Worker Churn in the Cross Section and Over Time: New Evidence from Germany

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Motivation

Aggregate worker churn is large, strongly procyclical, and persistently so:

- German quarterly worker churn rate is 6.7% of employment.
- 50% of worker turnover is due to worker churn.
- Churn is 40% higher during booms than during recessions.

This Paper

- Study cross-sectional relationship between worker churn and employment growth.
  - Restructuring mechanism.
  - Uncertainty mechanism.
  - Propose a model of worker churn.
- Study time-series properties of churn.
  - Conditional on employment growth.
  - Differentiate turnover through non-employment and employment.

Administrative Wage & Labor Market Flow Panel (AWFP)

- Main data source: Employment History (BeH) of the IAB.
- Unit of observation: establishment.
- Coverage: all West-German private establishments (for short: plants).
- Period: 1975–2014.

Definitions of the AWFP

- Most variables in the *AWFP* are calculated on a 'regular worker' basis. A 'regular worker' is
  - employed full-time and
  - subject to social security.
- A worker is considered to be working for a given plant in a given quarter when she is employed at this plant at the end of the quarter. This definition yields the:
  - number of jobs at a plant at the end of a quarter (J_t).
  - number of hires at a plant (H_t).
  - number of separations at a plant (S_t).

Job Creation and Job Destruction

- For each plant, we compute the quarterly net job flow, $JF_t = J_t - J_{t-1}$.
- When a plant decreases employment ($JF_t < 0$) within a quarter, we count this as job destruction, JD_t.
- When a plant increases employment ($JF_t > 0$) within a quarter, we count this as job creation, JC_t.

Worker Churn

- Worker churn quantifies the amount of worker flows in excess of job flows at the plant (Burgess et al. (2000)):

$$CH_t = (H_t - JC_t) + (S_t - JD_t). \tag{1}$$

- Intuitively, churn occurs because non growing plants hire workers, and growing plants separate from workers.

Rates

- We use the average of contemporaneous and lagged end-of-quarter employment as the denominator:

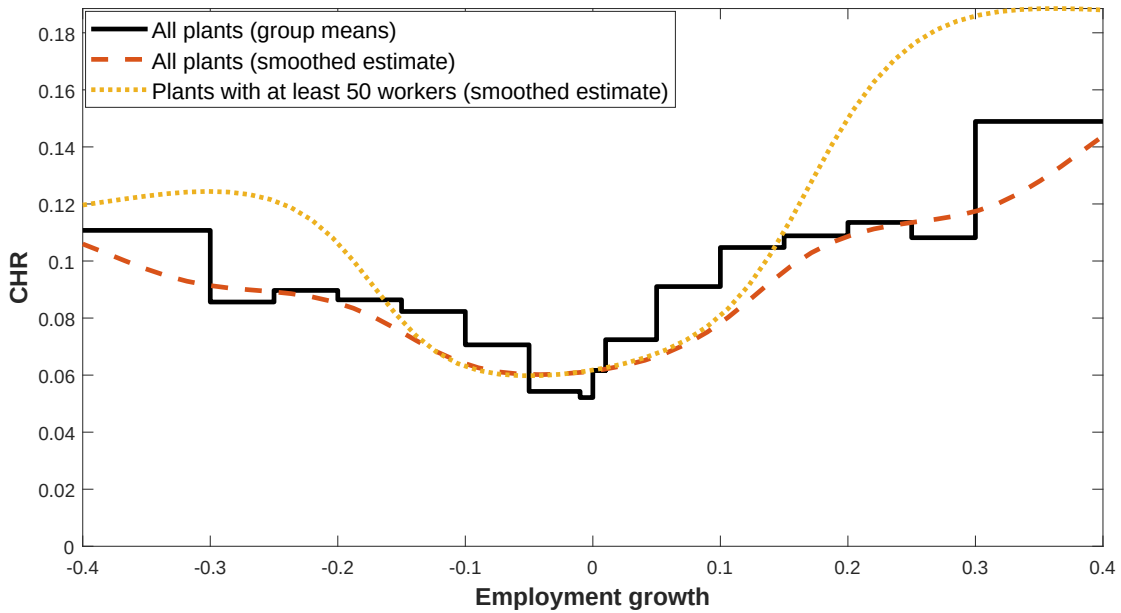
$$N_t = [J_t + J_{t-1}]/2.$$

- For example, $HR_t = \frac{H_t}{N_t}$.
- All rates are bound in the interval $[-2, 2]$ with endpoints corresponding to the death and birth.

