**		0.101***	
	(0.108)	(0.020)		(0.027)	
Parent allowed DI			0.060***		0.116***
			(0.023)		(0.032)
Dependent mean	0.12	0.03		0.08	

***p<.01, **p<.05, *p<.10. Standard errors (in parentheses) are clustered at the judge level.

Dahl, Kostol, and Mogstad (2014)

- Fairly large impact of obtaining DI on children obtaining DI
- Why?
  - Welfare culture?
  - Reduction of earnings?
  - Decision to apply?

First Stage and Reduced Form

Table 5: Effect of Parent's DI Allowance on Child Labor and Educational Outcomes.

5 years after parent's appeal decision

Dependent variable	Reduced form	IV	Dep. mean
A. DI	0.052**	0.060***	0.03
	(0.020)	(0.023)	
B. Any employment	-0.119**	-0.137**	0.58
	(0.055)	(0.065)	
C. Full-time work	-0.065	-0.075	0.42
	(0.079)	(0.090)	
D. College degree	-0.079	-0.091	0.25
	(0.060)	(0.069)	

***p<.01, **p<.05, *p<.10. Standard errors (in parentheses) are clustered at the judge level.

Dahl, Kostol, and Mogstad (2014)

- Results suggest large intergenerational persistence in DI (12pp after 10 years)
- Behavioral response by children (lower earnings)
  - Income effects vs. welfare culture?
  - What's the difference?

Deshpande (2016, AER): Impact of SSI

- Now, turn to US and focus on Supplementary Social Security Income (SSI)
- SSI provides cash payments and Medicaid eligibility to low-income children and adults with disabilities
    - Imposes high marginal tax rates on parents of these children and the children themselves
- 1996 welfare reform: increased strictness of medical review to remain on SSI at age 18
- Empirical strategy: compare children who turn 18 on either side of the August 22, 1996 cutoff

