Decline in Federal Disability Insurance Screening Stringency and Health Insurance Demand

Yue Li*Siying Liu†
December 12, 2014

Abstract
This paper proposes that the decline in federal disability insurance (DI) screening stringency raises the incentive of being uninsured. To support it, we provide a theoretical model and empirical evidence.
JEL classification: I13, I18, H31, H51, H55
Keywords: Disability Insurance, Health Insurance

1 Introduction

The percentage of U.S. residents aged 25-64 without health insurance rose substantially from 11.5 percent in 1979 to 19.7 percent in 2012 (CPS). Gruber (2008) provides a good summary on the reasons for the rapid growth in the uninsured population. In this paper, we posit a new explanation that the decline in DI screening stringency raises the benefits of being uninsured and partially accounts for the rising uninsured population. To support this explanation, we first develop a theoretical model that captures the incentive of purchasing health insurance, and show analytically that individuals with low health risks decline insurance coverage in response to less stringent

*Corresponding author. NBER, Email: liyue@nber.org. Acknowledgement: We thank the participants in the University of Pittsburgh Brown Bag and APPAM 2014 Fall Conference.
†University of Pittsburgh, Email: sil18@pitt.edu.
DI screening. Second, we exploit cross-state variation in the exposure to the 1984 Social Security Disability Benefits Reform Act (1984 Reform) which made it easier for people with mild disabilities to receive an award (Autor and Duggan, 2006), and find that during 1985-1994 the more exposed states experience greater increases in local uninsured rates than the less exposed states.

2 Model

The economy is populated by heterogeneous individuals who live for one period. Individuals differ in the probability of receiving an adverse health shock, denoted by $\alpha \in [0, 1]$. Individuals are endowed with income $z$ and health $\bar{h}$. Individuals decide whether to purchase health insurance, which costs a premium $P$ and pays for $(1-q)$ of total medical expenses. Following the insurance decision, a health shock, denoted by $\epsilon \in \{0, -\bar{h}\}$, is revealed. Individuals then choose medical expenditure $m$. The health production function has the following form:

$$h = \bar{h} + \epsilon + m.$$  \hfill (1)

where $h$ denotes final health.

After health investment, DI screening takes place.\footnote{For simplicity, the model abstracts from DI application cost, and hence all individuals file DI claims.} An individual is awarded with DI benefits $b$, with probability $Pr(h) = \theta(1 - h/\bar{h})$, where $\theta \in (0, 1)$ controls DI screening stringency: an increase in $\theta$ indicates less stringent DI screening.

Formally, the individual optimization problem can be summarized as follows:

$$\max_i E_{\bar{\alpha}}[\max_m E_d|h(c + \gamma \ln h)]$$

subject to (1) and

$$c + (qm + P)I_{i=1} + mI_{i=0} \leq z + bI_{d=1},$$  \hfill (2)
where $c, i \in \{0, 1\}$ denote consumption, insurance coverage, and DI status, respectively. $I$ is an indicator function taking the value of 1 if the subscript condition is true. For simplicity, the utility function is linear in goods consumption, and $\gamma$ denotes the weight attached to health.

**Proposition 1.** If observe an individual of type $\alpha$ purchase health insurance, all individuals of type $\alpha' \geq \alpha$ purchase insurance. If observe an individual of type $\alpha''$ decline health insurance, all individuals of type $\alpha''' \leq \alpha''$ decline insurance.

*Proof.*
Solve for the expected utility with and without health insurance, and define $G(\alpha)$ as the difference between the two values. An individual purchases insurance only if $G(\alpha)$ is non-negative. It is easy to show that

$$G(\alpha) = \alpha \gamma [\ln(1 + \theta b/\overline{h}) - \ln(q + \theta b/\overline{h})] - P,$$

which is continuous and monotonically increasing in $\alpha$.

Proposition 1 implies that there exists a cutoff type $\alpha^*$, such that all individuals with $\alpha \geq \alpha^*$ purchase insurance and the rest choose to be uninsured.

Consider a policy that reduces DI screening stringency, and it is described by the following proposition.

**Proposition 2.** With a positive measure of individuals purchasing health insurance, an increase in $\theta$ leads individuals of low health risks to switch to be uninsured.

*Proof.*
By solving $G(\alpha^*) = 0$, we have:

$$\frac{\partial \alpha^*}{\partial \theta} = -\frac{P}{\gamma} \left( \ln \left( \frac{1 + \frac{\theta}{\overline{h}}}{q + \frac{\theta}{\overline{h}}} \right) \right)^{-2} \cdot \frac{(q - 1)\frac{\theta}{\overline{h}}}{\left(1 + \frac{\theta}{\overline{h}}\right)(q + \frac{\theta}{\overline{h}})} > 0.$$

Proposition 2 suggests that less stringent DI screening leads to a greater uninsured population. Since individuals with low health risks switch to be uninsured, in the long term, insurance premiums will also rise.
3 Empirical Evidence

3.1 Data

The main data source is the March CPS. Since 1980, the CPS started to ask respondents about their health insurance coverage in the past year. The data includes all waves of the March CPS from 1980 to 1995 except for the waves of 1981 and 1982. For 1981 and 1982, the information about individual health insurance is missing. The sample does not contain 1996 and later years, because we are concerned that the results may be contaminated by another set of DI reforms which happened around that time and removed drug addictions and alcoholism from main contributing factors in DI screening. The sample includes all respondents aged 25-64 living in 50 states. In addition, we also collect GDP growth rates from the Bureau of Economic Analysis and unemployment rates from the Bureau of Labor Statistics.