Aggregate Job and Worker Flows in Germany

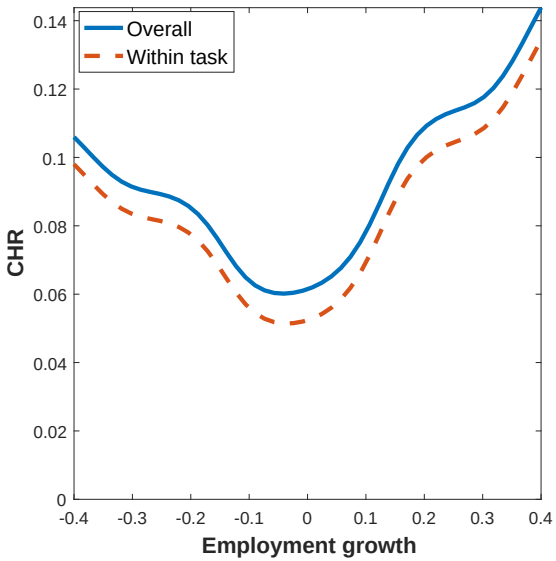
				Correlation with U_{t+j}		
	Mean	*Std*	*AC*(1)	$j=-2$	0	$+2$
JCR	3.69%	0.29%	0.53	0.19^{***}	-0.04	-0.28^{***}
JDR	3.69%	0.36%	0.40	-0.03	0.15	0.29^{***}
EJTR	6.95%	0.39%	0.51	0.21^{*}	0.15	0.11
HR	7.06%	0.57%	0.82	-0.26^{***}	-0.53^{***}	-0.72^{***}
SR	7.06%	0.47%	0.47	-0.46^{***}	-0.51^{***}	-0.48^{***}
CHR	6.74%	0.76%	0.92	-0.55^{***}	-0.77^{***}	-0.87^{***}

