1 Lecture 3: Disability Insurance

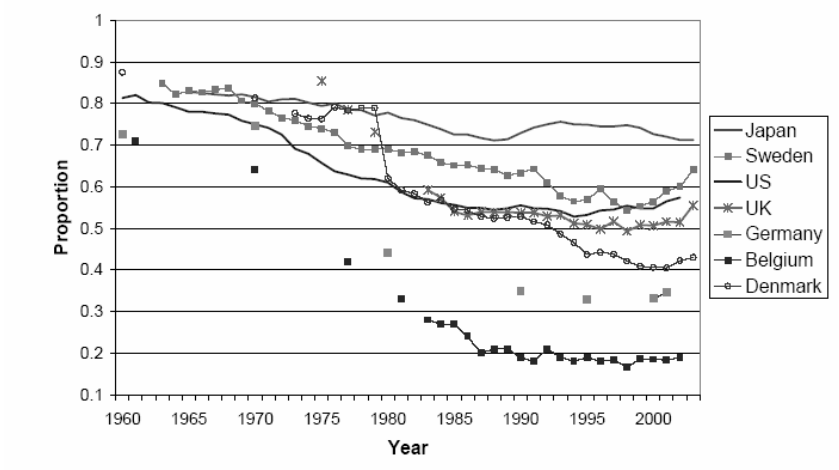
A trend towards earlier exit from the labor market and an increased utilization of DI programs.

Four main explanations:

1. Less strict medical screening. Shift towards muscelo-sceletal and psuchological disorders.
2. Replacement level have inctreased.
3. Higher female labor force participation.
4. Changes in the requirments on the labor market?

Are policies designed to change the economic incentives generated by the programs or limit the availability effective for increasing the labor force participation rate among older workers?

Different research strategies for answering this question. Early studies regressed the probability of receiving DI on individual replacement level. Obvious endogeneity problem!


Proportion
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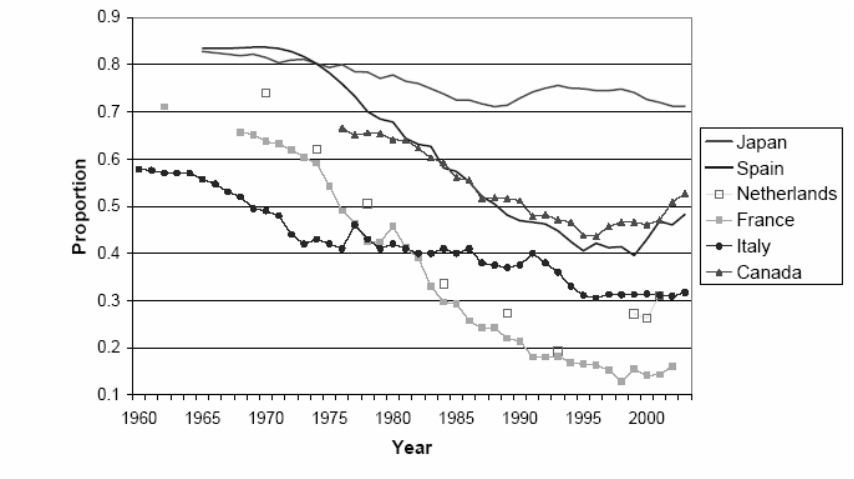
Japan
Sweden
US
UK
Germany
Belgium
Denmark


Proportion
Year
Japan
Spain
Netherlands
France
Italy
Canada

Parson (1980):

One of the first studies which addressed the role of DI in explaining the rise in non-participation among older workers in the US.

Very simple research strategy. Descriptive statistics analysis where he concludes that the main source of income after retirement is DI. Theoretichal model where he concludes that retirement probability (i) declines in health; (ii) decreases with labor income; (iii) Increases with benafit levels; (iv) cenrtification of poor health.

The author specifies a decision rule and estimate it in a latent variable framework. The main independent variables are the replacement rates, i.e., SSB/W^* where SSB and W^* is predicted DI benefits and earnings respectively, as well as subjective health measures.

He then uses the estimated model to predict the recent trends in labor force non-participation.

Weaknesses?

Benefit formula:

$$AIME_i = \frac{1}{T}\sum_{t=1}^{T} Y_{it} \cdot \max\left[\frac{\overline{Y}_{T-2}}{\overline{Y}_T}, 1\right]$$

$Y_{it}-$ individual average monthly earnings.
$\overline{Y}_T-$ average earnings in the US economy in year T.