RD Based on 18th Birthday

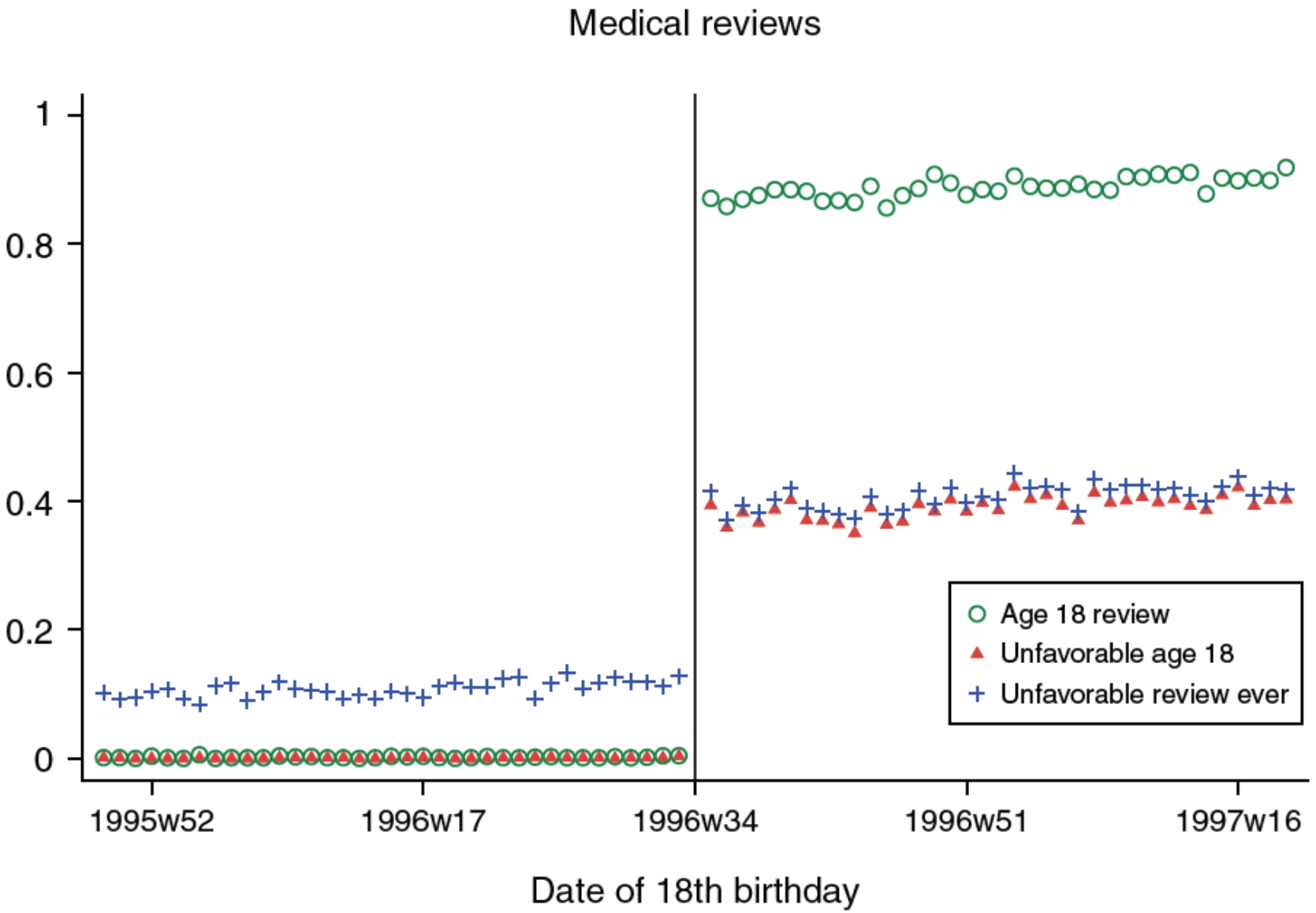


FIGURE 2. EMPIRICAL STRATEGY USING VARIATION IN ELIGIBILITY FOR MEDICAL REVIEWS