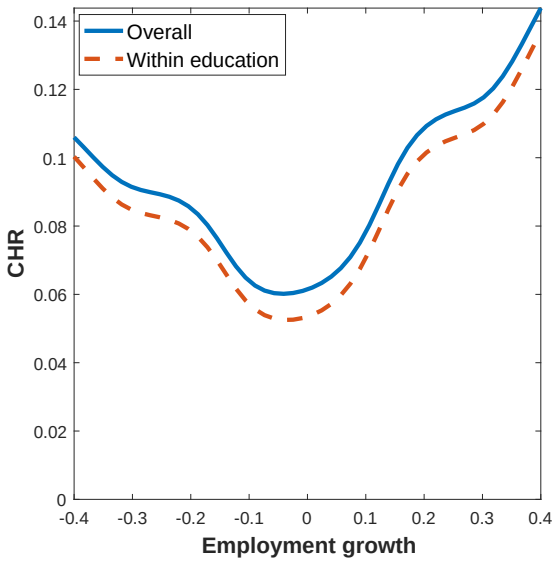
Worker Churn in the Cross-Section

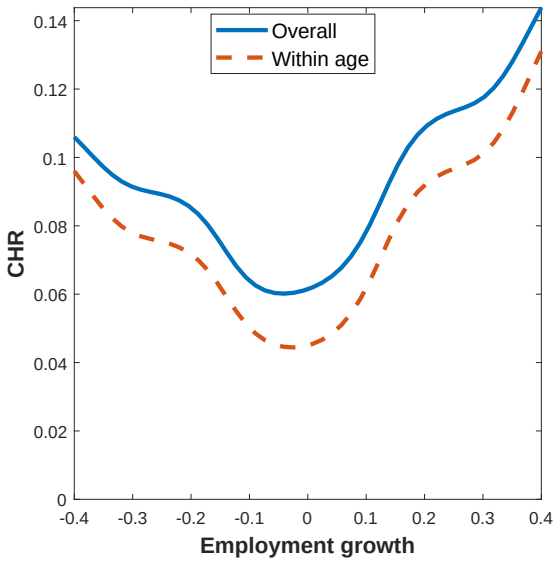


- Churn highest at rapidly adjusting plants.
- Not driven by small plants.

Reorganization Hypothesis

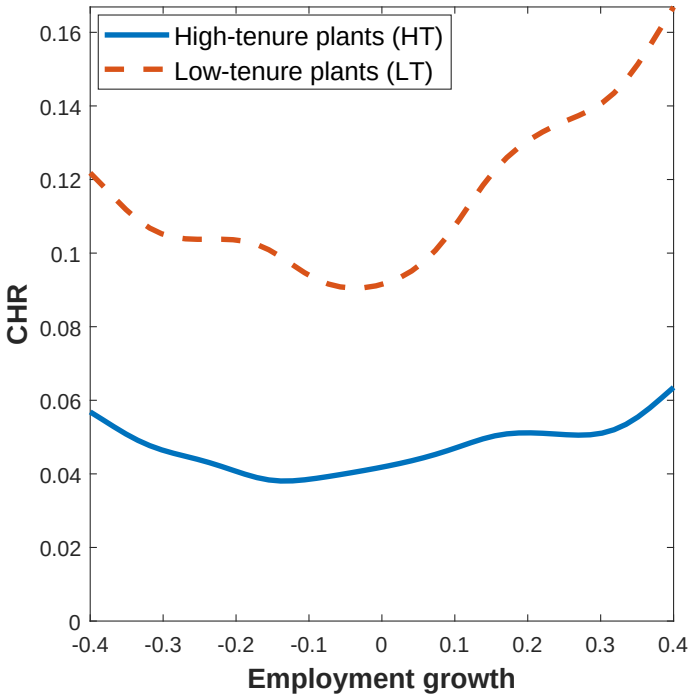


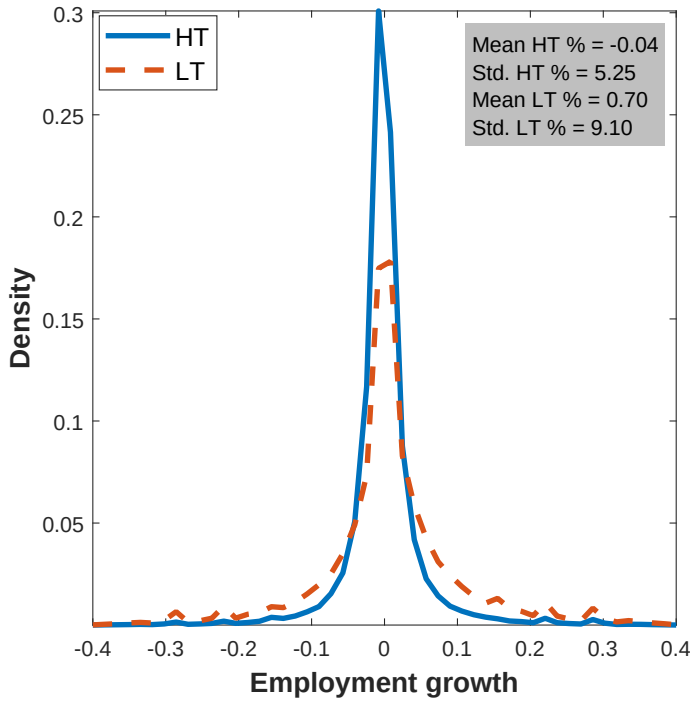




- Churn across worker observables explains little of churn.
- It explains nothing of the V-shape.

