An Estimation of Earnings Losses Due to Health Deteriorations

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Our original plan
- Get a permission to use micro data of a governmental statistical survey
  - FY2002: analysis of 1998 data
  - FY2003: analysis of 2001 data

What we did in FY2002
- Waiting for 1998 data
- Set up our paper based on our preceding analysis using 1995 data

What we add in FY2003
- Analysis of 1998 data
Method:
Health Deterioration → Wage Reduction, Job Loss

- Three equations
  1. wage = f(health, ...) 
  2. labor force participation = f(health, wage, ...) : probit 
  3. health = f(wage, ...) : probit 

- Issues in treating a health variable 
  1. Endogeneity: Simultaneous equations estimation 
  2. Difficult to measure: Micro data we will use contain rich information about health. Four different indicators for health state will be used.
Data

- The Comprehensive Survey of Living Conditions (SLC)
  - Not panel data. But, it contains the working status of the consecutive two years.

  1998 data.

- Sample
  - Prime age (30-54) male who are employed the past year of the survey. Over 10,000 for one year.
Dichotomous Health Indicators

We use 4 health indicators (2 objective, 2 subjective)

1. **Patient**
   1: a respondent is hospitalized or sees a doctor regularly (excluding an outpatient of a dental clinic)
   0: otherwise

2. **Aware of symptom(s)**
   1: a respondent is aware of some health-related symptom
   0: otherwise

3. **Work limitations**
   1: a respondent has health-related limitations to working
   0: otherwise

4. **Self-rated health state**
   1: “poor” and “very poor”
   0: “excellent,” “good,” and “fair”
Specification of Equations

1. wage = f(health, ...)
2. labor force participation = f(health, wage, ...) : probit
3. health = f(wage, ...) : probit

Identification restrictions
1. Labor force participation does not appear in wage equation: normal setting
2. Labor force participation does not appear in the health equation: normal setting in health capital model
Specification of Equations

1. \( \log \text{wage} = f(\text{health, age, age}^2, \text{city size}) \)

2. \( \text{labor force participation} = f(\text{health, log wage, age, age}^2, \text{married, log other income, log other family members’ income, log asset, log debt}) : \text{probit} \)

3. \( \text{health} = f(\text{wage, age, age}^2, \text{married, family health, daily health promoting activities}) : \text{probit} \)
Estimation Method

- Complex survey design (not i.i.d.)
  - Stratified single-stage clustering
  - Allow correlation of disturbances within a cluster
  - Sampling weights are different among strata
- Two step estimation
  - Pseudo maximum likelihood estimation of the reduced form
  - Use the fitted value of endogenous variables in the estimation of structural form
Regression Results
(Table 5)

- health → earnings
  significant (except for patient measure), adverse effect

- health → labor force participation
  not significant
  (statistically significant, adverse effect in previous years)

- earnings → labor force participation
  not significant

- earnings → health
  mixed
Earnings reduction due to observed health conditions
1. Calculate the earnings at good health by setting the health indicator in the earning equation “good.” $w_0$
2. For each sample, calculate $w_0 - w$ ($w$: observed earnings)
3. Aggregate

Earnings loss due to leaving a job
1. Calculate an increase in the probability of leaving a job: $DL = Pr(\text{not work}|h^*=1) - Pr(\text{not work}|h^*=0)$
2. For each sample, calculate DL $w$
3. Aggregate
The earnings losses due to health deterioration were estimated to be about 0.7 percent for 30 to 54-years old male workers.
Comparison with Employment Status Survey (就業構造調査)

- ESS: 5-year interval, SLC: 3-year interval
- In 1998, both are conducted
- ESS: 1 percent
  - Among the male aged 35-54 who do not work now but worked one year earlier, 227 thousand persons left a job due to “sickness or aging”
  - The number of male workers aged 35-54 is 25.3 million in 1997.
- Our estimation: 0.1-0.4 percent (not statistically significant)
- Justification hypothesis
Coverage of Sickness Benefit

- Sickness benefit of employee’s health insurance covers earning loss up to 60 percent of normal wage.
- Payment of sickness benefit in 1998: 0.17 percent of total earnings
- Our estimation of earnings loss: 0.7 percent of total earnings
Coverage of Sickness Benefit

- Social insurance plays some role in covering earnings loss
- But not perfect
  - If a person leaves a job, no sickness benefit is paid. They will be covered by a public assistance program
  - Employees do not take up the benefit
  - People with some health problem may work shorter, or choose less stressful job with a low wage
Policy Considerations

- Can we improve the coverage of social insurance?
  - The self-employed are not covered
  - Take up rate?
  - Moral hazard (health status is difficult to observe)
Results on the performance of health indicators

- Subjective indicators (work limitations or self-rated health state) have a clearer relation with earnings and labor force participation than objective ones (having a disease or symptom) do. The subjective indicators do not suffer from a serious measurement error.

- Suggestion: In the small-sample years the only question about health is whether a respondent goes regularly to a clinic or a hospital. This question turns out not a very good measure. Replacing it with self-rated health state would provide more useful information.