Leads to Semi-Persistent Drop in Enrollment

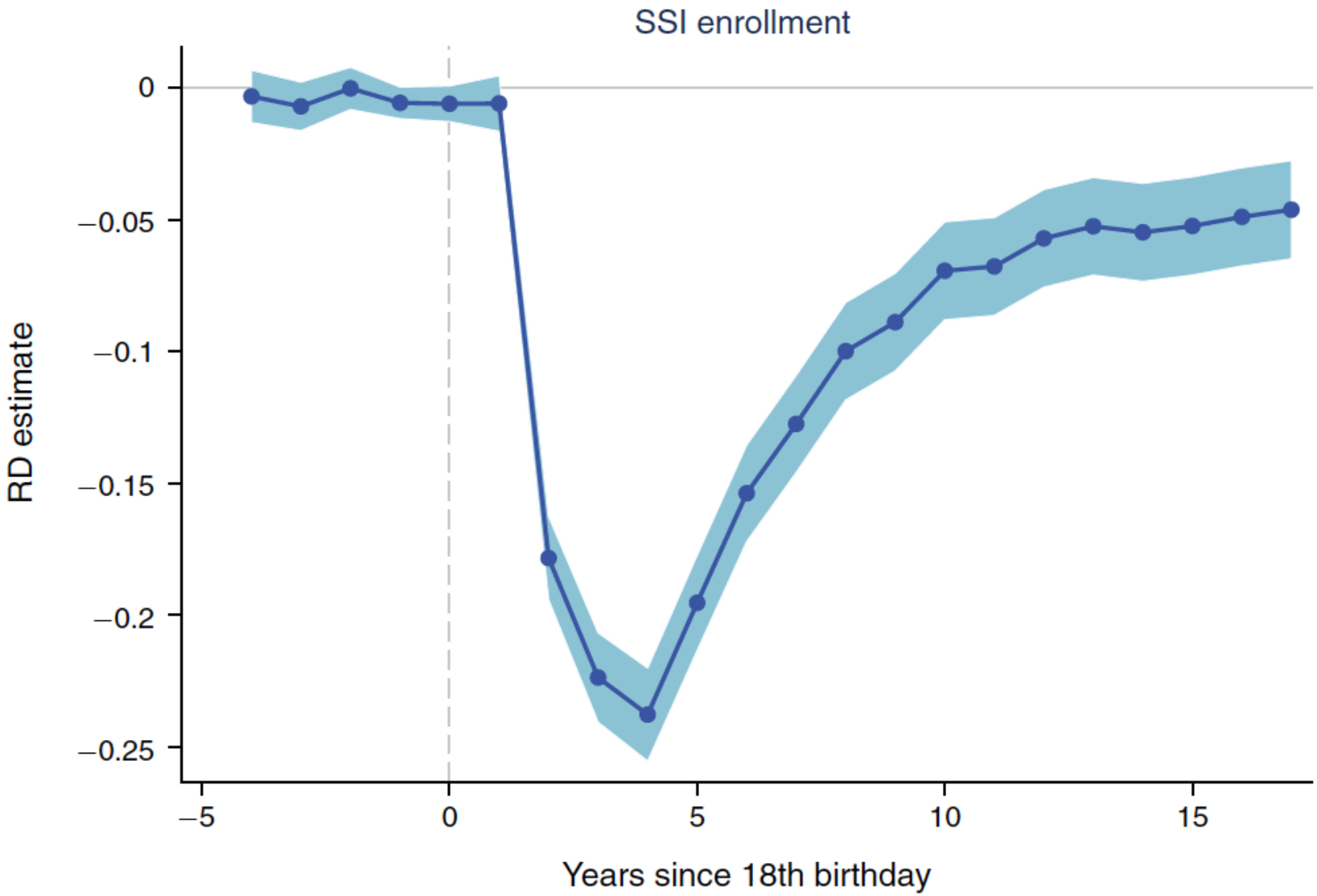
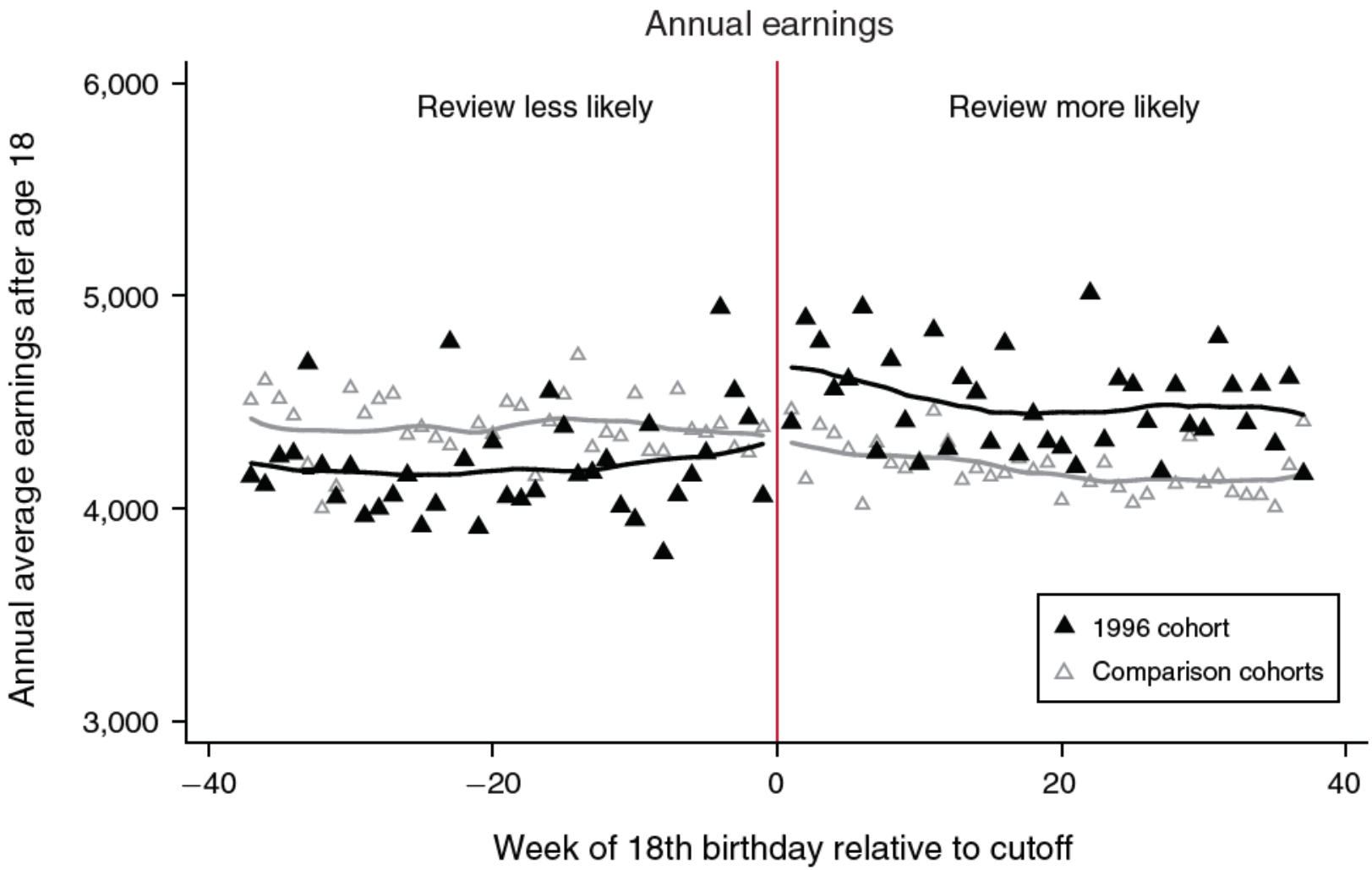


