Unemployment Insurance, Disability Insurance, and Workers’ Compensation

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INSTITUTIONAL FEATURES

Unemployment insurance, workers’ compensation, and disability insurance are three social insurance programs in the United States, and they share many common features.

**Unemployment insurance (UI):** A federally mandated, state-run program in which payroll taxes are used to pay benefits to unemployed workers laid off by companies.

**Disability insurance (DI):** A federal program in which a portion of the Social Security payroll tax is used to pay benefits to workers who have suffered a medical impairment that leaves them permanently unable to work.

**Workers’ compensation (WC):** State-mandated insurance, which firms generally buy from private insurers, that pays for medical costs and lost wages associated with an on-the-job injury.
## Comparison of the Features of UI, DI, and WC

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>UI</th>
<th>DI</th>
<th>WC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Qualifying Event</td>
<td>Job loss, job search</td>
<td>Disability</td>
<td>On-the-job injury</td>
</tr>
<tr>
<td>Duration</td>
<td>26-65 weeks</td>
<td>Indefinite</td>
<td>Indefinite (if verified)</td>
</tr>
<tr>
<td>Difficulty of verification</td>
<td>Job loss: easy Search: impossible</td>
<td>Somewhat difficult</td>
<td>Very difficult</td>
</tr>
<tr>
<td>Average after tax replacement rate</td>
<td>47%</td>
<td>60%</td>
<td>89%</td>
</tr>
<tr>
<td>Variation across states</td>
<td>Benefits and other rules</td>
<td>Only disability determination</td>
<td>Benefits and other rules</td>
</tr>
</tbody>
</table>
Unemployment Insurance

Unemployment insurance is a major social insurance program in the U.S.

Spending size: $50bn/year in normal times (up to $150bn/year during Great Recession, likely $300bn in 2020)

Macroeconomic importance in stabilization/stimulus

Like other social programs, triggered by an event

In this case, involuntary job loss

Controversial debate about unemployment benefits

Benefit: helps people in a time of need

Cost: reduces incentive to search for work while unemployed
Institutional Features of Unemployment Insurance

UI is a federally mandated, state-run program

Although UI is federally-mandated, each state sets its own parameters on the program.

This creates a great deal of variation across states

Useful as a “laboratory” for empirical work

⇒ UI is a heavily studied program

In 2020 crisis, most state systems unable to cope with volume and new expanded rules ⇒ Weakness of decentralized system
Financing of UI Benefits

1) UI is financed through a payroll tax on employers:

⇒ an employee will not see a deduction for UI on his or her paycheck.

This payroll tax averages 1-2% of earnings

2) UI is partially experience-rated on firms

⇒ the tax that finances the UI program rises as firms have more layoffs, but not on a one-for-one basis
Eligibility Requirements and Benefits

1) Individuals must have earned a minimum amount over the previous year.

2) Unemployment spell must be a result of a layoff, rather than from quitting or getting fired for cause (easy to check)

3) Individual must be actively seeking work and willing to accept a job comparable to the one lost (hard to check)

These eligibility requirements mean that not all of the unemployed actually collect benefits.

Even among eligible, 50% do not take up the UI benefit (Lack of information about eligibility, stigma from collecting a government handout, or transaction costs)

Take-up typically lower in good times and depends on how hard states make enrollment (e.g. Florida makes it hard)
Share of state’s unemployed workers receiving unemployment benefits, March 2020
UI Benefits

UI benefits are a function of previous earnings

These benefits vary by state.

The replacement rate is the amount of previous earnings that is replaced by the UI system.

\[ R = \frac{B}{W} \]

Replacement rates vary from 35% to 55% of earnings

In 2020 coronavirus crisis, CARES increased weekly benefits by $600 across the board for 4 months, and expands eligibility to self-employed and lower earners

Average UI benefit jumps up from $400 to $1000/week. Person on $10/hour wage making $400/week now makes more on UI. Uniform $600/week done bc of admin simplicity
Unemployment Benefit Schedule for Michigan

Weekly benefit vs. Weekly wage in highest quarter of past year
UI Benefits Duration

In general, one can collect UI for 6 months.

In recessions, benefits are automatically extended to 9 months or 12 months.

In deep recessions, benefits can be further extended (23 months in 2008-13).

Duration of UI benefits typically much higher in European countries.

In 2020 coronavirus crisis, CARES increased duration to 9 months, likely to be extended further as unemployment rate will jump up to 20% and stay above 10% likely for 1-2 years.

