Research Data Centre (FDZ)
of the German Federal
Employment Agency (BA)
at the Institute for
Employment Research (IAB)

Employers' Selection Behavior during Short-Time Work

11th Comparative Analysis of Enterprise Data & COST Conference 2012

(CAED 2012)

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Theresa Scholz

Outline

1. Motivation
2. Theoretical Considerations
3. Data Generation: Short-time Workers in Nuremberg
4. Empirical Strategy
5. Transition to Short-time Work and Unemployment
    1. Descriptive Analysis
    2. Effects of Individual Characteristics
6. Conclusion and Outlook

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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- 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 ?

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

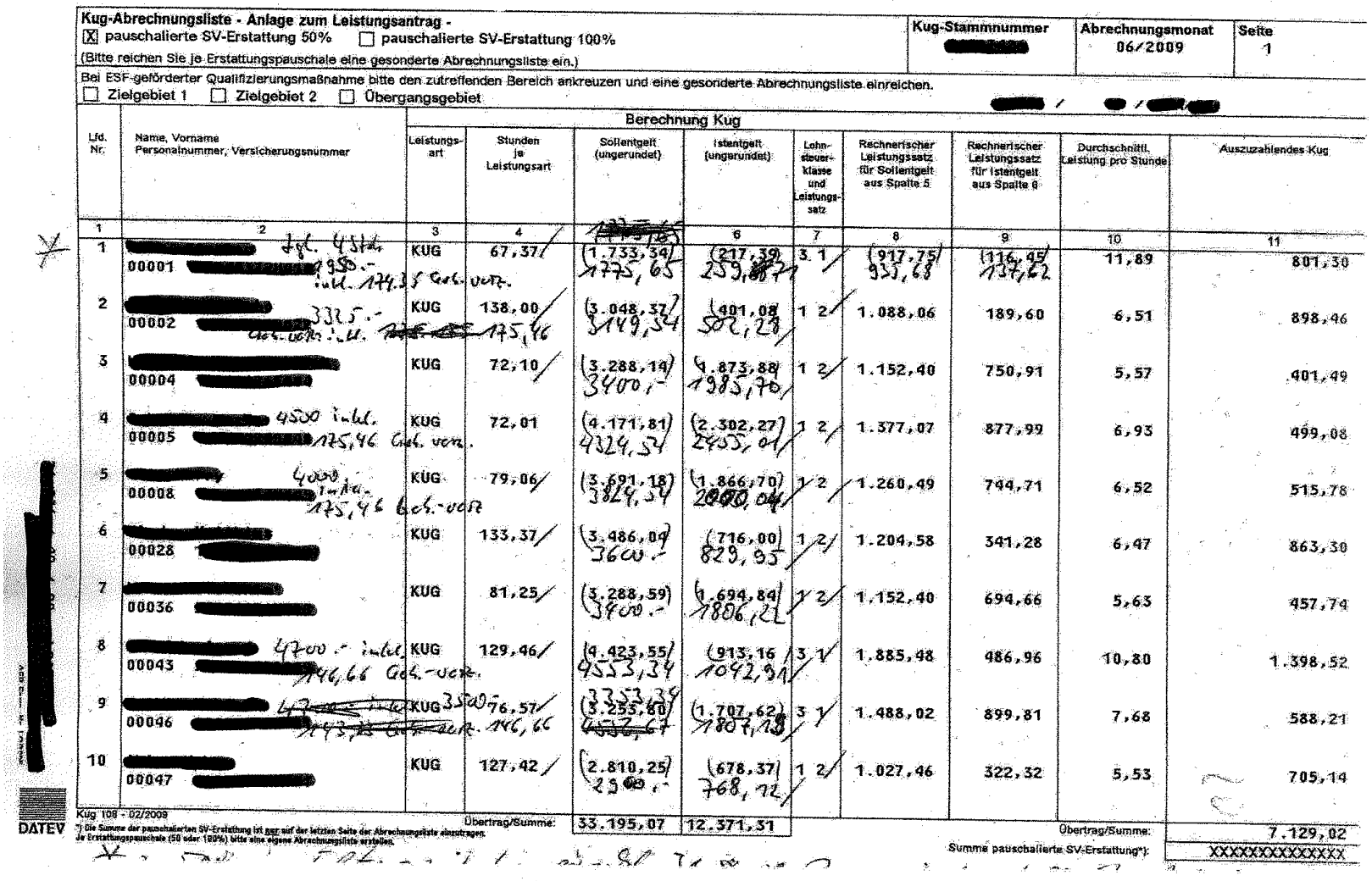
- paper copies of lists of all short-time workers in the district of Nuremberg were typewritten

  → 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



Kug-Abrechnungsliste - Anlage zum Leistungsantrag -

☒ pauschalierte SV-Erstattung 50% ☐ pauschalierte SV-Erstattung 100%

(Bitte reichen Sie je Erstattungspauschale eine gesonderte Abrechnungsliste ein.)