Primary Insurance Amount (PIA)

$$\begin{aligned} PIA &= 0.9 \times AIME \text{ if } AIME \in [0, b1] \\ &= 0.9 \times b1 + 0.32 \times (AIME - b1) \text{ if } AIME \in [b1, b2] \\ &= 0.9 \times b1 + 0.32 \times (b1 - b2) + 0.15 \times (AIME - b2) \text{ if } AIME > b2 \end{aligned}$$

Bound (1989)

Studies the labor force participation rate of those whose DI application was rejected. The idea is that those who were rejected have on average better health than those admitted. Their labor force participation could therefore serve as a *lower bound* for those who were not rejected.

Individual data from the 1972 Survey of Disabled and Non-Disabled Adults (SDNA) and 1978 Survey of Disability and Work (SDW).

Table 2: compares different observable characteristics between population, rejected applicants and beneficiaries. Less than 50 percent of the rejected applicants work.

Table 3: Health evaluation of rejected DI applicants. Only 33.7 % were capable of work under normal conditions.

Table 4: Income sources of rejected DI applicants.

Alternative explanations:

1. The effect of application Decision on Employment.
2. Alternative Factors Influencing Reemployment Prospects of Rejected Applicants.

Buschinsky et al (1999)

Investigates appeal option for DI applications.

Uses the 1992 and 1993 Health and Retirement Survey (HRS).

Finds that subjective health measures seem to work as a "sufficient statistics" in determining the award and appeal decisions.

Gruber (2000)

Does the replacement level in DI affect labor force participation? Differences-in-Differences. Uses different replacement levels between Canadian provinces as exogenous variation.

Background

Two DI programs: Quebec Pension Plan QPP and Canadian Pension Plan (CPP)

Benefits from both programs consist of three parts:

1. A flat rate portion (lump-sum).
2. An earnings related portion.
3. Child allowance.

Average replacement level on about 26 % in 1986.
The earnings related part has always been the same in CPP and QPP. The flat rate portion was the same up to 1972. After that the level increased more rapidly in Quebec. In January 1987 CPP raised the level to the same as QPP. Thus, 1972-1987 an experimental period.

Child allowance somewhat more generous in CPP up to 1993, when it was raised in QPP.
Differences-in Differences estimator:

$$NE_i = f\left(\alpha + \beta_1 CPP + \beta_2 AFTER + \beta_3 CPP \times AFTER + \beta_4 X_i + \epsilon_i\right)$$

Two limitations of this approach:

1. Does not allow estimation of labor supply elasticities with respect to the replacement level in DI. An important policy parameter.
2. Does not take into account that different groups are affected differently by the difference between CPP and QPP, i.e., the replacement level of low income earners are affected to a larger extent by the level of the flat rate part.

To address these limitation he computes synthetic earnings paths and in the next step cell specific replacement levels. Each cell is defined by education/region/year.

Parameterized model:

$$NE_i = f\left(\alpha + \beta_1 RR_i + \beta_2 X_i + \beta_3 \tau_i + \beta_4 ED_i \times \delta_j + \beta_5 ED_i \times \tau_i + \epsilon_i\right)$$

$ED_i \times \delta_j$ - interactions between education and regional dummies.
$ED_i \times \tau_j$ - interactions between education and time dummies.

Avoids the "Bound critique".
Identification: Two sources of variation:

1. Changes over time in CCP provinces relative to QPP provinces.
2. The differential impact of these changes over the 16 cell groups.

Results and refutability tests.

Autor and Duggan (2003)

Background: 60 percent increase in the share of non-elderly receiving DI. A less stringent screening process and a higher replacement rate due to lower demand for unskilled workers combined with a progressive benefit formula are suggested to be the main explanation to this development. The study tries to measure the relative contribution of each of these factors.

Changes in screening stringency. Three eras:

1976- 1984. More stringent screening. Accepted applications fell fro 45 to 32 % in 1980.

Legislation in 1984 on new award process - less stringent screening. Increase in awarded DIs with one third.