EU countries tend to have more generous and longer benefits.
Analysis of Optimal Unemployment Insurance

Optimal UI trades-off insurance value vs. efficiency costs

In principle, provide full insurance (perfect consumption smoothing) with 100% replacement rate if there is no moral hazard

With moral hazard, 100% replacement rate would eliminate incentives to find a job

⇒ Optimal replacement rate should be less than 100%

Optimal replacement rate depends negatively on the size of moral hazard and positively on how much people value insurance

Empirical work examines size of moral hazard and value of UI for consumption smoothing
Expected Utility Model

Individual’s expected utility:

\[ EU = (1 - p)u(c_e) + pu(c_u) = (1 - p)u(w - t) + pu(b) \]

\( p \): probability of being unemployed

\( c_e \) = consumption when employed,

\( c_u \) = consumption when unemployed

\( w \) = wage when working

\( t \) = tax used to finance program,

\( b \) = UI benefit

Government needs to balance budget (taxes fund benefits):

\[ (1 - p) \cdot t = p \cdot b \quad \Rightarrow \quad t = \left( \frac{p}{1 - p} \right) \cdot b \]
Optimal UI with no moral hazard

No moral hazard means that $p$ is not affected by UI

Plugging in govt. budget constraint, rewrite individual’s expected utility as:

$$EU = (1-p)u(w - (p/(1-p))b) + pu(b)$$

Government’s problem: find $b$ that maximizes $EU$.

Optimal benefit $b^*$ will be $b$ such that: $c_u = c_e$

This is full insurance (as we saw earlier in class)
Optimal UI with moral hazard

With moral hazard, \( p \) increases with \( b \) as more generous benefits deter job search and hence increase unemployment.

Government now chooses \( b \) to maximize \( EU \) but taking into account that \( p \) is a function of \( b \) in the budget constraint

\[
EU = (1 - p)u(w - [p(b)/(1 - p(b))]b) + pu(b)
\]

Get new formula:

\[
\frac{u'(c_u) - u'(c_e)}{u'(c_e)} = \frac{1}{1 - p} \varepsilon_{p,b} \quad \text{with} \quad \varepsilon_{p,b} = \frac{b}{p} \cdot \frac{dp}{db}
\]

\( \varepsilon_{p,b} > 0 \) is the elasticity of unemployment rate with respect to benefits (captures size of moral hazard effects).

Now \( 0 < c_u < c_e < w \): partial insurance is optimum. Optimum level increases with curvature of \( u(.) \) but decreases with elasticity \( \varepsilon_{p,b} \).
Empirical Estimation of Effects of UI

Moral hazard in UI manifests itself in the duration of the unemployment spell

Economists ask whether the unemployed find jobs more slowly when benefits are higher

Key challenge: need to use quasi-experiments to identify these effects

One common empirical approach (Meyer 1990): difference-in-difference

Exploit changes in UI laws that affect a “treatment” group and compare to a “control” group
EVIDENCE: Moral Hazard Effects of Unemployment Insurance
Empirical Estimation of Effects of UI: Evidence

Meyer (1990) and many other implement this method using data on unemployment durations in the U.S. and state-level reforms.

General finding: benefit elasticity of 0.4-0.6

10% rise in unemployment benefits leads to about a 4-6% increase in unemployment durations.

More recent empirical approach: regression discontinuity

Card-Chetty-Weber (2007) use the fact that in Austria, you get up to 30 weeks of benefits when you have been employed for 36+ months in last 5 years (instead of up to 20 weeks).

Can look at duration of unemployment based on how long you have worked in last 5 years ⇒ Finds somewhat smaller elasticity around 0.3
Effect of Benefit Extension on Unemployment Durations
Evidence on Consumption-Smoothing

Difference-in-difference strategy has been used to examine how UI benefits affects consumption.

Gruber (1997) finds that consumption falls on average when people lose their job by about 10-15%.

$1$ increase in UI benefits increases consumption by 30 cents.

Much less than 1-1 because savings behavior changes, spousal labor supply, borrowing from friends, etc. (this is called self-insurance).