Bei ESF-geförderter Qualifizierungsmaßnahme bitte den zutreffenden Bereich ankreuzen und eine gesonderte Abrechnungsliste einreichen.

☐ Zielgebiet 1 ☐ Zielgebiet 2 ☐ Übergangsgebiet

Kug-Stammnummer	Abrechnungsmonat	Seite
[redacted]	06/2009	1

Berechnung Kug

Lfd. Nr.	Name, Vorname Personalnummer, Versicherungsnummer	Leistungsart	Stunden je Leistungsart	Sollentgelt (ungerundet)	Istentgelt (ungerundet)	Lohnsteuerklasse und Leistungssatz	Rechnerischer Leistungssatz für Sollentgelt aus Spalte 5	Rechnerischer Leistungssatz für Istentgelt aus Spalte 6	Durchschnittl. Leistung pro Stunde	Auszuzahlendes Kug
1	2	3	4	5	6	7	8	9	10	11
1	[redacted] 00001	KUG	67,37	(1.733,34) 1775,65	(217,39) 259,87	3 1	(917,75) 933,68	(116,45) 137,62	11,89	801,30
2	[redacted] 00002	KUG	138,00	(3.048,37) 3149,34	(401,08) 502,29	1 2	1.088,06	189,60	6,51	898,46
3	[redacted] 00004	KUG	72,10	(3.288,14) 3400,-	(1.873,88) 1985,70	1 2	1.152,40	750,91	5,57	401,49
4	[redacted] 00005	KUG	72,01	(4.171,81) 4324,54	(2.302,27) 2455,01	1 2	1.377,07	877,99	6,93	499,08
5	[redacted] 00008	KUG	79,06	(3.691,18) 3824,54	(1.866,70) 2000,04	1 2	1.260,49	744,71	6,52	515,78
6	[redacted] 00028	KUG	133,37	(3.486,09) 3600,-	(716,00) 829,95	1 2	1.204,58	341,28	6,47	863,30
7	[redacted] 00036	KUG	81,25	(3.288,59) 3400,-	(1.694,84) 1806,22	1 2	1.152,40	694,66	5,63	457,74
8	[redacted] 00043	KUG	129,46	(4.423,55) 4553,34	(913,16) 1042,91	3 1	1.885,48	486,96	10,80	1.398,52
9	[redacted] 00046	KUG	76,57	(3.255,80) 3353,39	(1.707,62) 1807,18	3 1	1.488,02	899,81	7,68	588,21
10	[redacted] 00047	KUG	127,42	(2.810,25) 2900,-	(678,37) 768,72	1 2	1.027,46	322,32	5,53	705,14
			Übertrag/Summe:	33.195,07	12.371,51				Übertrag/Summe:	7.129,02
									Summe pauschalierte SV-Erstattung*):	XXXXXXXXXXXXX

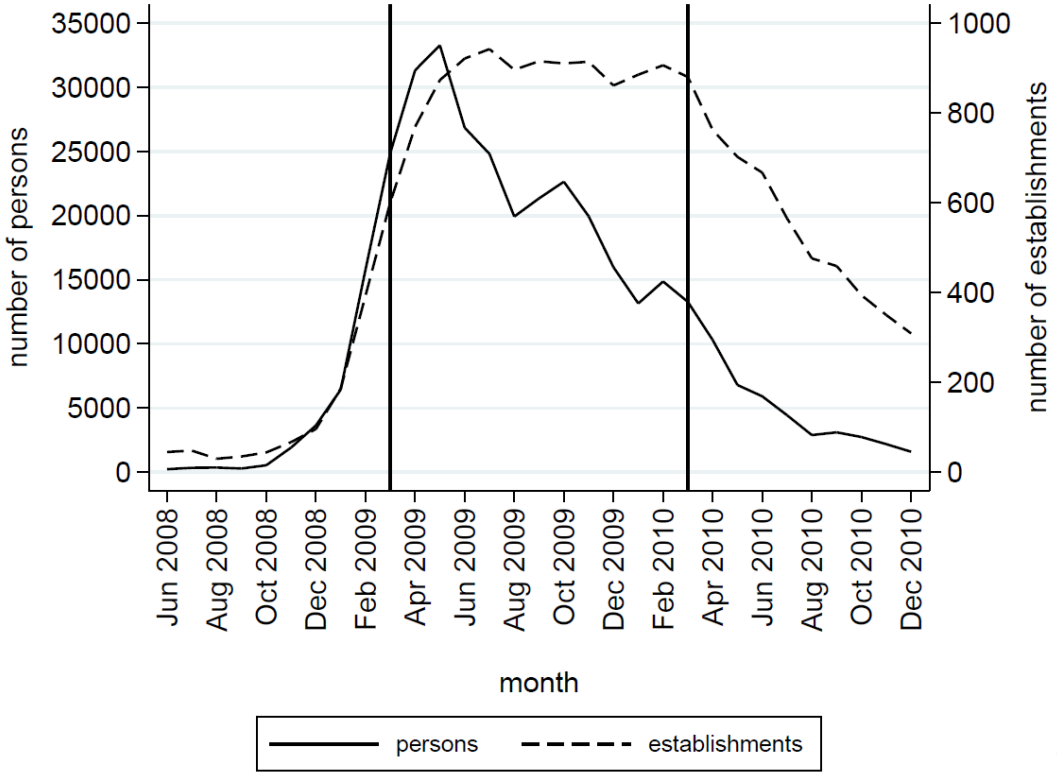
Kug 109 - 02/2009

*) Die Summe der pauschalierten SV-Erstattung ist nur auf der letzten Seite der Abrechnungsliste einzutragen. Je Erstattungspauschale (50 oder 100%) bitte eine eigene Abrechnungsliste erstellen.