Uncertainty Hypothesis





- Firms with many low tenured workers have
  - more worker churn.
  - a more pronounced V-shape.
  - more dispersed employment growth.

A Model of Worker Churn

Firms produce output according to

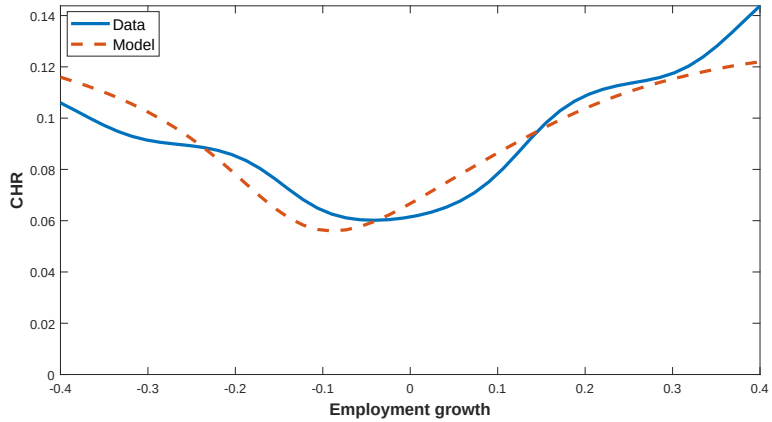
$$Y_{it} = zE_{it}^{\alpha},$$

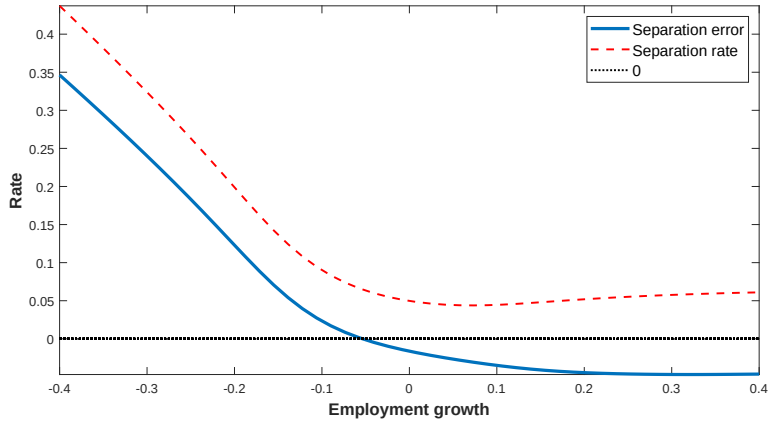
Employment dynamics:

$$\begin{aligned}
&\max_{\Delta^a_{E_{it}}} \left\{ \mathbb{E}_{t-1}\{ zE_{it}^{\alpha} - wE_{it} \} \right\} \\
&E_{it} = (1 - s_{it})(E_{it-1} + \Delta^a_{E_{it}}) \\
&s_{it} = \min\{\exp(\tilde{s}_{it}), 1\} \\
&\tilde{s}_{it} = (1 - \rho_s)\mu_s + \rho_s \tilde{s}_{it-1} + \epsilon_{it}, \quad \epsilon_{it} \sim N(0, \sigma_s^2),
\end{aligned}$$

Key: Firms do not control size perfectly.