Changes in the replacement rate

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Changes in the earnings distribution: real wage for highschool dropouts fell by 19.1 percent between 1979 and 1995. Average earnings recorded for the entire work force increased by 21.6 %. This increased the replacement rate in DI for high school dropouts. Changes shown in Table 1.

Changing characteristics of DI beneficiaries

Rapid increase of younger beneficiaries.

More highschool dropouts.

Better health status. More mental disorders and musculosceletal disorders.

How will an increased supply of DI benefit affect labor force participation
Dynamic programing model:

$v(w,h)-$ per-period utility of employment. Depends on the wage rate and health such that $v_w(\cdot)$ and $v_p(\cdot)$
s per period hazard of job loss.
q per period hazard of reemployment.
$p(h)$ probability of being awarded DI.
β discount factor.

$$V_E = \max\left[\frac{\beta p V_D}{1-\beta(1-p)}, \frac{(1-\beta(1-p))\cdot v_i + \beta^2 p s V_D}{(1-\beta(1-s))(1-\beta(1-p))}, \frac{1-\beta(1-q))v_i}{(1-\beta)(1-\beta(1-q-s))}\right]$$

Three components of the expression:

1. The value of quitting employment and seeking DI. $V_D = u(d)/(1-\beta)$ the present value of future payments discounted by the expected time from quit to award.
2. Value of remaining employed until exogenous job loss and then apply for DI.
3. Remaining in the labor market perpetually.

Figure 2 shows the relation between the value of the per period value of staying at the labor market and the asset value of each strategy. Two thresholds, $\widetilde{v}_{IC}$ and $\widetilde{v}_{CR}$, which marks the shifts in optimal strategies.

These thresholds can be written as

$$\begin{aligned}\widetilde{v}_{IC} &= \left(\frac{\beta p}{1-\beta(1-p)}\right) u(d) \\ \widetilde{v}_{CR} &= \left(\frac{pu(d)}{q}\right)\left(\frac{1-\beta(1-q-s)}{1-\beta(1-p)}\right)\end{aligned}$$

These expression tells us how the program parameters p (award probability) and d (replacement level) affects as well as the "demand parameters" q (reemployment) and s (job loss).

"Demand factors": Does not affect the unconditional applicant group. However, affect unambiguously the conditional applicant group. More adverse labor market conditions increases who conditionally apply.

$$\frac{\partial \widetilde{v}_{CR}}{\partial d} > \frac{\partial \widetilde{v}_{IC}}{\partial d} > 0 \text{ and } \frac{\partial \widetilde{v}_{CR}}{\partial p} > \frac{\partial \widetilde{v}_{IC}}{\partial p} > 0 \text{ and } \frac{\partial^2 \widetilde{v}_{CR}}{\partial d \partial p} > \frac{\partial^2 \widetilde{v}_{IC}}{\partial d \partial p} > 0$$

Conditional applicants sensitive to both supply and demand factors and the interaction of these.

Unconditional applicants only sensitive to supply factors.

Instrumenting for benefit supply factors.

$$E[LFP \mid X, w, d, p, h] = \alpha + \phi g(d, p) + \beta_1 w + \beta_2 h + X'\beta_3$$

Labor force participation is a function of the policy parameters, health, the wage rate and personal characteristics. Problematic to estimate on individual level data: in particular d (replacement level) and w. Individuals with poor health typically experience declining wages.

State level analog:

$$\Delta(LFP/Pop)_{j_\tau} = \alpha + \phi \Delta DI_{j_\tau} + \beta_1 \Delta w_{j_\tau} + \beta_2 \Delta h_{j_\tau} + \Delta X'_{j_\tau} \beta_3 + \epsilon_{j_\tau}$$

OLS will be biased if shifts in the supply of benefits are correlated with shifts in demand for benefits. IV approach. Progressivity of the benefit

formula is exploited. Idea that screening stringency is likely to have greater impact where the replacement level is high. Interaction between national shift in DI screening regimes and state replacement rates.

Results in Table IV.

Do Disability benefits affect how low-skilled workers respond to adverse employment shocks?

Exploit the cross-state in industrial composition to predict state level of employment growth.

$$\widehat{\eta}_{j_\tau} = \sum_k \gamma_{jkt}\eta_{jk_\tau}$$

η_{jk_τ} log change in industry $k's$ employment share nationally.

γ_{jkt} share of industry k initially.