DATEV

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.

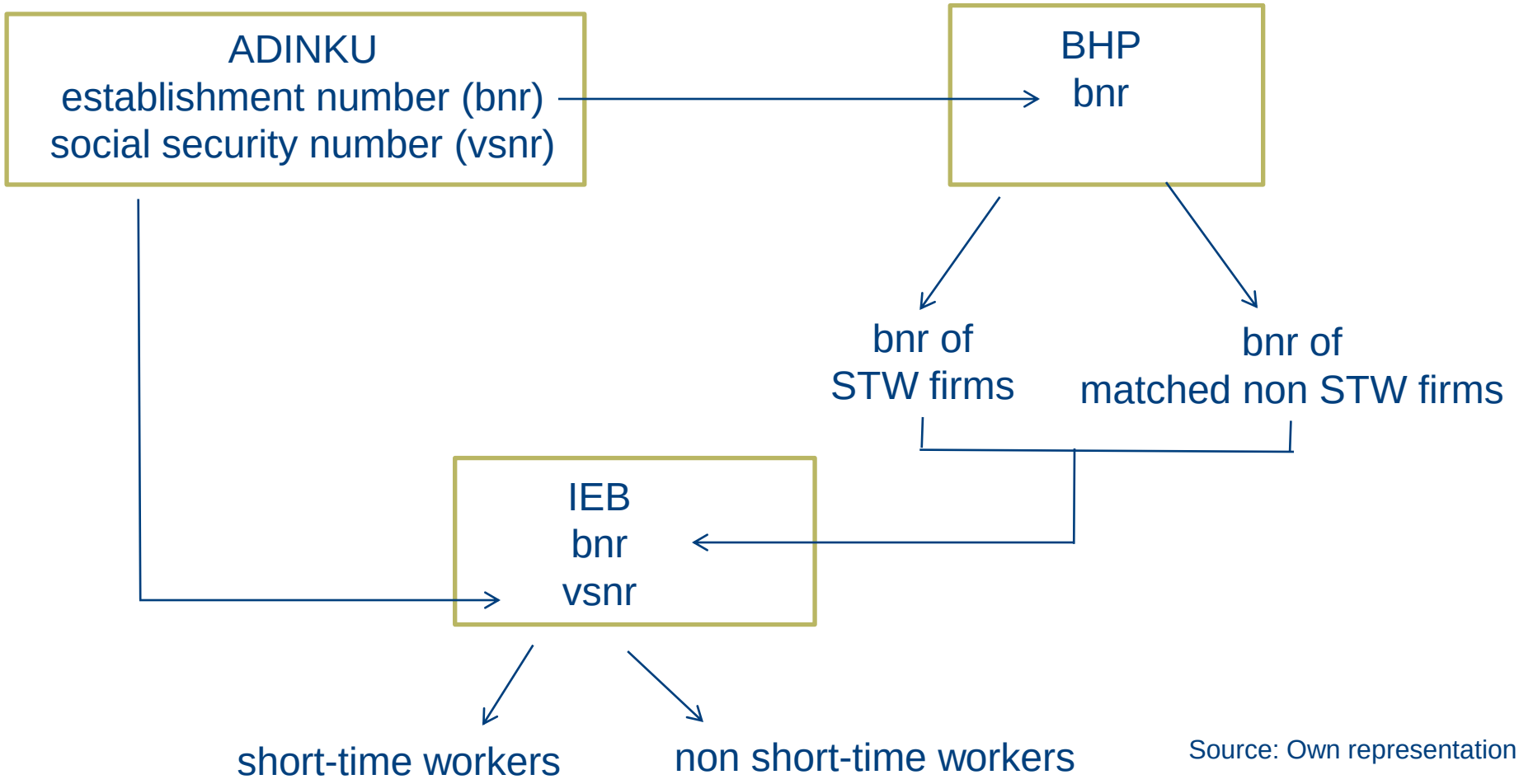
4. Empirical Strategy

Two-stage Approach

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



Source: Own representation.

