Employers’ Selection Behavior during Short-Time Work

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3. Data Generation: Short-time Workers in Nuremberg
4. Empirical Strategy
5. Transition to Short-time Work and Unemployment
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   2. Effects of Individual Characteristics
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1. Motivation

- Individual data on short-time workers scarce
  - No administrative data
  - German Socio-Economic Panel (Büchel/Pannenberg 1992)

- Little knowledge about short-time workers
  - Who is affected by short-time work (STW) ?
  - To what extent are individuals affected by STW ?
  - What is the effect of STW on individual employment biographies ?
1. Motivation

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  - What is the effect of STW on individual employment biographies ?
2. Theoretical Considerations

- heterogeneous labor
  - workers either dispose of high (H) or low (L) level of human capital
  - wage rates \( w \) exogenously given
  - perform same tasks
  - productivity_{H} > productivity_{L}
  - \( w_H > w_L \)

- representative establishment
  - experiences inescapable lack of work due to exogenous shock
  - lack of work is equally distributed across groups of workers
  - adjustment of volume of work necessary
2. Theoretical considerations

reduction of volume of work

- establishment can to opt for one of two regimes
- decision for one regime according to accruing cost

STW → who is to work short-time?

cost: contributions to social security for hours cut

lay-offs → who is laid-off?

cost for lay-offs and future re-hiring

- in case of STW
  - cost of STW increase with wage rate
  - employing skilled workers in short-time is costly
  - establishment will cut hours of low skilled workers
2. Theoretical considerations

Hypothesis

- Individual level of human capital negatively influences probability of working short-time

- Risk of STW higher for employees with low level of human capital
3. Data Generation: Short-time Workers in Nuremberg

- paper copies of lists of all short-time workers in the district of Nuremberg were typewritten
  → Administrative Individual Data on Short-time Workers in Nuremberg (ADINKU)

- ADINKU data can be combined with process data of the IAB via
  - social security number
  - establishment number

- amount of typewritten data at time of analysis
  - June 2008 to December 2010
  - 57,057 short-time workers
  - 1,820 establishment
  - corresponds to 90% of all data material to be typewritten
List of Short-time Workers in Nuremberg

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<tr>
<th>Nr.</th>
<th>Name, Vorname</th>
<th>Abrechnungsart</th>
<th>Stunden</th>
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Dynamics of Short-time Work in Nuremberg

- **STW expansion period**: June 2008 to February 2009
- **STW plateau period**: March 2009 to March 2010
- similar development as in Germany as a whole (Statistik der BA 2011)

Source: Own calculations from ADINKU data.
1. identify non STW establishments with similar characteristics as STW establishments
   - similar non STW establishments may have opted for STW
     → employees of similar non STW establishments also at risk of STW
   - allows estimation of transition rates into unemployment (competing risk)
   - propensity score matching of STW and non-STW establishments
   - data source: Establishment History Panel 2008 (BHP) of the IAB

2. event history analysis including
   - employees of STW establishments
   - employees of matched non-STW establishments
   - estimate transition rate into STW and unemployment separately
   - data source: Integrated Employment Biographies (IEB) of the IAB
Combination of ADINKU data with Process Data of the IAB

ADINKU
establishment number (bnr)
social security number (vsnr)

BHP
bnr

bnr of STW firms
bnr of matched non STW firms

IEB
bnr
vsnr

short-time workers
non short-time workers

Source: Own representation.
5. Transition to Short-time Work and Unemployment
5.1 Descriptive Analysis

Kaplan-Meier Estimates

Source: Own calculations from ADINKU data.
Regression Analysis

piecewise constant model with period specific effects
- splitting of episodes at split points $\tau_l, l=1,\ldots,10$
- ten intervals of two months length
- estimation
  - maximum likelihood
  - transition to STW and unemployment estimated separately
- two local maxima of hazard function
  → parametric models of time dependence not suited
- proportional hazard assumption fulfilled within periods
- period specific effects allow estimated hazard functions to cross
5. Transition to Short-time Work and Unemployment
5.2 Effects of Individual Characteristics

Model Specification

\[ h_t = \exp \left( t_{kl} + A_l \beta_l \right), \quad l = 1, \ldots, 10 \]

\[ A_l = \begin{pmatrix}
    female_l \\
    age_l \\
    non-german_l \\
    seniority_l \\
    low skilled_l \\
    high skilled_l \\
    low skilled occupation_l \\
    high skilled occupation_l \\
    year of foundation_l \\
    firm size_{jl} \\
    branch of economic activity_{kl}
\end{pmatrix} \]
5. Transition to Short-time Work and Unemployment
5.2 Effects of Individual Characteristics

Effects on the Transition to Short-time Work

Hazard rates by seniority

Source: Own calculations from ADINKU data.
5. Transition to Short-time Work and Unemployment
5.2 Effects of Individual Characteristics