DI application equation for a displaced worker:

$$E\left[Apply \mid Jobb\ Loss, X, w, d, p, h\right] = \alpha + \sigma g\left(d, p\right) + \beta_1 w + \beta_2 h + X'\beta_3$$

$g\left(d, p\right)$ is the disability supply function.

State level function:

$$\left(Apps/Pop\right)_{j_\tau} = \alpha + \lambda_t \Delta\left(Emp/Pop\right)_{j_\tau} + \epsilon_{j_\tau}$$

λ_t measures the direct impact of employment on DI applications.

Model for labor force exit:

$$\Delta\left(NILF/Pop\right)_{j_\tau} = \gamma + \theta_t \Delta\left(Emp/Pop\right)_{j_\tau} + \lambda_t \Delta\left(Emp/Pop\right)_{j_\tau}$$

λ_t measures the the share of job losers applying for DI.
λ_t measures the the share of job losers not applying for DI.

$$\Delta\left(NILF/Pop\right)_{j_\tau} = \gamma + \pi_t \Delta\left(Emp/Pop\right)_{j_\tau}$$

where $\pi_t = \theta_t + \lambda_t$.

Three cases:

1. DI applications sensitivity has increased but labor force exit propensity has not ($\Delta\lambda_t > 0$ and $\Delta\pi_t = 0$).

2. Labor force exit propensity has increased but DI application propensity has not ($\Delta\lambda_t = 0$ and $\Delta\pi_t > 0$).

3. Both have increased ($\Delta\lambda_t > 0$ and $\Delta\pi_t > 0$).

Results in Table V.

Adverse Employment shocks and Labor Force Exit of High School Dropouts

Rising DI application sensitivity for labor market shocks may have two explanations:

1. Employment shocks have increasing spurred displaced workers to apply.

2. The share of labor force leavers to apply for DI has increased.

IV approach. Uses projected demand shocks to instrument for employment losses.
Results in Table VI.

Result suggests an increasing propensity to leave the labor force for displaced workers.

Period	Medical Reasons	Labor market reasons	Medical and labor market reasons combined
Before 1970	Yes	No	No
1970-1972 (1 July)	Yes	No	Yes, aged 63-66
1972-1974 (1 July)	Yes	Yes, aged 63-66	Yes, aged 63-66
1974-1976 (1 January)	Yes	Yes, aged 60-64	Yes, aged 63-66
1976-1991 (1 July)	Yes	Yes, aged 60-64	Yes, aged 60-64
1991-1997 (1 October)	Yes	No	Yes, aged 60-64
After 1997	Yes	No	No

Figure 1:

Karlström, Palme and Svensson (2006) "The Employment Effect of Stricter Rules for Eligibility to DI: Evidence from a Natural Experiment in Sweden"

1997 reform

- Eligibility to DI for labor market reasons combined with health reasons abolished.
- Health requirements for DI eligibility were lower for workers aged 60-64 before the reform. Also lower requirements to change occupation or area of residence.
- Workers aged 60-64 were not required to take part in retraining and rehabilitation programs before the reform.

Figure 2:

Four main effects of the reform:

1. Transition to DI from all states.
2. Transition from Employment (Work) to all Non-employment states.
3. Transition from all Nen-employment states to DI.
4. Persistence in Employment (Work).