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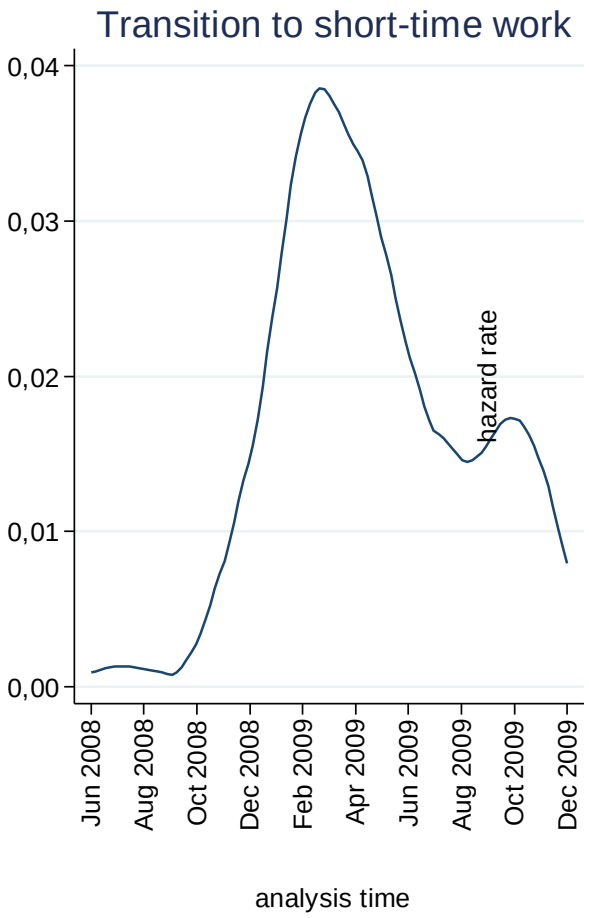
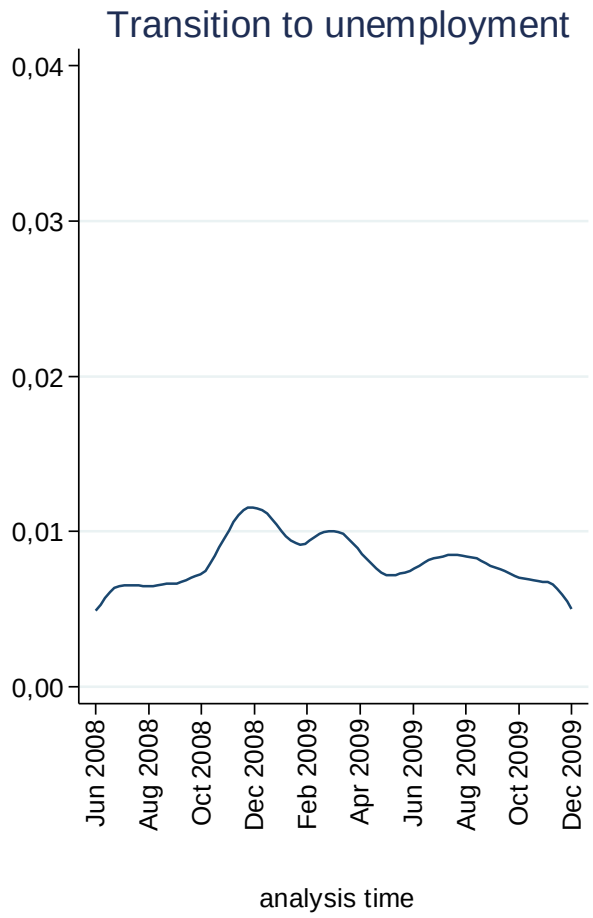
Kaplan-Meier Estimates





Source: Own calculations from ADINKU data.

Regression Analysis

piecewise constant model with period specific effects

- splitting of episodes at split points τ_l , $l=1,\ldots,10$
- ten intervals l 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