Recent study by Ganong-Noel AER’19 uses bank account data to follow people through UI spell ⇒ Finds big effects of UI benefit exhaustion on consumption especially for groups with high replacement rates or low wealth.
Figure 2: Income and Spending If Stay Unemployed

Income (Labor + UI) If Stay Unemployed

Notes: This figure plots income and spending for the sample that stays unemployed. In months $t = \{ \neq -5, \neq -4, \neq -3, \neq -2, \neq -1, 0 \}$, this includes everyone who receives UI at date 0 and meets the sampling criteria described in Section 2.1. In month $t = 1$, this includes only households who continue to receive UI and excludes households who receive their last UI check in month 0. In month $t = 2$, this excludes households who receive their last UI check in month 0 or month 1, and so on. Employment status after UI exhaustion is measured using paycheck deposits. The vertical line marks UI benefit exhaustion. Income is positive after UI benefit exhaustion because of labor income of other household members. Vertical lines denote 95 percent confidence intervals for change from the prior month. See Section 3.1.1 for details.
Notes: This figure plots income and spending for the sample that stays unemployed. In months $t = \{-5, -4, -3, -2, -1, 0\}$, this includes everyone who receives UI at date 0 and meets the sampling criteria described in Section 2.1. In month $t = 1$, this includes only households who continue to receive UI and excludes households who receive their last UI check in month 0. In month $t = 2$, this excludes households who receive their last UI check in month 0 or month 1, and so on. Employment status after UI exhaustion is measured using paycheck deposits. The vertical line marks UI benefit exhaustion. Income is positive after UI benefit exhaustion because of labor income of other household members. Vertical lines denote 95 percent confidence intervals for change from the prior month. See Section 3.1.1 for details.
Figure 3: Heterogeneity in Income and Spending If Stay Unemployed

Notes: This figure shows heterogeneity in income and spending by the ratio of UI benefits to estimated household annual income and the ratio of estimated total liquid assets (a measure described in Section 2.2) to consumption prior to the onset of unemployment. The sample is households that receive UI and stay unemployed, as described in the note to Figure 2.
Does UI have Long-Term Benefits?

Another potential benefit of UI, neglected in simple model above: improvements in **match quality**

Are people forced to take worse jobs because they have to rush back to work to put food on the table?

E.g. engineer starts working at McDonalds.

Can examine this using similar data

Look at whether people who got higher benefits and took longer to find a job are better off years later

Card-Chetty-Weber (2007) exploit again the **regression discontinuity** and find no long-term match benefit on subsequent wage or subsequent job duration

Effect of Extended Benefits on Subsequent Wages

Wage Growth vs. Months Worked in Past Five Years
Effect of Extended Benefits on Subsequent Job Duration

Summary of Empirical Findings on UI

1. Higher benefit level $\Rightarrow$ longer unemployment durations (moral hazard cost)

2. Higher benefit level $\Rightarrow$ more consumption while unemployed (consumption smoothing benefit)

3. UI benefits have no beneficial effects on long-term job outcomes

$\Rightarrow$ Model implies that providing some UI is desirable but UI replacement rate should be only around 50% based on those empirical findings
Should UI Benefits be Extended during Recessions?

US extends UI benefits during recessions. Extensions ended in 2014 (controversial policy debate)

1) **Social Justice:** Harder to find jobs in recessions ⇒ being unemployed is less of a choice ⇒ Extending benefits is desirable

2) **Efficiency:** In recessions, the job market is too slack [too hard to find jobs, too easy for firms to find workers].

   a) If longer UI benefits decrease slack in labor market then longer UI benefits desirable [this is the case if UI benefits stimulate aggregate demand or if job seekers compete for a fixed number of jobs in recession, this is the left-wing view]

   b) If longer UI benefits increase slack in labor market then shorter UI benefits desirable [this is the case if longer UI benefits increase the bargaining power of workers and hence increase wages further reducing labor demand, this is the right-wing view]

Economists try to tell apart a) from b) using empirical evidence
DISABILITY INSURANCE

Disability is conceptually close to retirement: some people become unable to work before old age (due to accidents, medical conditions, etc.)

All advanced countries offer public disability insurance almost always linked to the public retirement system

Disability insurance allows people to get Social Security retirement benefits before the “Early Retirement Age” if they are unable to work due to disability
US DISABILITY INSURANCE

1) Federal program funded by OASDI payroll tax, pays SS benefits to disabled workers under retirement age (similar computation of benefits based on past earnings)

2) Program started in 1956 and became more generous over-time (age 50+ condition removed, definition of disability liberalized, replacement rate has grown)

3) Eligibility: Medical proof of being unable to work for at least a year, Need some prior work experience, 5 months waiting period with no earnings required (screening device)

4) Social security examiners rule on applications. Appeal possible for rejected applicants. Imperfect process with big type I and II errors (Parsons AER'91) ⇒ Scope for Moral Hazard

5) DI tends to be an absorbing state (most beneficiaries won't ever work again). Can earn up of $1200/month while on DI.
1) In 2018, about 10.2m DI beneficiaries (not counting widows+children), about 5-6% of working age (20-64) population