FIGURE 3. CHANGE IN FIRST STAGE FOR SSI ENROLLMENT OVER TIME

Slight Increase in Earnings



Impacts on Parents too (Substitution)

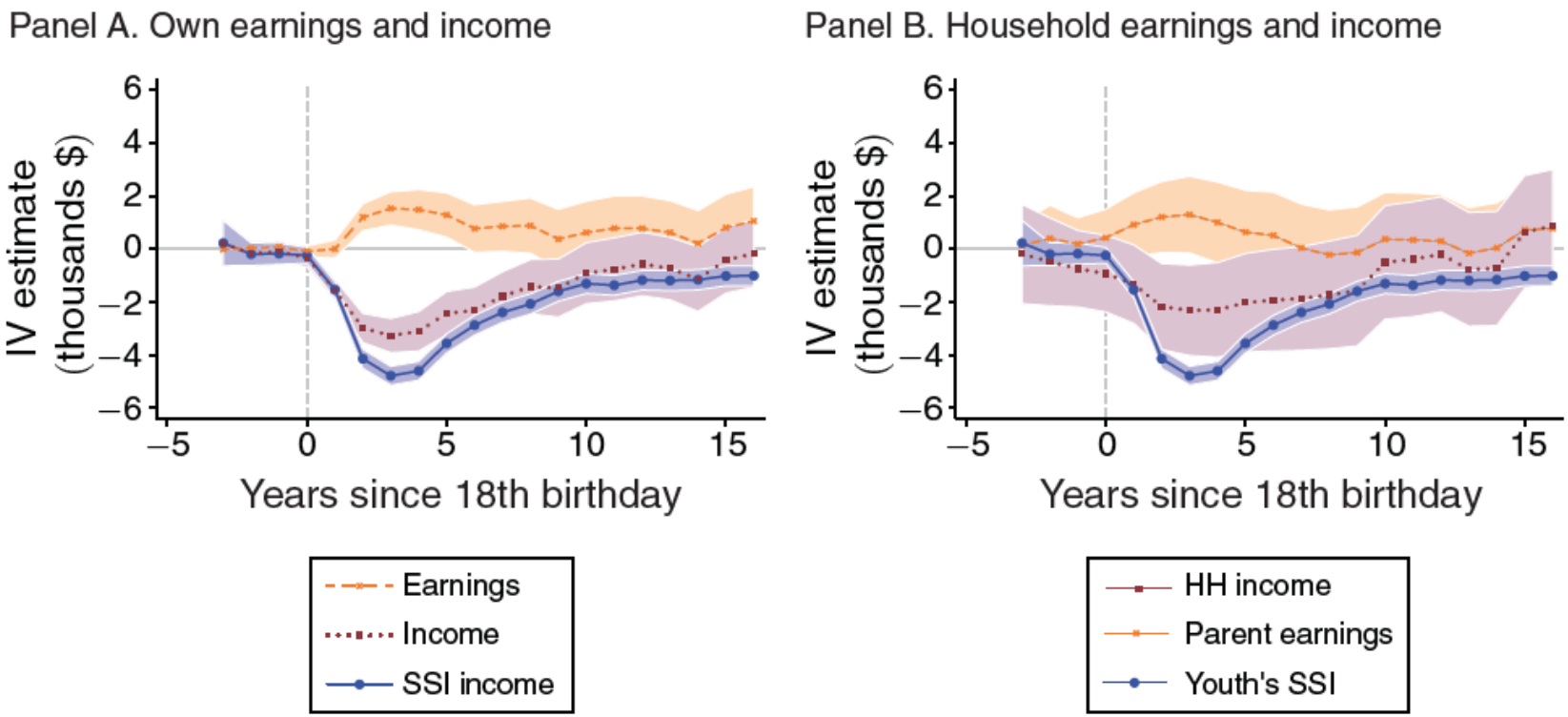


FIGURE 5. IV ESTIMATES OF THE EFFECT OF AGE 18 REMOVAL

Income Does Not Replace Benefits

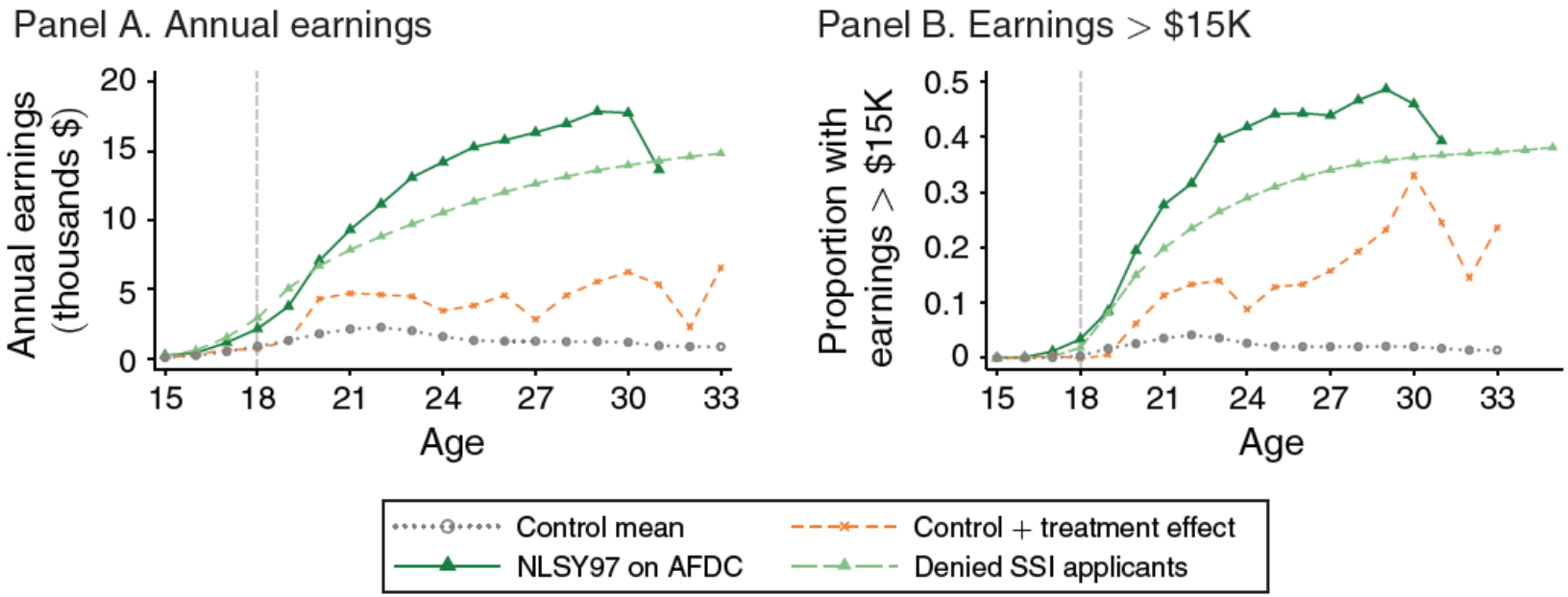


FIGURE 7. EARNINGS OF REMOVED SSI YOUTH VERSUS BROADER DISADVANTAGED POPULATION

Deshpande (2016, AER): Impact of SSI

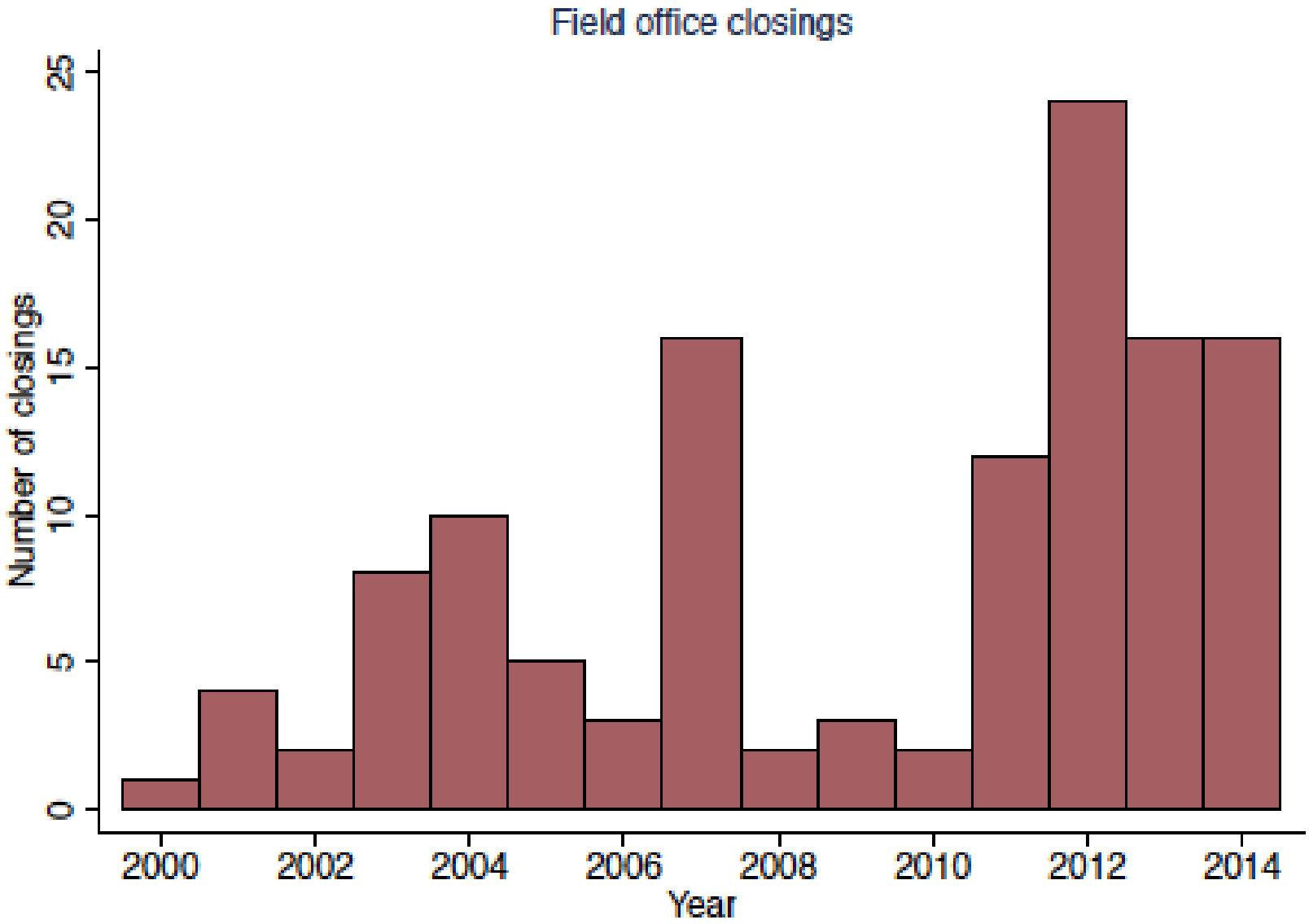
- Results: SSI lowers earnings
- But earnings response is minimal for those who are removed from the program
  - Far from recovering the lost SSI income
- Suggests those who are enrolled in SSI on the margin do not have strong outside work options
- Thoughts:
  - What if un-enrolled earlier? Or, what if they knew they'd lose SSI at age 18 – maybe work harder in school?
  - Welfare implications?