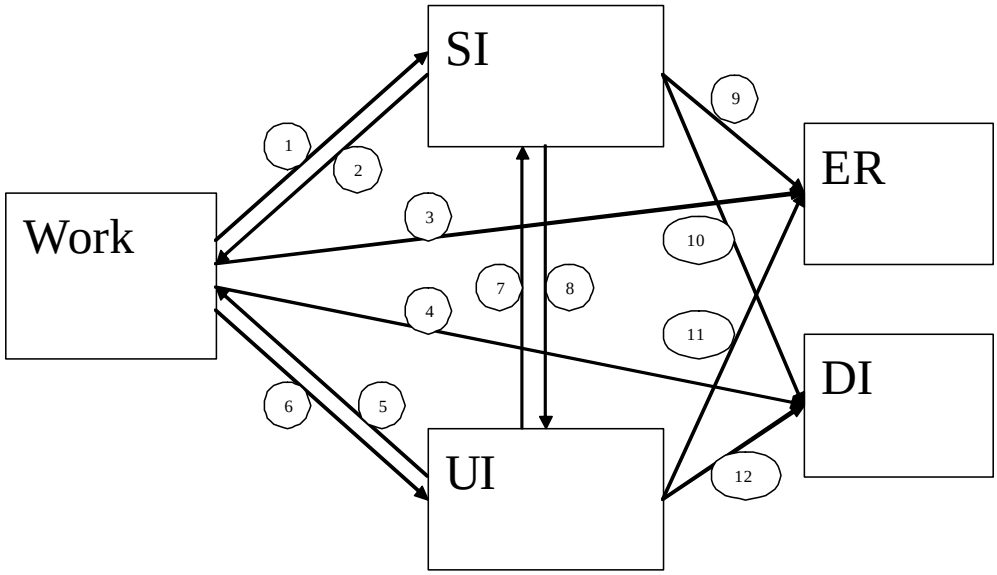
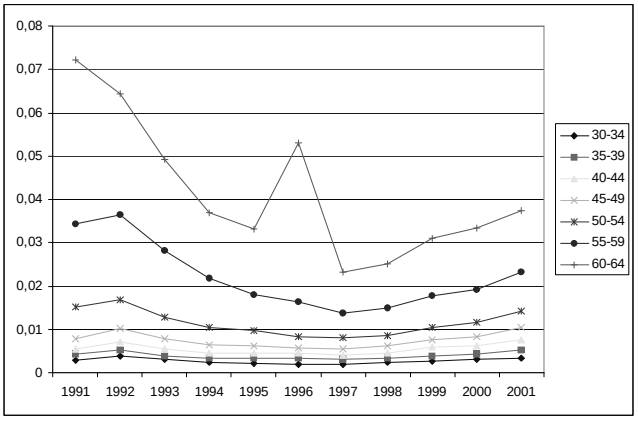


Figure 3: Transitions between gainful employment and UI, SI, DI and ER.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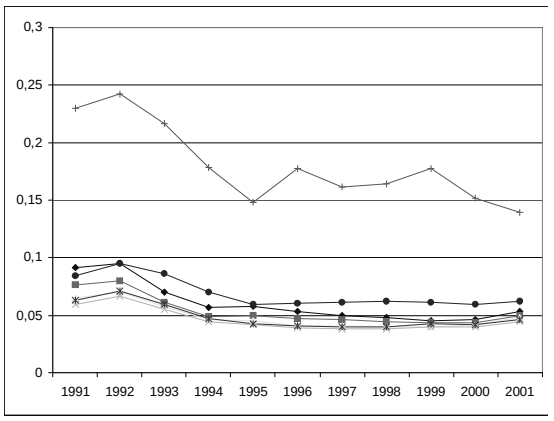
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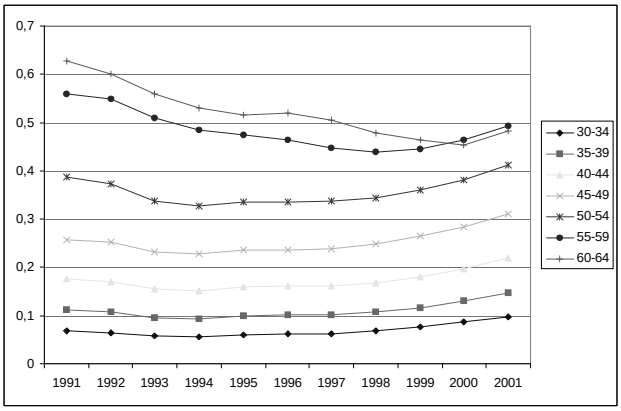
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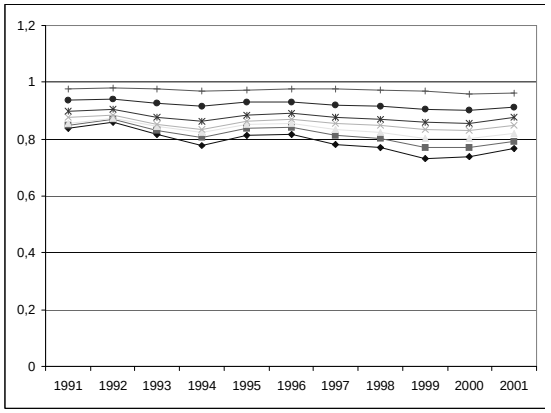
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