2) Very rapid growth: In 1960, less than 1% of working age population was on DI

3) Growth particularly strong during recessions: early 90s, late 00s. Slight decline from 11m in 2013 to 10.2m in 2018

**Key empirical question:** Are DI beneficiaries unable to work? or are DI beneficiaries not working because of DI.
The number of disabled beneficiaries has risen from 1,812,786 in 1970 to 10,059,166 in 2017, driven primarily by an increase in the number of disabled workers. The number of disabled adult children has grown slightly, and the number of disabled widow(er)s has remained fairly level. In December 2017, there were 8,695,475 disabled workers; 1,105,405 disabled adult children; and 258,286 disabled widow(er)s receiving disability benefits.
In 2010, 1,026,988 disabled workers were awarded benefits. Among those awardees, the most common impairment was diseases of the musculoskeletal system and connective tissue (32.5 percent), followed by mental disorders (21.4 percent), circulatory problems (10.2 percent), neoplasms (9.0 percent), and diseases of the nervous system and sense organs (8.2 percent). The remaining 18.7 percent of awardees had other impairments.
US DISABILITY INSURANCE

Detecting disability is challenging, particularly for back injuries and mental health conditions.

One way to quantify difficulty in assessment: audit study.

Take a set of disability claims that was initially reviewed by a state panel.

One year later, resubmit them to the panel as anonymous new claims.

Compare decisions on the same cases.

⇒ Substantial evidence of Type I errors (incorrect rejection of a disabled person) and Type II errors (letting a non-disabled person on the program).
# Table 1—Reassessments of Initial Social Security Determinations

## A. Bureau of Disability Insurance Review One Year After Initial Determination (Percentages):

<table>
<thead>
<tr>
<th>BDI assessment</th>
<th>Initial determination</th>
<th>Allowance</th>
<th>Denial</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allowance</td>
<td></td>
<td>78.8</td>
<td>21.1</td>
</tr>
<tr>
<td>Denial</td>
<td></td>
<td>22.5</td>
<td>77.5</td>
</tr>
</tbody>
</table>

*Note:* The sample sizes are 250 initial allowances and 248 initial denials.

Nonparticipation and Recipiency Rates, Men 45-54 Years Old

Source: Parsons 1984 Table A1
DI Empirical Effects: Observational Studies

Parallel growth of DI recipients and non-participation rates among men aged 45-54 but causality link not clear

Cross-Sectional Evidence (Parsons ’80): Does potential DI replacement rate have an impact on labor force participation (LFP) decision?

Uses cross-sectional variation in potential replacement rates

Survey data on men aged 45-59 from 1966-69

OLS regression

\[ NLFP_i = \alpha + \beta DIreprise_i + \varepsilon_i \]

Large effect that can fully explain decline in LFP among men 45+
DI EMPIRICAL EFFECTS: OBSERVATIONAL STUDIES

Issues with Cross-Sectional Evidence:

1) $DI_{prerate_i}$ depends on wages (higher for low wage earners) and likely to be correlated with $\varepsilon_i$ (likelihood to become truly disabled)

2) Impossible to control fully for wages in regression because all variation in $DI_{prerate_i}$ is due to wages

3) Bound AER’89 replicates Parson’s regression on sample that never applied to DI and obtains similar effects implying that the OLS correlation not driven by UI
**DI EMPIRICAL EFFECTS: REJECTED APPLICANTS**

Bound AER’89 proposes a technique to bound effect of DI on LFP rate

Uses data on LFP on (small sample of) rejected applicants as a counterfactual

**Idea:** If rejected applicants do not work, then surely DI recipients would not have worked \( \Rightarrow \) Rejected applicants’ LFP rate is an upper bound for LFP rate of DI recipients absent DI

**Results:** Only 30% of rejected applicants return to work and they earn less than half of the mean non-DI wage

\( \Rightarrow \) at most 1/3 of the trend in male LFP decline can be explained by shift to DI

Von Waechter-Manchester-Song AER’11 replicate Bound using full pop SSA admin data and confirm his results
<table>
<thead>
<tr>
<th></th>
<th>1972</th>
<th></th>
<th>1978</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Population</td>
<td>Rejected Applicants</td>
<td>Beneficiaries</td>
<td>Population</td>
</tr>
<tr>
<td>Labor Supply</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percent Employed</td>
<td>77.7</td>
<td>32.6</td>
<td>3.2</td>
<td>69.3</td>
</tr>
<tr>
<td>Percent Worked 71/77</td>
<td>91.9</td>
<td>45.0</td>
<td>7.5</td>
<td>86.7</td>
</tr>
<tr>
<td>Percent Full Year</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(≥ 50 Weeks)</td>
<td>76.8</td>
<td>47.4</td>
<td>31.4</td>
<td>83.5</td>
</tr>
<tr>
<td>Percent Full Time</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(≥ 35 Hours)</td>
<td>95.4</td>
<td>75.9</td>
<td>25.0</td>
<td>92.4</td>
</tr>
<tr>
<td>Earnings Among Positive Earners</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Median Annual Earnings, 71/77</td>
<td>$9000</td>
<td>$4000</td>
<td>$700</td>
<td>$14000</td>
</tr>
</tbody>
</table>