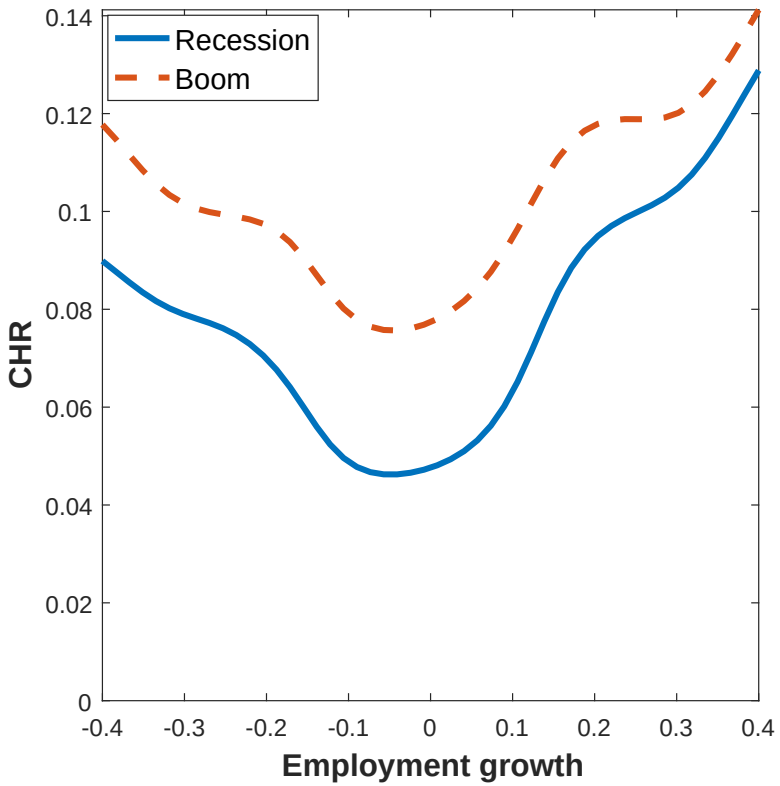
Result

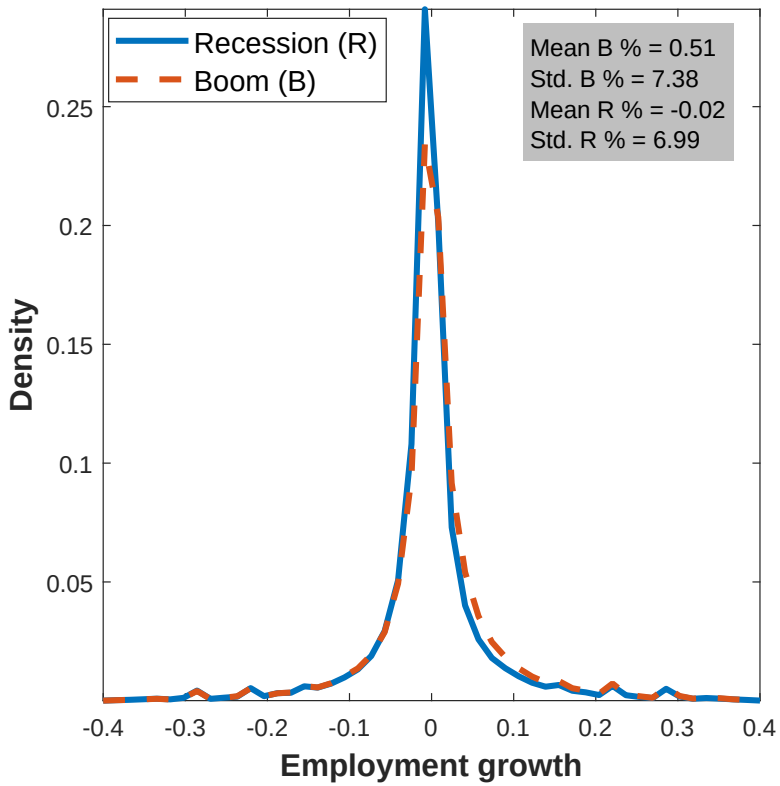




- Rapidly growing plants experienced large shock last period.
- Non-adjusters start close to optimal size.
- Rapidly shrinking plants experience large shock this period.

Churn and the Cycle





- Employment growth churn nexus shifts up during booms.
- Employment growth dispersion changes little.

Cyclical Churn in the Model

- The model rationalizes cyclical dynamics by ▸ Model
  - higher average separations in booms.
  - more uncertain separations in recessions.
- Procyclical worker turnover does not imply procyclical job turnover.