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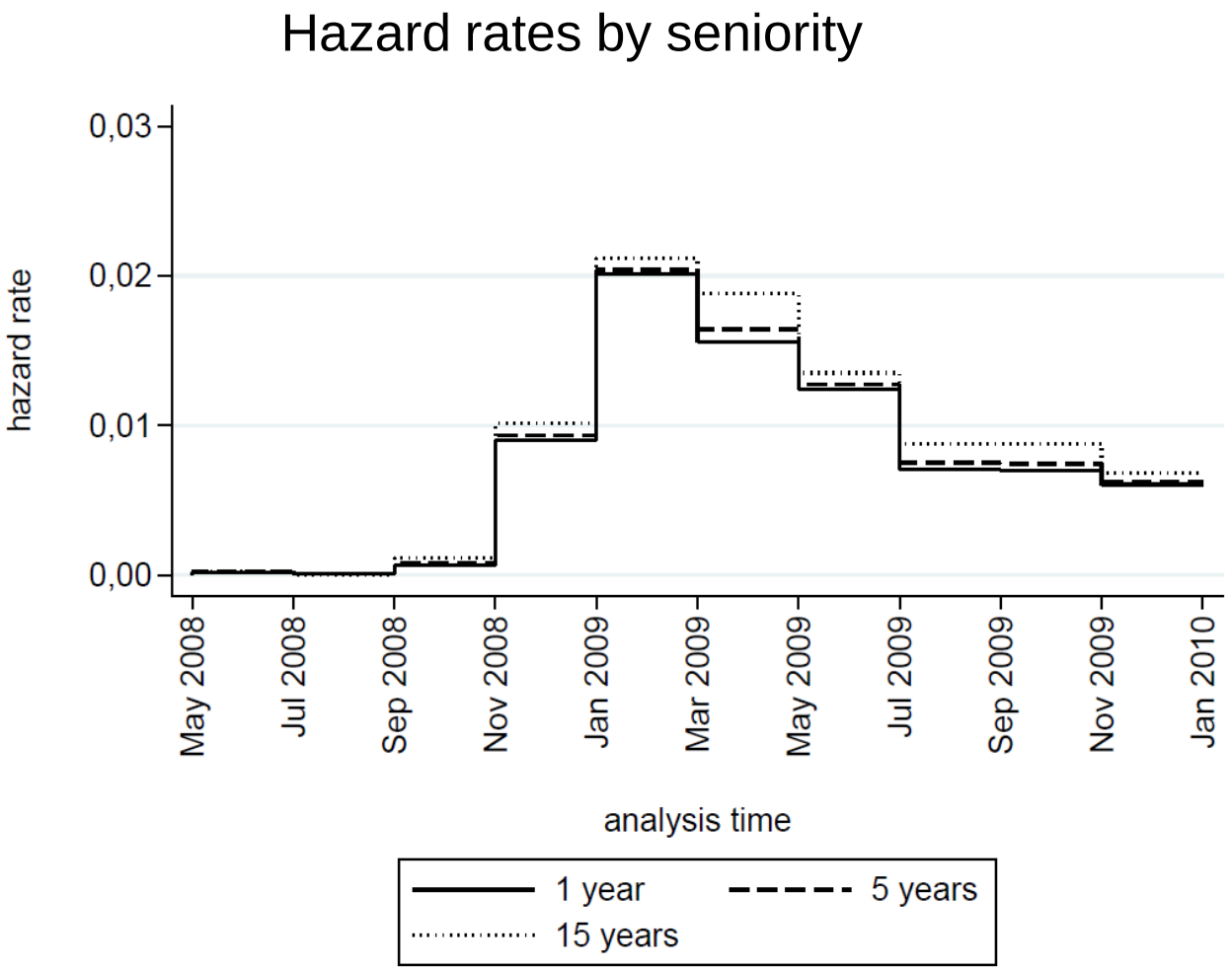
FDZ

Model Specification

$$h(\cdot) = \exp\{t_k + A_l \beta_l\}, \quad l = 1,\ldots,10$$

$$A_l = \begin{pmatrix} female_l \\ age_l \\ non-german_l \\ seniority_l \\ low\ skilled_l \\ high\ skilled_l \\ low\ skilled\ occupation_l \\ high\ skilled\ occupation_l \\ year\ of\ foundation_l \\ firm\ size_{jl} \\ branch\ of\ economic\ activity_{kl} \end{pmatrix}$$

Effects on the Transition to Short-time Work



Source: Own calculations from ADINKU data.