Source: Bound 1991
DI EMPIRICAL EFFECTS: REJECTED APPLICANTS

Maestas-Mullen-Strand AER’13 obtain causal effect of DI on LFP using natural variation in DI examiners’ stringency and large SSA admin data linking DI applicants and examiners

Idea: (a) Random assignment of DI applicants to examiners and (b) examiners vary in the fraction of cases they reject ⇒ Valid instrument of DI receipt

Result 1: DI benefits reduce LFP of applicants by 28 points ⇒ DI has an impact but fairly small (consistent with Bound AER’89)

Result 2: DI has heterogeneous impact: small effect on those severely impaired but big effect on less severely impaired

Tough judges marginal cases unlikely to work without DI, lenient judges marginal cases somewhat likely to work without DI
We display $t$-statistics in parentheses, where robust standard errors are computed and clustered by DDS examiner. Column 1 shows the first-stage coefficient on \( \text{EXALLOW} \) from a regression with no additional covariates. In both years, a 10 percentage point increase in initial examiner allowance rate leads to an approximately 3 percentage point increase in the probability of ultimately receiving SSDI.

Adding covariates sequentially to the regression allows us to indirectly test for random assignment on the basis of observable characteristics because only covariates that are correlated with \( \text{EXALLOW} \) will affect the estimated coefficient on \( \text{EXALLOW} \) when included. Based on our interviews with DDS managers (see Section I), we expect the additions of the body system and terminal illness indicators to potentially affect the coefficient on \( \text{EXALLOW} \), since they are case assignment variables, but no other variables should affect the coefficient. The coefficient on \( \text{EXALLOW} \) falls from 0.29 to 0.24 with the addition of body system codes and is not significantly affected by the addition of any other variables, including the \( \text{TERI} \) flag. Thus, our results are consistent with random assignment of applicants to examiners within DDS office, conditional on body system code and alleged terminal illness.40

40 We also experimented with a different measure of initial allowance rate to test the implication of the monotonicity assumption that generic allowance rates can be used to instrument for any type of case. For this measure, we constructed the initial allowance rate leaving out all cases with the same body system code as the applicant (instead of just the applicant's own case). Table A1 in the online Appendix presents these results. For all impairments but one ("special/other" cases), around 4 percent of the sample, this alternative measure of \( \text{EXALLOW} \) is positively and significantly associated with increased SSDI receipt.

Figure 4. SSDI Receipt and Labor Supply by Initial Allowance Rate

Notes: Ninety-five percent confidence intervals shown with dashed lines. Employment measured in the second year after the initial decision. Bandwidth is 0.116 for DI and 0.130 for labor force participation.

DI Generosity Effects: Regression Kink Design (RKD)

DI benefits calculated like SS benefits: AIME formula based on average life-time earnings creates a “kinked” relationship

Ideal setting for an RKD (Card et al. 2015): test whether outcome such as earnings or mortality is also “kinky”

1) Test first for no sorting of DI recipients around kink to validate RKD design [similar to RDD validation]

2) RKD estimate: Change in slope of outcome at kink / Change in slope of benefits at kink

a) Gelber et al. ’17 analyze effects on earnings of DI generosity and find an income effect of -$0.2 per dollar of benefits

b) Gelber et al. 18 analyze effects on mortality: at lower bend point, $1K extra DI/year reduces annual mortality by .25 points (1 out of 400 lives saved)
effects cannot readily be separated.” Our paper helps to fill this gap, complementing a small set of papers that examine income effects in other disability contexts. Autor and Duggan (2007) and Autor et al. (2016) examine an income effect of changing access to Veterans’ Administration (VA) compensation for Vietnam War veterans on labor force participation, employment, and earnings. Marie and Vall Castello (2012) and Bruich (2014) study the income effect of DI benefits in Spain and Denmark, respectively. Finally, Deshpande (2016) studies the effect of children’s SSI payments on parents’ earnings. All of these studies find evidence consistent with substantial income effects in these other contexts. Our paper is the first to estimate an income effect specifically in the context of DI in the United States, which is the largest US federal expenditure on the disabled and one of the largest social insurance programs in the United States and around the world.