We use the percentage of people aged 25-64 on DI in 1978 by state as a measure for the exposure to the 1984 Reform under the assumption that people living in states with a high percentage of DI beneficiaries are more likely to learn the 1984 Reform via local communities. This exposure measure is denoted by $d_s$, where $s$ indicates states, and is defined as the ratio of the sum of 25-64 Social Security DI worker beneficiaries and 25-64 blind/disabled Supplemental Security Income beneficiaries (Autor and Duggan, 2003) to the 25-64 population (Census Bureau).\footnote{This method is double counting DI beneficiaries receiving both social security and supplemental security income, but we do not have information about them for 1978.}

As Table 1 shows, the exposure measure $d_i$ has a mean of 4.7 and a standard deviation of 1.2. The outcome variable is the uninsured rate among people aged 25-64, and it rises from 12.9 for the before reform period (1979-1984) to 14.9 for the after reform period (1985-1994). Note that the standard deviation of this variable rises by a larger proportion: from 3.2 to 4.2, which indicates a wider dispersion of uninsured rates across states after the 1984 Reform.
Table 1: Summary Statistics of State-Level Variation

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>% uninsured (before)</td>
<td>12.9</td>
<td>3.2</td>
</tr>
<tr>
<td>% uninsured (after)</td>
<td>14.9</td>
<td>4.2</td>
</tr>
<tr>
<td>% on DI (1978)</td>
<td>4.7</td>
<td>1.2</td>
</tr>
</tbody>
</table>

Notes: Data are from Autor and Duggan (2003) and March CPS (1980, 1983-1995). The number of observations is 50.

3.2 Estimating Equation

The main estimating equation is specified as follows:

\[ u_{ist} = \beta (POST_t \cdot d_s) + \phi_1 (1984_t \cdot d_s) + \phi_2 POST_t + \phi_3 d_s + X'_{ist} \eta + \epsilon_{ist}, \quad (3) \]

where \( u_{it} \) is a dummy indicating individual \( i \) in state \( s \) and year \( t \) is uninsured. \( POST_t \) is a dummy for the post reform period. \( 1984_t \) is a dummy for the year of 1984, and the interaction term \( 1984_t \cdot d_s \) controls pre-trend. \( X_{ist} \) is a vector of controls. The baseline controls are age, its square, the interaction of age and its square with education levels (high school dropouts, high school graduate, and the rest), race, marital status, labor force participation, log family income, year dummies, state dummies, and unemployment rates and growth rates for each state-year cell. \( \epsilon_{it} \) is a random disturbance term. Standard errors are clustered at the state level and observations are weighted by person weights. The identifying assumption is that, without the enactment of the 1984 Reform, states with different percentages of DI beneficiaries would not have experienced differential changes in uninsured rates.

3.3 Results

Table 2 reports the findings from three specifications.\(^3\) In the baseline specification, the coefficient of \( POST_t \cdot d_s \) is positive and significant at the 5 percent level, which

\(^3\)The reported results are using linear models, and results using probit models are similar.
indicates individuals who are more exposed to the 1984 Reform are more likely to become uninsured after the reform. A one standard deviation increase in the exposure measure is associated with a 0.5 percentage point rise in the probability of being uninsured. Recall that the average over the post period is 14.9 percent.

We implement two robustness checks. First, we are concerned about the correlation between $POST_t \cdot d_s$ and region dependent growth patterns of uninsured rates. To address this, we add division-specific trends in the second specification. The point estimate is close to the baseline but it is no longer significant due to a larger standard error. Second, we are concerned about the persistence of the uninsured rate over time and its correlation with the exposure measure. To control this, in the third specification, we add the interaction between 1979 state-level uninsured rates and a year trend. The results are similar to the baseline.

Table 2: Linear Results

<table>
<thead>
<tr>
<th>Coefficient of $POST_t \cdot d_s$</th>
<th>% Uninsured</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline</td>
<td>0.44**</td>
</tr>
<tr>
<td></td>
<td>(0.19)</td>
</tr>
<tr>
<td>Baseline + division trend</td>
<td>0.33</td>
</tr>
<tr>
<td></td>
<td>(0.24)</td>
</tr>
<tr>
<td>Baseline + uninsured rates by state in 1979 × Year</td>
<td>0.42*</td>
</tr>
<tr>
<td></td>
<td>(0.21)</td>
</tr>
</tbody>
</table>

Notes: Robust standard errors are clustered at state levels and in parentheses. *** $p < .01$, ** $p < .05$, * $p < .10$. The number of observations is 1,065,507.

4 Conclusion

This paper belongs to the large literature that examines how public provisions crowd out the demand for private insurance (for example, Cutler and Gruber (1996); Brown and Finkelstein (2008)), and posits a new moral hazard behavior that the improved social safety net for people with disabilities negatively affect the incentive of having health insurance for the purpose of reducing disability risks.
References


