Early Identification of Short-Term Disability Claimants Who Exhaust Their Benefits and Transfer to Long-Term Disability Insurance

Kara Contreary, Yonatan Ben-Shalom, and Brian Gifford

MATHEMATICA
— CENTER FOR —
STUDYING DISABILITY POLICY

Background

- **Short-term disability insurance (STDI) provides partial wage replacement to employees temporarily unable to work due to off-the-job illness or injury**

  – **40% of private-sector workers have STDI**

  – **Maximum duration varies: six months is common, up to one year**

- **Partial wages incentivize return to work**

- **STDI claimants who cannot return to work before benefits expire may be at high risk of job loss, long-term disability insurance (LTDI), and/or entry into the Social Security Disability Insurance (SSDI) program**

Motivation

- **Relatively little is known about factors influencing STDI duration, transition from STDI to LTDI or SSDI**

- **STDI claim can serve as a trigger for early intervention to help workers remain in the labor force**

- **Careful timing, targeting of early intervention is critical to efficiency**
  - **Some will return to work without intervention**
  - **Others will not benefit from intervention**

MATHEMATICA
CENTER FOR
STUDYING DISABILITY POLICY

Research Questions

- **What observable factors help predict exhaustion of STDI benefits, transfers to LTDI?**

- **Can waiting for some claims to resolve without intervention improve the efficiency of targeting people for early intervention?**

MATHEMATICA
CENTER FOR
STUDYING DISABILITY POLICY

Data

- **Integrated Benefits Institute (IBI) Health and Productivity Benchmarking data**
  - **820,751 STDI claims from 2011 to 2015**
  - **8,587 employer policies**
  - **Nine disability insurance carriers**
- **Two primary outcomes of interest**
  - **Exhaustion of STDI benefits**
  - **Transition to LTDI**

MATHEMATICA
CENTER FOR
STUDYING DISABILITY POLICY

First Step: Regression Analysis

- **Run logistic regressions and generate predicted probabilities of STDI exhaustion**
  - Individual: age, sex, diagnosis category, weekly wage, census division
  - Employer: size, industry
  - Plan: elimination period
- **Restrict to claims with 26 weeks of partial wage replacement**

MATHEMATICA
CENTER FOR
STUDYING DISABILITY POLICY

Factors Positively Associated with Exhaustion of Benefits

- **Age**

- **Diagnosis**
  - **Cancer: 11 percentage points**
  - **Intervertebral disc disorders: 6 percentage points**
  - **Other back diseases: 3 percentage points**
  - **Depression, post-traumatic stress disorder: 4 percentage points**
  - **Other mental disorders: 2 percentage points**

- **Industry: Agriculture, mining, construction, transportation, and utilities**

MATHEMATICA
CENTER FOR
STUDYING DISABILITY POLICY

Definitions

	Flagged	Not flagged
Exhausts STDI benefits	True positive	False negative
Does not exhaust STDI benefits	False positive	True negative

Second Step: Receiver Operating Characteristic (ROC) Curve Analysis

- **Construct a ROC curve to show the relationship between the true positive rate (TPR) and false positive rate (FPR)**

- **Compare predictive accuracy across models using the area under the curve**
  - Separate analyses by minimum claim duration: zero, two, four, and six weeks

- **For a given ROC curve, use a point that maximizes TPR-FPR ("Youden's index") to identify the threshold for "high risk"**