The remainder of the paper proceeds as follows. Section I describes the policy environment. Section II explains our identification strategy. Section III describes the data. Section IV shows our analysis of income effects. Section V discusses evidence on the extent to which income or substitution effects underlie earnings effects of DI by comparing our results to other literature. Section VI concludes. The online Appendix contains additional results.

Both studies estimate the reduced-form effects of receiving VA Disability Compensation. Autor et al. (2016, 3) conclude that “the effects that we estimate are unlikely to be driven solely by income effects.”

In the context of US Civil War veterans, Costa (1995) finds large income effects of pensions on labor supply.

Low and Pistaferri (2015) estimate many parameters simultaneously, including parameters of the work decision.

### Figure 1. Primary Insurance Amount as a Function of Average Indexed Monthly Earnings

**Notes:** The figure shows the primary insurance amount (PIA) as a function of average indexed monthly earnings (AIME) in 2013. The percentages are marginal replacement rates.

**Source:** SSA (2013)
Using a baseline specification without additional controls, none of the specifications show that $\beta_2$ is statistically different from zero at the 5 percent level. Moreover, these regressions are rarely statistically significant for any polynomial order. The test that the coefficients are jointly significant across outcomes in the AICc-minimizing specifications shows $p = 0.20$ at the upper bend point and $p = 0.35$ at the lower.

We show in the online Appendix that there is no evidence for "bunching" in the density of initial AIME around the convex kink in the budget set created by the reduction in the marginal replacement rate around a bend point (since earning an extra dollar that increases AIME leads to a greater increase in DI benefits below the bend point than above it).\footnote{Working more will not lead to higher DI income if earnings are not in the highest earning years used to calculate AIME. However, as long as the prevalence of such cases evolves smoothly through the bend point (consistent with our data), the substitution effect should still lead to a greater incentive to earn below each bend point than above it.}

Consistent with the exposition of the models in online Appendix 1, this finding could reflect that future DI claimants do not anticipate or understand the DI income they will receive, or that they do not react to the substitution incentives even when correctly anticipating them.

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{figure3.png}
\caption{Smoothness of Density and Predetermined Covariates around the Upper Bend Point (continued)}
\end{figure}

Notes: The figure shows the density of initial AIME in $50 bins as a function of distance of initial AIME to the upper bend point. The number of observations appears smooth through this bend point, with no sharp change in slope or level. The upper bend point is where the marginal replacement rate in converting AIME to PIA changes from 32 percent to 15 percent. The sample includes DI beneficiaries within $1,500 of the upper bend point (see the text for other sample restrictions). The fraction of the sample in each bin is calculated by dividing the number of beneficiaries in each bin by the total number of beneficiaries in the sample. The best-fit line is a ninth-order polynomial that parallels the regression presented in Table 2 that minimizes the corrected Akaike Information Criterion (AICc).

Source: The data are from SSA administrative records.
Table 2—Smoothness of the Densities and Predetermined Covariates

<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>Polynomial minimizing AICc</th>
<th>Estimated kink</th>
<th>Fraction of statistically significant kinks, polynomials of order 3–12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of observations</td>
<td>9</td>
<td>-0.76</td>
<td>0%</td>
</tr>
<tr>
<td>Fraction male</td>
<td>12</td>
<td>-0.100</td>
<td>0%</td>
</tr>
<tr>
<td>Average age when filing for DI (× 1,000)</td>
<td>10</td>
<td>1.27</td>
<td>40%</td>
</tr>
<tr>
<td>Fraction black</td>
<td>12</td>
<td>-0.064</td>
<td>10%</td>
</tr>
<tr>
<td>Fraction of hearings allowances (× 1,000)</td>
<td>12</td>
<td>-0.024</td>
<td>0%</td>
</tr>
<tr>
<td>Fraction with mental disorders (× 1,000)</td>
<td>12</td>
<td>-0.075</td>
<td>10%</td>
</tr>
<tr>
<td>Fraction with musculoskeletal conditions (× 1,000)</td>
<td>12</td>
<td>0.081</td>
<td>0%</td>
</tr>
<tr>
<td>Fraction SSI recipients (removed from main sample)</td>
<td>12</td>
<td>-0.034</td>
<td>0%</td>
</tr>
</tbody>
</table>

Notes: The table shows that the density of the assignment variable (i.e., initial AIME) and distributions of predetermined covariates are smooth around the upper bend point. We test for a change in slope at the bend point using polynomials of order 3 to 12. For each dependent variable, the table shows: the polynomial order that minimizes the corrected Akaike Information Criterion (AICc) (column 1), the estimated change in slope at the bend point and standard error under the AICc-minimizing polynomial order (column 2), and the percent of estimates of the change in slope that are statistically significant at the 5 percent level (column 3). Before running the regression, we take bin means of variables in bins of $50 width around the bend point, so each regression has 60 observations. See other notes to Table 1.