Imperfect Take Up (Deshpande, 2016)

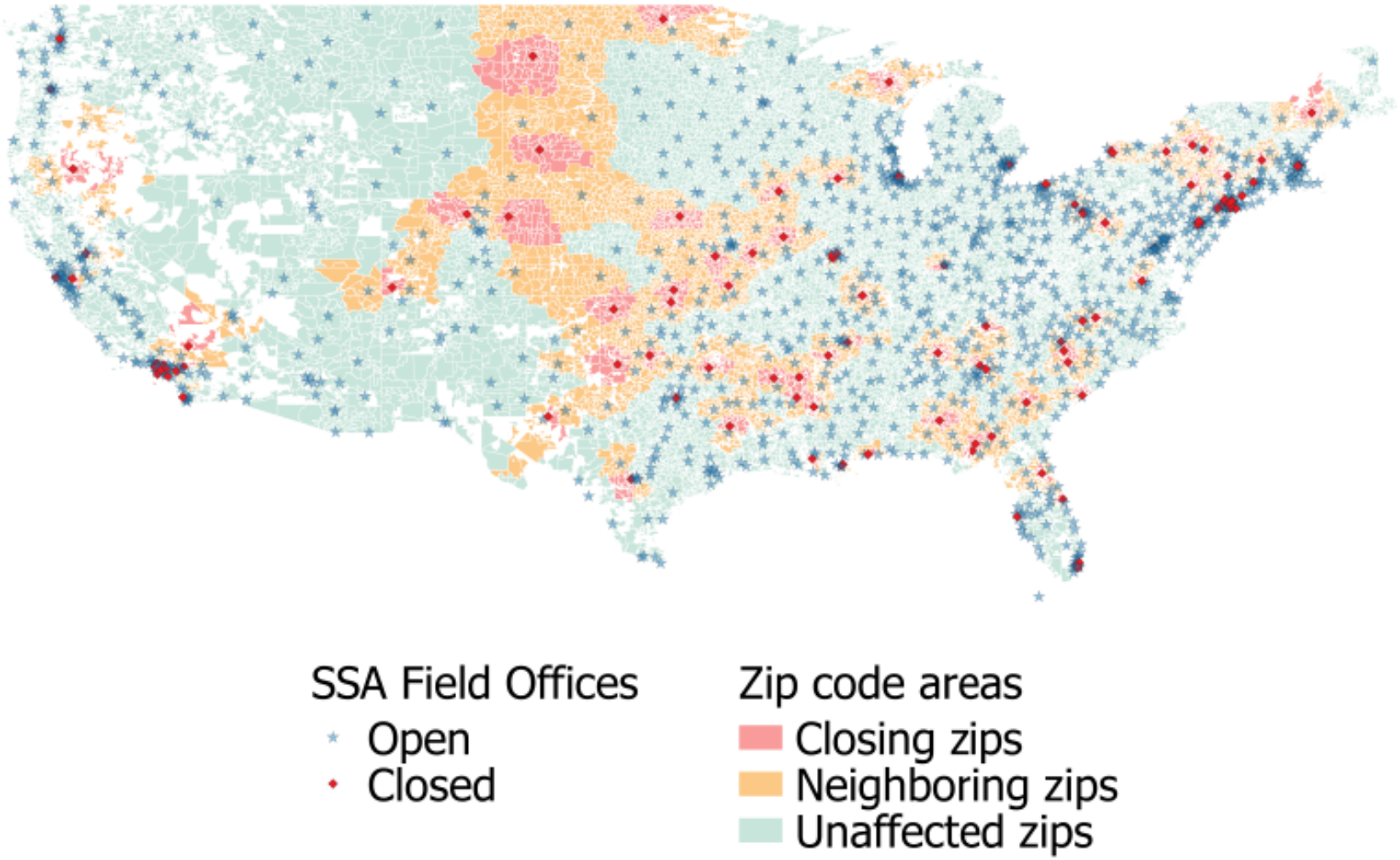
- How difficult should it be to apply for DI?
  - Depends on who the marginal applicant is..
- Deshpande (2016): "Who is Screened Out: Application Costs and the Targeting of Disability Programs"
  - Exploits closing of field offices for DI
- Compare applications from people zip codes that did vs. did not experience closure of nearest office
  - Control group: ZIPs with closures in future years

Field Office Closures (Deshpande, 2016)