- **Use a split-sample approach**

Example: ROC Curve and High-Risk Threshold at Week 6
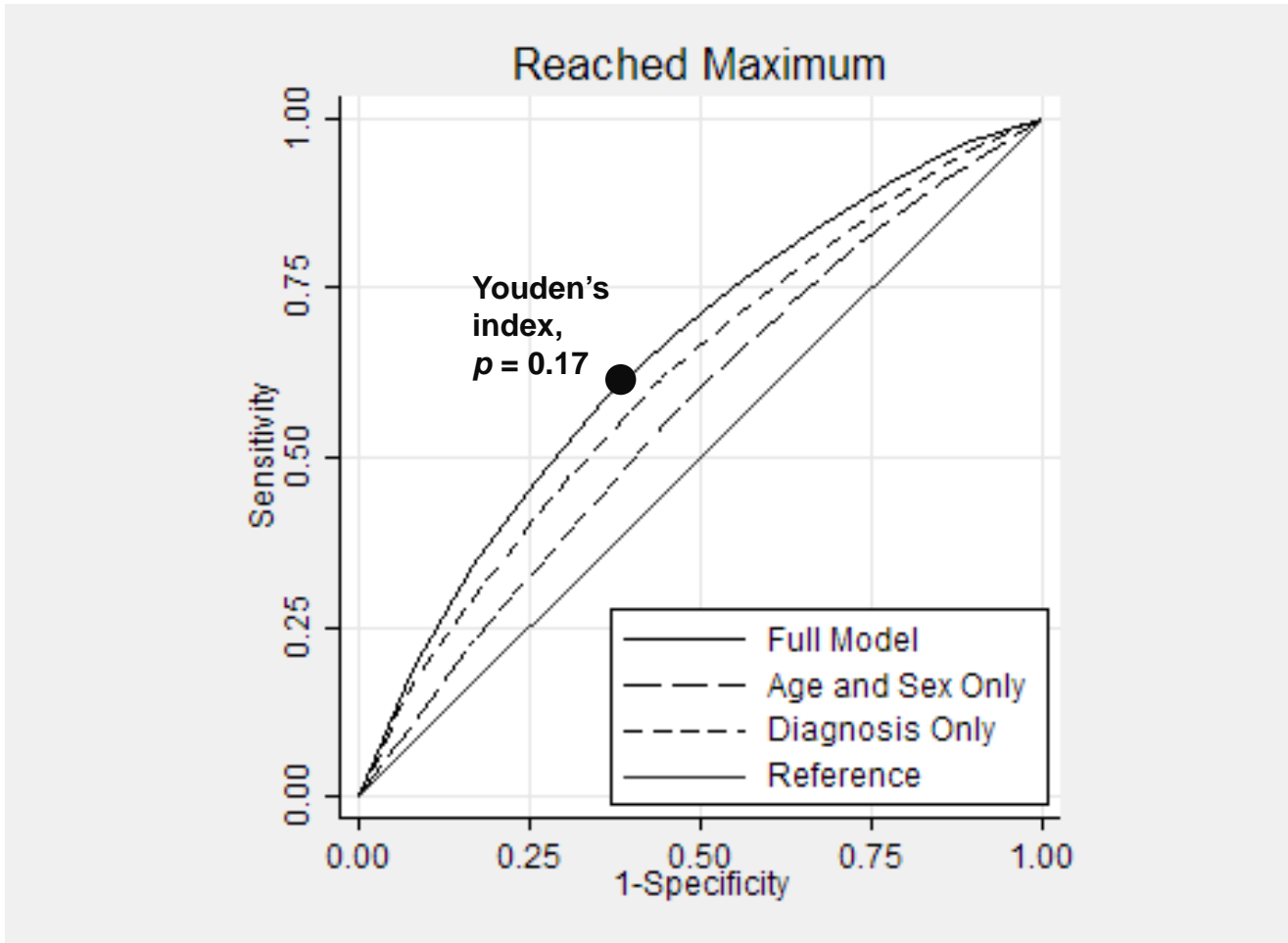
Predictive Accuracy Does Not Improve with Claim Duration

Table 1. Predictive accuracy of model, maximum benefit of 26 weeks

Minimum claim duration (weeks)	Percentage of initiated claims remaining	Area under the curve	Percentage of initiated claims flagged "high risk"	True positive rate	Percentage of initiated claims flagged incorrectly
0	100.00	0.70	40.21	65.35	35.60
2	83.03	0.68	33.27	63.16	28.82
4	64.46	0.67	26.17	61.41	21.86
6	50.13	0.65	20.92	60.10	16.73

But Efficiency of Targeting Does Improve

Table 1. Predictive accuracy of model, maximum benefit of 26 weeks

Minimum claim duration (weeks)	Percentage of initiated claims remaining	Area under the curve	Percentage of initiated claims flagged "high risk"	True positive rate	Percentage of initiated claims flagged incorrectly
0	100.00	0.70	40.21	65.35	35.60
2	83.03	0.68	33.27	63.16	28.82
4	64.46	0.67	26.17	61.41	21.86
6	50.13	0.65	20.92	60.10	16.73

Benefit of Model Over Attrition Only, Week 6

Table 2. Predictive accuracy of model versus attrition alone, six weeks

Strategy	Percentage of remaining claims flagged "high risk"	True positive rate	False positive rate
Attrition alone	100	100	100
Model	41.73	60.10	37.50

Future Work

- **More complex model specification**

- **Optimization of the prediction metrics for policy purposes**

MATHEMATICA
CENTER FOR
STUDYING DISABILITY POLICY

Conclusions

- **Waiting allows claims that will resolve without intervention to do so**

- **Modeling can further narrow the target population**

- **Additional information can likely improve precision and the identification of people most likely to benefit**

MATHEMATICA
CENTER FOR
STUDYING DISABILITY POLICY

Contact Information

- **Kara Contreary**
  - **kcontreary@mathematica-mpr.com**

- **Yonatan Ben-Shalom**
  - **yben-shalom@mathematica-mpr.com**
  - **@BenShalomY**

MATHEMATICA
CENTER FOR
STUDYING DISABILITY POLICY