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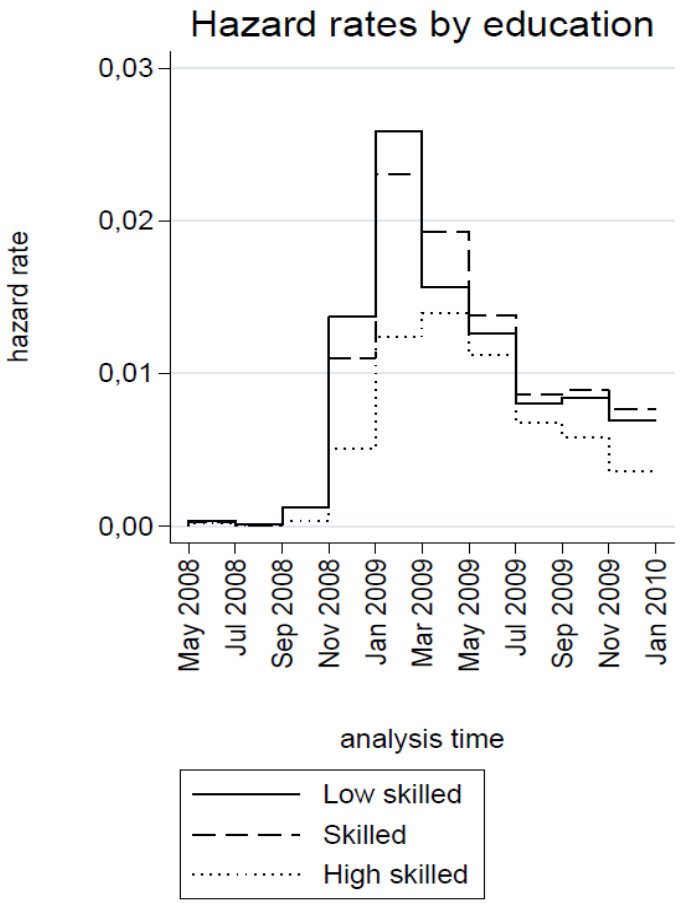
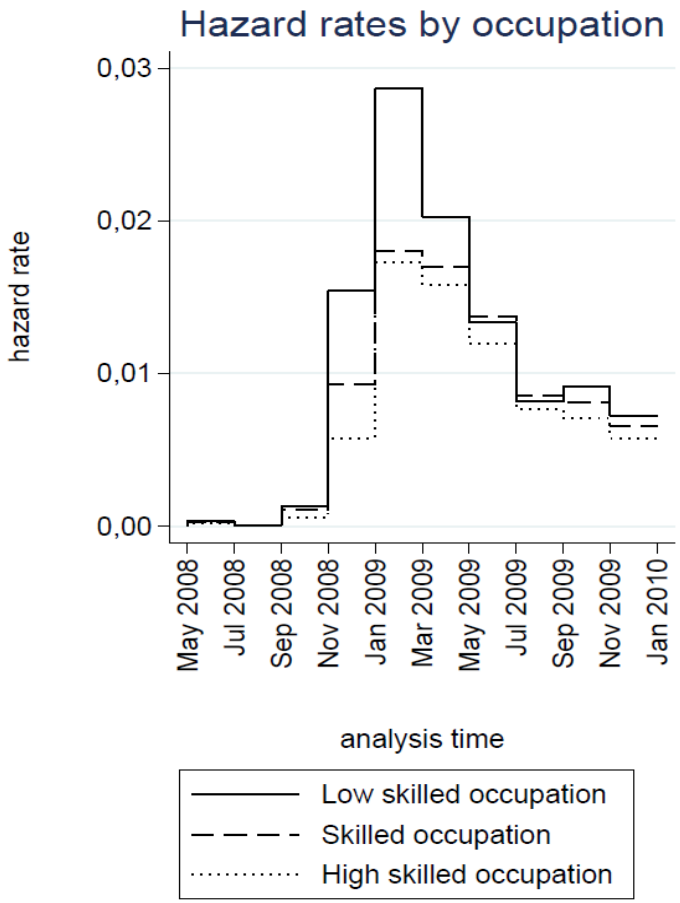
Effects on the Transition to Short-time Work

Imputed Education Variable (Fitzenberger et al. 2005)