Figure 4. Average Monthly Earnings after DI Allowance

Notes: The figure shows mean monthly earnings in the first four years after going on DI, in $50 bins, as a function of distance of AIME from the bend point, where AIME is measured when applying for DI. The figure shows that mean earnings slope upward more steeply above the upper bend point than below it, with fitted lines that lie close to the data.
Figure 3. Annual Percent Mortality Rates around the Bend Points
A: Lower bend point

Source: Gelber et al. (2018)
Workers Compensation: Institutional Features

Workers compensation is insurance for injuries on the job, mainly temporary injuries that prevent work (short-term).

Workers Compensation is a state-level program.

Two components: medical and indemnity.

Indemnity payment replaces roughly two-thirds of lost wages.

Unlike UI, WC payments are untaxed, leading to a higher replacement that is near 90% on average.

Substantial variation across states in benefit levels.
Workers Compensation (WC): Institutional Features

1) Workers comp is a mandated benefit; no explicit tax but firms required by law to provide this benefit to workers

Most firms choose to buy coverage from private insurers

Premiums are more tightly experience rated than UI because they are determined by private sector

Insurance companies charge high-risk firms more.

2) Important feature of WC: no-fault insurance.

When there is a qualifying injury, WC benefits paid regardless of whether the injury was the worker’s or the firm’s fault.

Idea: reduce inefficiency of tort system (legal costs) by having fixed rules and not worrying about liability
Moral Hazard in Workers? Compensation

Moral hazard in WC can manifest itself in reported injuries, injury durations, and types of injuries reported.

E.g. easier to report back pain—very hard to verify

Huge issue in CA—companies paid high workers comp rates

Governor Schwarzenegger reform in 2004 cut benefits sharply, claiming to reduce injuries and “open CA for business”

Is it true that there is substantial moral hazard?

Again, consider several pieces of evidence

Strategy 1: Timing of injuries. “Monday effect” (faking weekend injuries into work injuries)
Figure 1. Distribution of Weekday Injuries.

Source: Card and McCall 1996
Moral Hazard in Workers’ Compensation

Strategy 2: examine effect of workers comp benefit levels on durations using a diff-in-diff strategy (Meyer, Viscusi, Durbin 1995)

Reforms in Kentucky and Michigan that increased benefits for high-earning workers (but not low-earning workers) in late 1980s

Compare changes in injury durations and medical costs for high-earners vs. low earners in those states before and after reform
The main idea behind our solution to this problem can be seen in Figure 1, which displays a typical state schedule relating the weekly benefit amount (WBA) for temporary total disability to previous weekly earnings. The solid line is the schedule prior to a change in the state law that raises the maximum weekly benefit amount. The dashed line is the schedule after the benefit increase. For people with previous earnings of at least $E_3$ (the high-earnings group), we compare the weeks of benefits received for people injured during the year before and the year after the change in the benefit schedule. Those whose claims began before the increase receive $WBA_{\text{max}}^A$ while those injured afterwards receive $WBA_{\text{max}}^B$. This group of workers consequently experiences the full effect of the benefit increase. An individual's injury date determines his temporary total disability benefit amount for the entire period of the disability.

Section I briefly outlines the structure of workers' compensation and describes the benefit changes in Kentucky and Michigan that provide the basis for this paper. In Section II we describe the data and outline the empirical procedure used to relate the policy shifts to the incentive effects. The two modes of analysis, assessment of mean effects resulting from the policy shifts and regression analysis of durations, appear in Sections III and IV. By comparing changes in duration and changes in medical expenditures we are also able to distinguish the spell-duration effect of higher benefits from the effect of changes in injury severity. Section IV also reports more precise estimates using all of the available data without making certain assumptions about the data.

3This identification problem created by the dependence of program generosity on an individual's previous earnings is common to many social insurance programs. See Meyer (1989) for a parallel paper on unemployment insurance that builds on earlier work by Kathleen P. Classen (1979) and Gary Solon (1985).

4Temporary total disabilities are those where the employee is unable to work but is expected to recover fully and return to work. The types of benefits are discussed in more detail in Section I.