Effects on the Transition to Short-time Work

Imputed Education Variable (Fitzenberger et al. 2005)

Blossfeld (1985) classification of occupations

Source: Own calculations from ADINKU data.
5. Transition to Short-time Work and Unemployment
5.2 Effects of Individual Characteristics

Effects on the Transition to Short-time Work

- gender, age, nationality: no systematic influence on transition to STW
- no discriminatory behavior of employers when implementing STW scheme
- selection of low skilled employees into STW only during STW expansion period
Effects on the Transition to Unemployment

5. Transition to Short-time Work and Unemployment

5.2 Effects of Individual Characteristics

Hazard rates by seniority

Source: Own calculations from ADINKU data.
5. Transition to Short-time Work and Unemployment
5.2 Effects of Individual Characteristics

Effects on the Transition to Unemployment

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Source: Own calculations from ADINKU data.
5. Transition to Short-time Work and Unemployment
5.2 Effects of Individual Characteristics

Effects on the Transition to Unemployment

- gender, age, nationality: no systematic influence on transition to unemployment
- no discriminatory behavior of employers with respect to layoffs
- selective behavior of employers in line with standard human capital theory
Further Determinants of Employers’ Behavior

- expectations
  - employers’ may have expected recession to be short (Burda/Hunt 2011)
  - apply instruments of labor hoarding to all groups of employees
- fairness considerations
  - organizational justice theory (Greenberg 1987, 1990)
  - empirical evidence confirms withdrawal / counterproductive behavior as reaction to perceived unfair behavior of employer (Cohen-Charash/Spector 2001, Colquitt et al. 2001)
6. Conclusion and Outlook

- no selective behavior of employers during STW plateau period
- selective behavior of employers with respect to layoffs in line with human capital theory
- no discriminatory behavior of employers
- hypothesis not confirmed empirically

- further research questions
  - exits out of short-time work
  - medium-/long-run effects of short-time work on individual employment biography

- ADINKU data
  - combined with further process data will be offered to researchers at the Research Data Center
Thank you for your attention

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References

- Blossfeld, Hans-Peter; Golsch, Katrin; Rohwer, Götz (2007): Event History Analysis with Stata. Erlbaum, Mahwah (NJ), USA.
BACKUP
Propensity Score Matching

- exclusion of establishments outside of district of employment agency of Nuremberg
- nearest neighbor matching
  - with replacement
  - 4 nearest neighbors within caliper of 0.05
  - keep matches within region of common support
- estimation of propensity score: logit regression including
  - branch of economic activity
  - firm size
  - shares of employees by education
  - shares of employees by occupational status
  - share of full-time, part-time, marginally employed
  - year of foundation
Data Structure

- individual employment biographies from IEB
- identification of transitions to STW and unemployment
- multi-episode data
- restriction to
  - episodes of employment subject to social security
  - June 2008 to December 2009
- risk to exit regular employment from June 2008 on
Piecewise Constant Model with Period Specific Effects

define

\[ \Delta \{ t, l \} = \begin{cases} 
  t - \tau_l & \text{if } s \leq \tau_l \land \tau_l < t < \tau_{l+1} \\
  \tau_{l+1} - \tau_l & \text{if } s \leq \tau_l \land t \geq \tau_{l+1} \\
  \tau_{l+1} - s & \text{if } t \geq \tau_{l+1} \land \tau_l < s < \tau_{l+1} \\
  0 & \text{else} 
\end{cases} \]

for the model it follows

\[ h(t) = \exp \left( \xi_l + A_l \beta_l \right) \]

\[ G(t) = \exp \left( \frac{1}{r} \exp \left( \xi_l + A_l \beta_l \right) \Delta \{ t, l \} \right) \]

Estimation via Maximum Likelihood

\[ L = \prod_{i \in E} f(i) \prod_{i \in Z} G(i) \prod_{i \in E} r(i) \prod_{i \in N} G(i) \]

\[ \max \log \left( \sum_{i \in E} \left( \xi_l + A_{li} \beta_l \right) \sum_{i \in N} \sum_{l=1}^{L} \Delta \{ i, t, l \} \exp \left( \xi_l + A_{li} \alpha_l \right) \right) \]

where

- \( s \): Start of episode
- \( t \): End of episode
- \( \tau_l \): Split point
- \( l \): Interval

\[ \varepsilon : \text{Number of uncensored episodes} \]
\[ N : \text{Number of all episodes} \]
\[ Z : \text{Number of all censored episodes} \]
Restriction of Risk Pool

- to employees of STW establishments
- very similar results are obtained

Hazard rates by seniority

- 1 year
- 5 years
- 15 years
Restriction of Risk Pool

- to employees of STW establishments
- very similar results are obtained