Figure 2: Timing of Field Office Closings

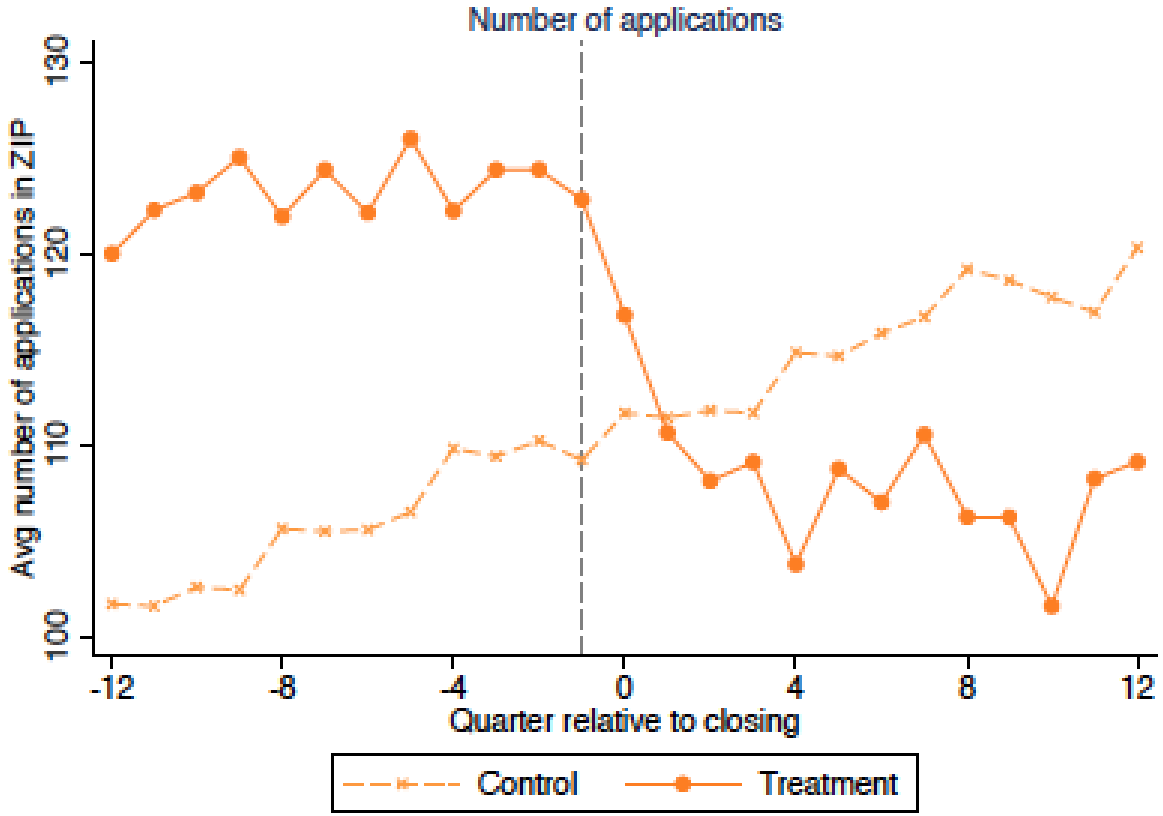


Field Office Closures (Deshpande, 2016)



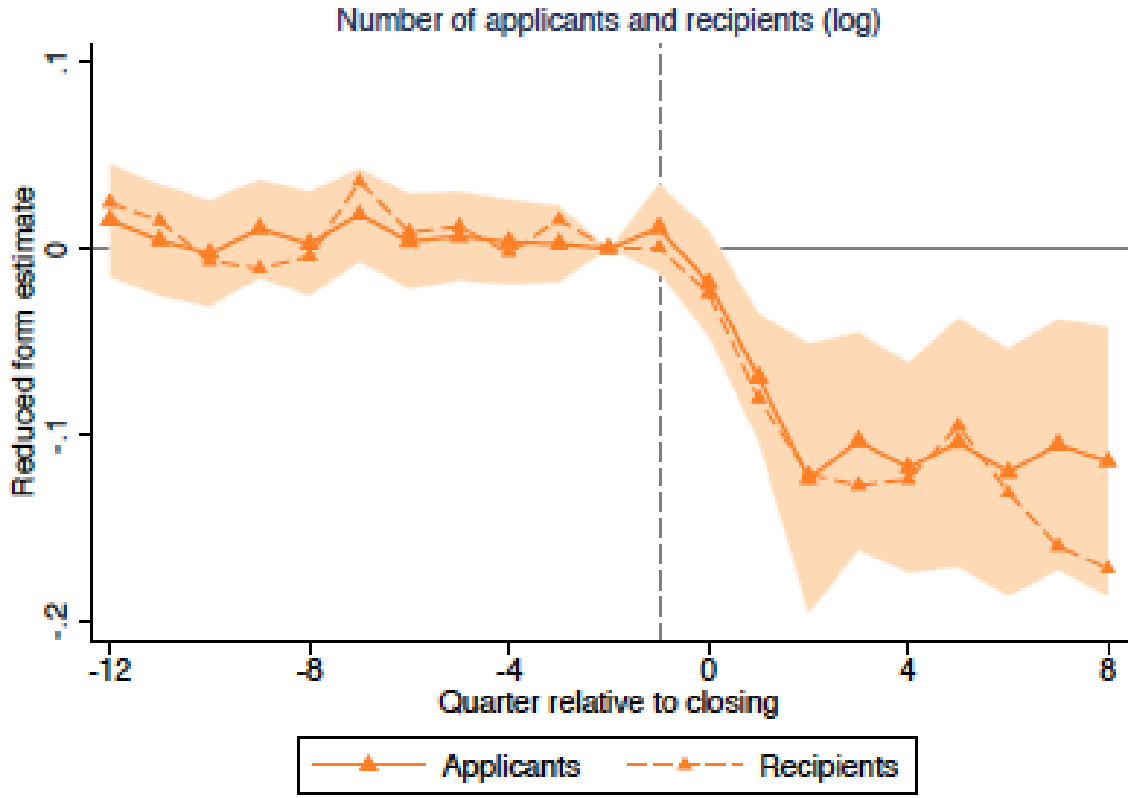
Compare to Control ZIPs with Closures in Future Years