5Some states have cost-of-living adjustments which index the benefit for inflation. The two states examined here, Kentucky and Michigan, did not have such adjustments during the period examined.
<table>
<thead>
<tr>
<th>Variable</th>
<th>Kentucky Before increase (1)</th>
<th>Kentucky After increase (2)</th>
<th>Percentage change (3)</th>
<th>Michigan Before increase (4)</th>
<th>Michigan After increase (5)</th>
<th>Percentage change (6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum benefit ($)</td>
<td>131.00</td>
<td>217.00</td>
<td>65.65</td>
<td>181.00</td>
<td>307.00</td>
<td>69.61</td>
</tr>
<tr>
<td>Replacement rate, high earnings (percent)</td>
<td>32.70</td>
<td>51.02</td>
<td>56.02</td>
<td>30.01</td>
<td>44.15</td>
<td>47.14</td>
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<tr>
<td></td>
<td>(0.25)</td>
<td>(0.37)</td>
<td>(1.65)</td>
<td>(0.35)</td>
<td>(0.48)</td>
<td>(2.33)</td>
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<tr>
<td>Replacement rate, low earnings (percent)</td>
<td>66.42</td>
<td>66.66</td>
<td>0.36</td>
<td>66.64</td>
<td>66.35</td>
<td>-0.45</td>
</tr>
<tr>
<td></td>
<td>(0.20)</td>
<td>(0.22)</td>
<td>(0.44)</td>
<td>(0.24)</td>
<td>(0.30)</td>
<td>(0.58)</td>
</tr>
</tbody>
</table>

Source: Meyer, Viscusi, Durbin 1995
<table>
<thead>
<tr>
<th>Variable</th>
<th>High earnings Before increase (1)</th>
<th>High earnings After increase (2)</th>
<th>Low earnings Before increase (3)</th>
<th>Low earnings After increase (4)</th>
<th>Differences [(2) − (1)]</th>
<th>[(4) − (3)]</th>
<th>Difference in differences [(5) − (6)]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean duration (weeks)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kentucky</td>
<td>11.16 (0.83)</td>
<td>12.89 (0.83)</td>
<td>6.25 (0.30)</td>
<td>7.01 (0.41)</td>
<td>1.72 (1.17)</td>
<td>0.76 (0.51)</td>
<td>0.96 (1.28)</td>
</tr>
<tr>
<td>Michigan</td>
<td>14.76 (2.25)</td>
<td>19.42 (2.67)</td>
<td>10.94 (1.09)</td>
<td>13.64 (1.56)</td>
<td>4.66 (3.49)</td>
<td>2.70 (1.90)</td>
<td>1.96 (3.97)</td>
</tr>
<tr>
<td>Median duration (weeks)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kentucky</td>
<td>4.00 (0.14)</td>
<td>5.00 (0.20)</td>
<td>3.00 (0.11)</td>
<td>3.00 (0.12)</td>
<td>1.00 (0.25)</td>
<td>0.00 (0.16)</td>
<td>1.00 (0.29)</td>
</tr>
<tr>
<td>Michigan</td>
<td>5.00 (0.45)</td>
<td>7.00 (0.67)</td>
<td>4.00 (0.22)</td>
<td>4.00 (0.28)</td>
<td>2.00 (0.81)</td>
<td>0.00 (0.35)</td>
<td>2.00 (0.89)</td>
</tr>
<tr>
<td>Median medical cost (dollars)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kentucky</td>
<td>393.51 (19.29)</td>
<td>411.49 (22.72)</td>
<td>238.96 (8.48)</td>
<td>254.40 (9.11)</td>
<td>17.98 (29.80)</td>
<td>15.44 (12.44)</td>
<td>2.55 (32.30)</td>
</tr>
<tr>
<td>Michigan</td>
<td>689.73 (77.30)</td>
<td>765.00 (134.53)</td>
<td>390.63 (32.80)</td>
<td>435.00 (33.09)</td>
<td>75.27 (155.16)</td>
<td>44.38 (46.59)</td>
<td>30.89 (162.00)</td>
</tr>
</tbody>
</table>

Source: Meyer, Viscusi, Durbin 1995
Moral Hazard in Workers’ Compensation

Result: 10% increase in WC benefit raises out-of-work duration due to injury by 4%

Again, need to weigh this against benefits to reach policy conclusions

Give people more time to heal after injury without rushing them back to work

Higher consumption while out of work

No evidence yet on these issues
CONCLUSION

Individuals clearly value the consumption smoothing provided by social insurance programs.

In each case there are moral hazard costs associated with the provision of the insurance.

Empirical analyses of all three programs can be used to inform policy makers’ decisions as program reforms move forward.
REFERENCES