Blossfeld (1985) classification of occupations

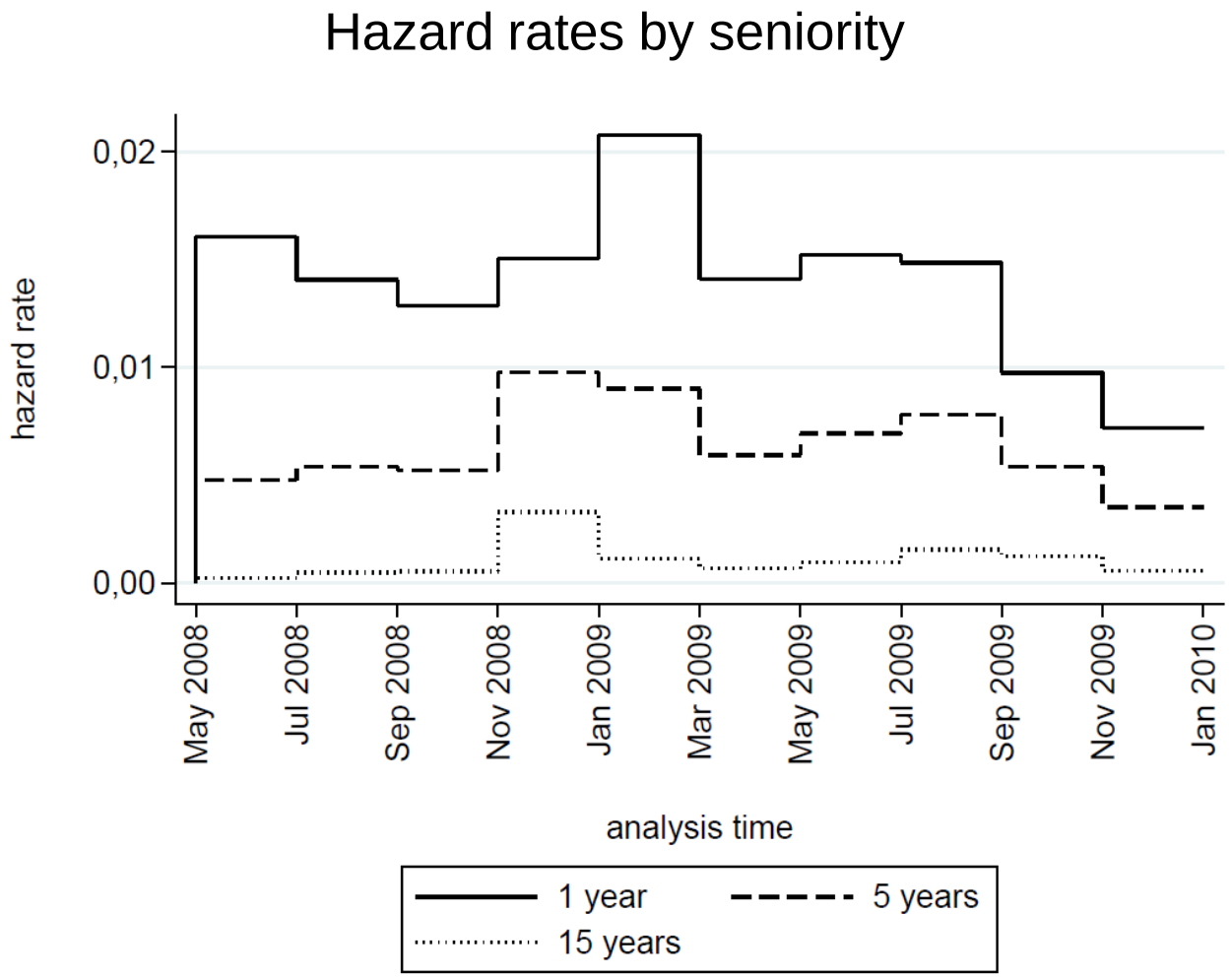


Source: Own calculations from ADINKU data.

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



Source: Own calculations from ADINKU data.

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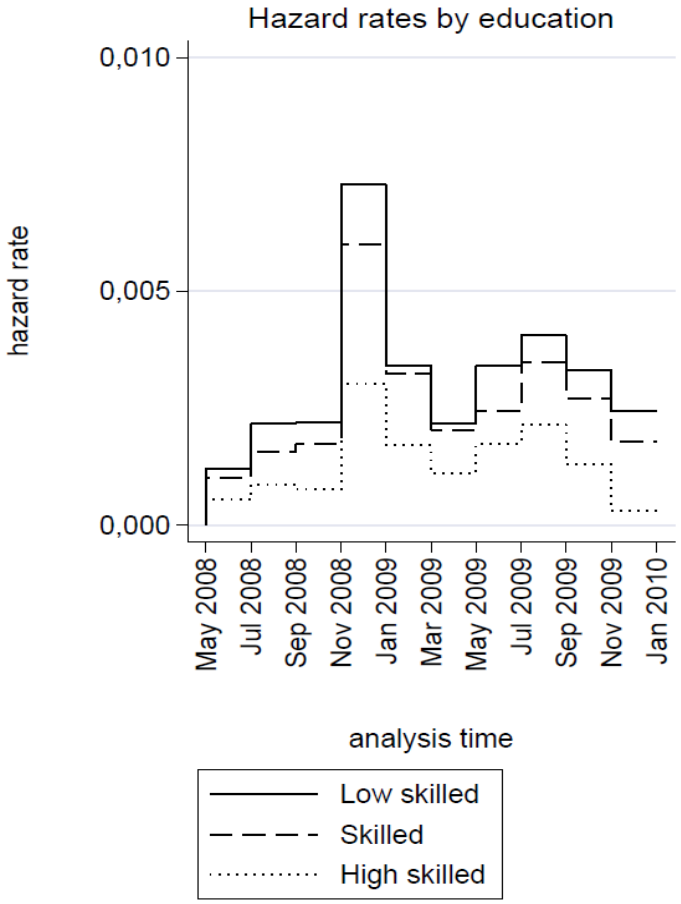

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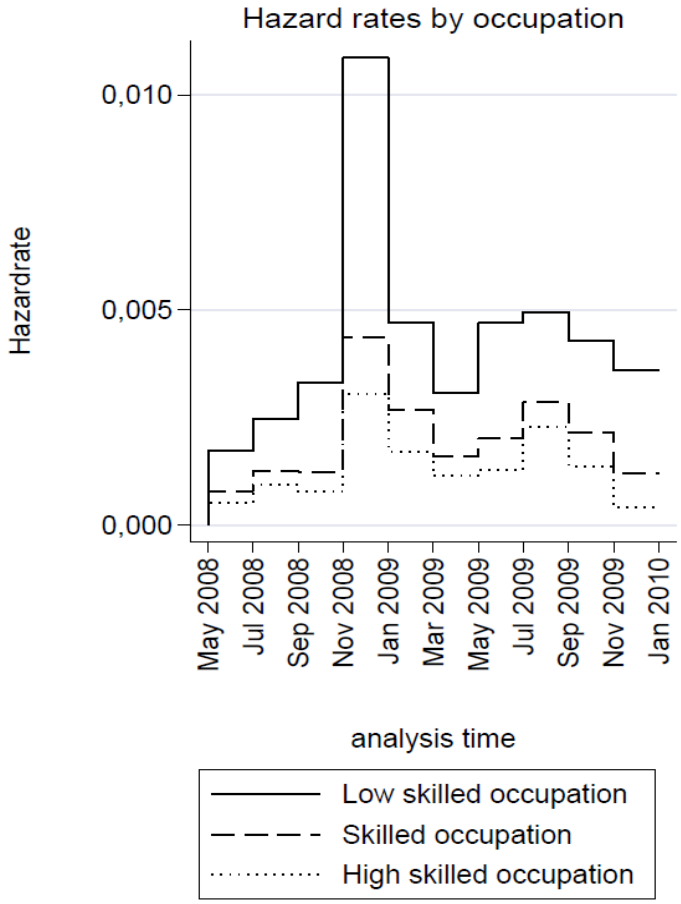

Source: Own calculations
from ADINKU data.