Figure 4: Raw Plots of Number of Applications in Control and Treatment ZIPs



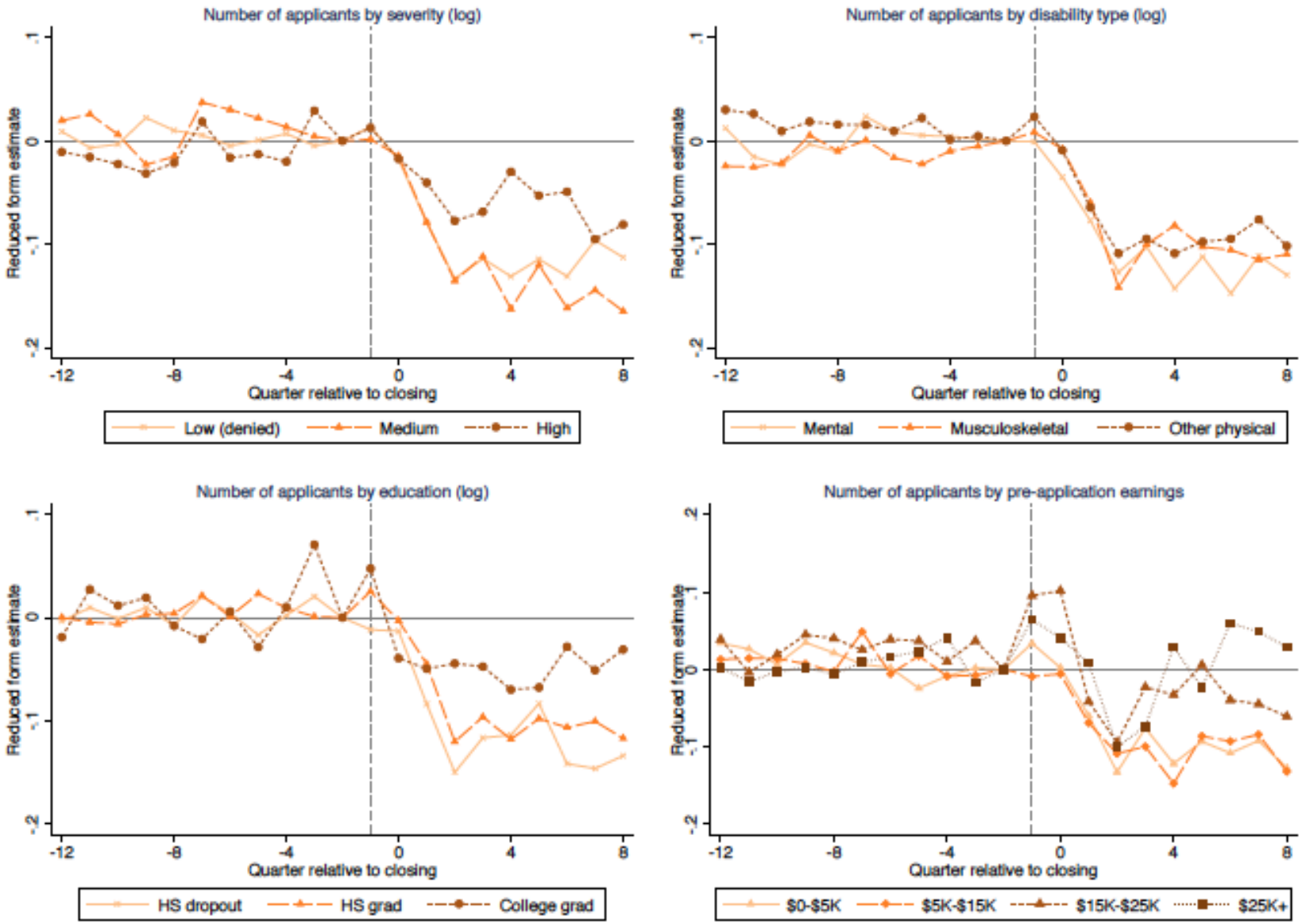
Difference in Difference Estimate

Figure 5: Effect of Closings on Number of Disability Applications and Allowances



Largest Drops by Least Severe Applications

Figure 6: Effect of Closings on Number of Disability Applications, by Subgroup



Imperfect Take Up (Deshpande, 2016)

- Results suggest significant decline of DI applications when a field office closes
- Welfare implications?
  - Least severe applications suggests those on the margin are not highly disabled?
  - But, reduction in accepted applications suggests many of those who are missed are actually disabled?
- Ideally: measure consumption smoothing impacts (or marginal utilities!)

1. Trends in DI spending
2. Causal Impact of DI on Outcomes
3. Modeling DI

Optimal Disability Insurance

- Discuss three models of DI:

1. Classic model: Diamond and Sheshinski (1995, JPubEc)
   - Disability assessment as imperfect signal of disutility of labor
2. Structural model: Low and Pistaferri (2016, AER)
   - Disability modeled in dynamic life-cycle model as impacting the budget constraint
3. New Dynamic Public Finance model: Golosov and Tsyvinksi (2006, JPE)
   - Disability unobserved and no ability to conduct informative assessment

Diamond and Sheshinski (1995, JPubEc)

- Setup:
  - Disutility of working, θ
  - Can provide screen that says "DISABLED" with probability $p(\theta)$, where $p' > 0$
  - Binary labor supply choice
  - Decision for whether to apply for disability

- Main result: Consumption smoothing benefits weighed against the moral hazard costs
  - Baily-Chetty logic
  - Key difference: can rely on imperfect tag ("Disability")
  - Still want welfare benefits for those who are rejected
  - Welfare benefits are larger if screen is less informative
    - DI benefits larger if screen is more informative
  - How is this different w.r.t. UI?
    - Same issues in UI?
    - Unemployment an imperfect measure of true shock?

Optimal Disability Insurance

- Key distinction with disability insurance is the dynamic
- Suppose we observed consumption upon exiting labor force from shock
  - Would this summarize welfare impact?
- Additionally: Decision to apply for DI is dynamic
  - Value of dynamic model
- Low and Pistaferri (2015, AER)

Low and Pistaferri (2015, AER)

- Low and Pistaferri (2015, AER) set up dynamic life cycle model to evaluate DI
- Why estimate a structural model?
  - Incorporate dynamic responses generally not observed
  - Simulate policies not observed
- Key aspect of Low and Pistaferri model:
  - Dynamic labor supply decisions with stochastically evolving productivity/wage/disability shocks

Setup: Utility

- Maximize

$$\max_{c,P,DI^{app}} V_{it} = E_t \sum_{s=t}^{T} \beta^{s-t} U\left(c_{is}, P_{is}; L_{is}\right)$$

  - where
    - β is the discount factor
    - E_t is the expectations operator conditional on info available in period t
    - $P \in \{0, 1\}$ is an indicator for labor force participation
    - c_t is consumption
    - $L_{it} \in \{0, 1, 2\}$ is a discrete work limitation status (no limitation, partial limitation, full limitation)

Setup: Budget Constraint

- Budget constraint

$$\begin{aligned} A_{i,t+1} &= R[A_{it} + (w_{it} h (1-\tau_w) - F(L_{it})) P_{it} \\ &\quad + \left(B_{it} Z_{it}^{UI} \left(1 - Z_{it}^{DI}\right) + D_{it} Z_{it}^{DI} + SSI_{it} Z_{it}^{DI} Z_{it}^{W}\right)(1 - P_{it}) + W_{it} Z_{it}^{W} - c_{it} \end{aligned}$$

  - where
    - A is assets
    - R is rate of interest
    - w is the hourly wage rate
    - h is a fixed number of hours (500 per quarter)
    - τ_w is a proportional tax financing social security programs
    - F is a fixed cost of work that depends on disability status
    - B is unemployment benefits
    - W is the monetary value of a means-tested welfare payment
    - D is the amount of disability insurance payments
    - SSI is the amount of SSI benefits
    - Z^j are indicators for participation in program j

Decisions

- Individuals choose:
  1. Whether to work
     - If unemployed, choose whether to accept/reject job offers
  2. Savings vs. consumption
     - No borrowing, $A \geq 0$ constraint imposed
     - No other insurance beyond government
  3. Whether to apply for DI
     - Can only apply for DI if unemployed
- No choice of intensive margin labor earnings

Implementation

- Implementation as follows:
  1. Specify and parameterize a utility function
  2. Specify and parameterize a wage process
  3. Specify the tax/transfer/insurance programs

Utility Function

- Utility given by

$$u(c, P; L) = \frac{\left(c\left(e^{\theta L}\right)\left(e^{\eta P}\right)\right)^{1-\gamma}}{1-\gamma}$$

  where $\theta < 0$ and $\eta < 0$

  - Allows for complementarity between L and the marginal utility of consumption

Budget Constraint Specification

- Wages given by

$$ln\left(w_{it}\right) = X_{it}'\mu + \sum_{j=1}^{2} \phi L_{it}^{j} + f_i + \epsilon_{it}$$

  where
  - $\epsilon_{it} = \epsilon_{it-1} + \zeta_{it}$, ζ_{it} is iid so that there is a random walk component
  - f_i is an individual-specific heterogeneity term
  - X_{it} are characteristics like education
  - $L_{it}^{j} = 1\left\{L_{it} = j\right\}$ is a work-limitation status variable
    - Follows Markov process

- Tax/Transfer/Insurance Program fit to align with existing system (see paper)

Results

- Implementation
  - Use data from the PSID
  - Use computer to solve model given parameter choices to match the data
    - Repeat iterations until model closely matches the data
- Main result: Optimal DI is higher if tax/transfer/welfare system is more generous
  - Prevents desire to claim UI for low-income workers
  - What is the reduced-form test of this?

"New Dynamic Public Finance" Approach

- Golosov and Tsyvinski (2006, JPE) model disability in dynamic stochastic screening model
- Productivity / disutility of labor evolves over time, $y = \theta l$
- Additively separable utility over consumption and labor supply

$$u(c) + v(l)$$

- Leads to inverse Euler equation

$$\frac{1}{u'(c_t)} = E\left[\frac{1}{u'(c_{t+1})}\right]$$

- Implies savings distortion!
  - Jensen's inequality

Inverse Euler Equation

- Logic of the inverse Euler equation:
  - Suppose no distortion in savings
  - Then, types that expect to claim disability in future will choose to save more to help increase future consumption
  - Taxing this savings helps prevent this "double deviation"
- Provides rationale for requiring asset test for disability insurance?
  - Similar to asset test for Medicaid?

Merging Social Insurance and Optimal Taxation

- Traditional distinction between optimal tax and social insurance
- Dynamically evolving type distribution merges these two forces
  - Demand for insurance against evolving abilities
    - e.g. disability/unemployment/health shock as special case of productivity shock?
- "New Dynamic Public Finance: A User's Guide" in 2006 Macro Annual provides nice treatment of this literature
  - But optimal tax often difficult to derive (e.g. depends on full history of shocks); what about MVPF of policy changes?

Summary

- Disability insurance expenditures are large and growing
- Significant evidence that DI reduces labor earnings (not surprising)
  - Some people that apply can work
  - But many do not even without DI!
  - Intergenerational impacts
- Various approaches to measuring welfare and thinking about optimal DI
  - Structural approach: DI is additional factor affecting budget constraint
  - Static welfare analysis: Income taxation with a tag (disability assessment)
    - Dynamic screening: savings as a tag