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

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Thank you for your attention

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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

$$\Delta(s,t,l) = \begin{cases} t-\tau_l & \text{if } s \le \tau_l \ , \ \tau_l < t < \tau_{l+1} \\ \tau_{l+1}-\tau_l & \text{if } s \le \tau_l \ , \ t \ge \tau_{l+1} \\ \tau_{l+1}-s & \text{if } t \ge \tau_{l+1} \ , \ \tau_l < s < \tau_{l+1} \\ 0 & \text{else} \end{cases}$$

where

s : *Start of episode*

t : *End of episode*

τ_l : *Split point*

l : *Interval*

for the model it follows

Hazard rate $h(\cdot) = \exp(\alpha_l + A_l\beta_l)$

Survivor function $G(\cdot) = \exp\{-\exp(\alpha_l + A_l\beta_l)\Delta(s,t,l)\}$

Estimation via Maximum Likelihood

$$L = \prod_{i\in\varepsilon} f(\cdot_i) \prod_{i\in Z} G(\cdot_i) = \prod_{i\in\varepsilon} r(\cdot_i) \prod_{i\in N} G(\cdot_i)$$

$$\max \ \log(L) = \sum_{i\in\varepsilon}(\alpha_l + A_{li}\beta_l) - \sum_{i\in N}\sum_{l=1}^{L} \Delta(s_i,t_i,l)\exp(\alpha_l + A_{li}\alpha_l)$$

where

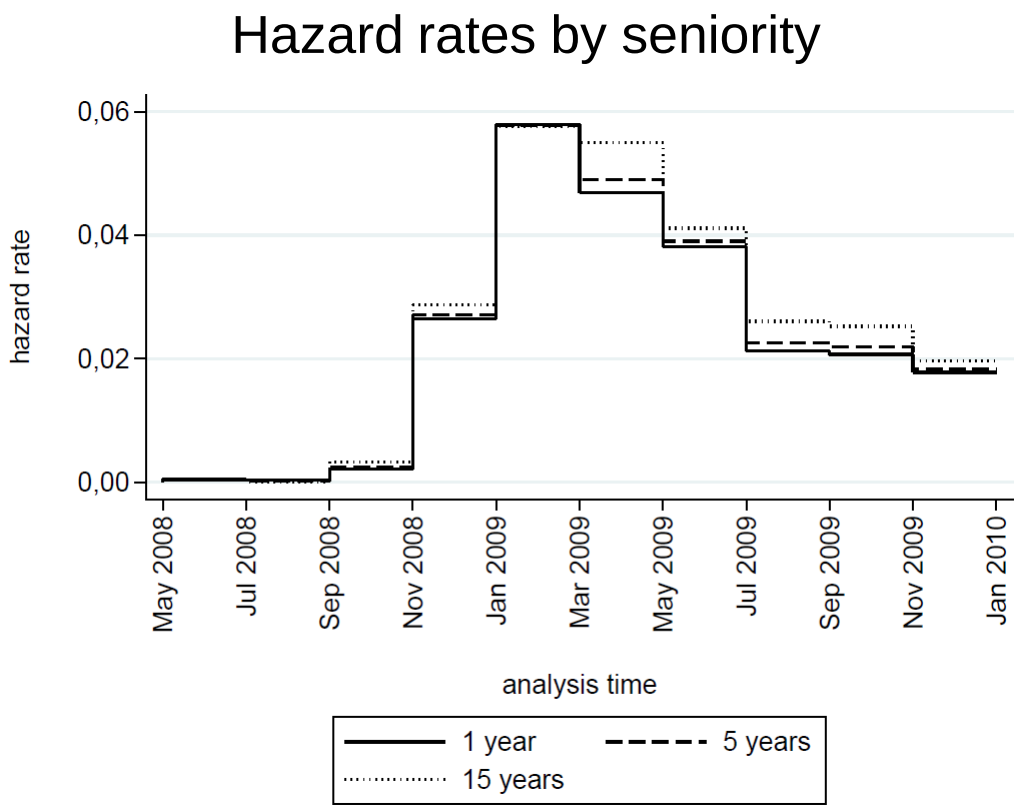
ε : *Number of uncensored episodes*

N : *Number of all episodes*

Z : *Number of all censored episodes*

Restriction of Risk Pool

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



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