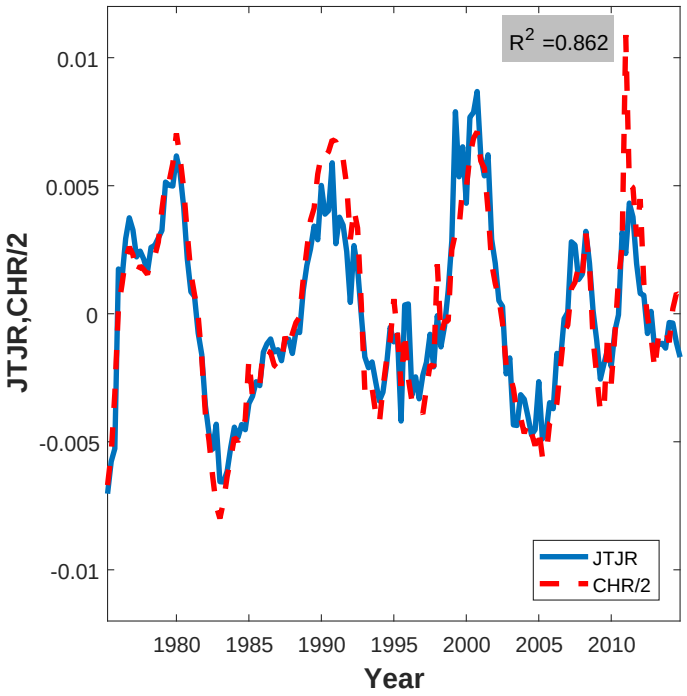
Source of Procyclical Churn

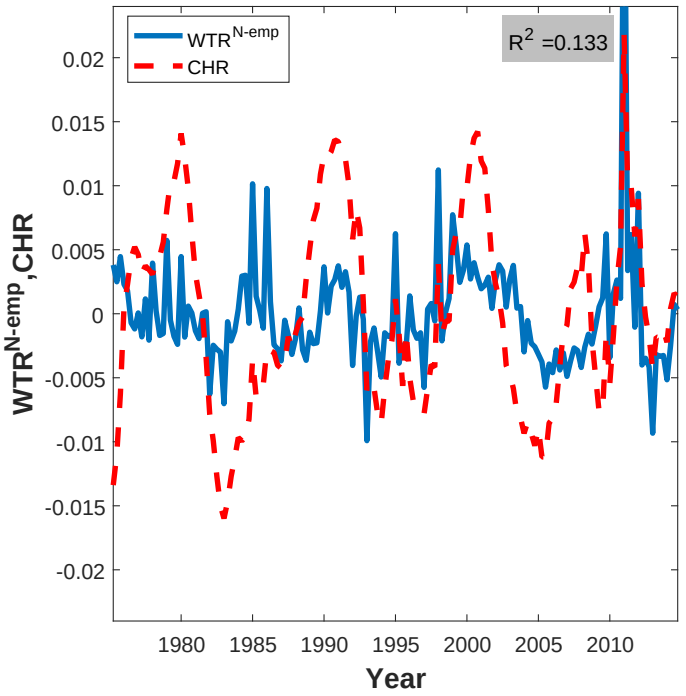
Write the churning rate as:

$$\begin{aligned} CHR_t &= (HR_t + SR_t) - (JCR_t + JDR_t) \\ &= (HR_t^{N-emp} + SR_t^{N-emp} + 2JTJR_t) - (JCR_t + JDR_t). \end{aligned}$$

- Churn may result from
  - churn through the non-employment pool.
  - churn through job-to-job transitions.

Source of Procyclical Churn II





- All procyclical churn is job-to-job.
- Procyclical job-to-job transitions do not lead to procyclical job reallocation.
- Cyclical worker flows from/to non-employment imply job flows.

▸ Job flows

Implications for the Cycle

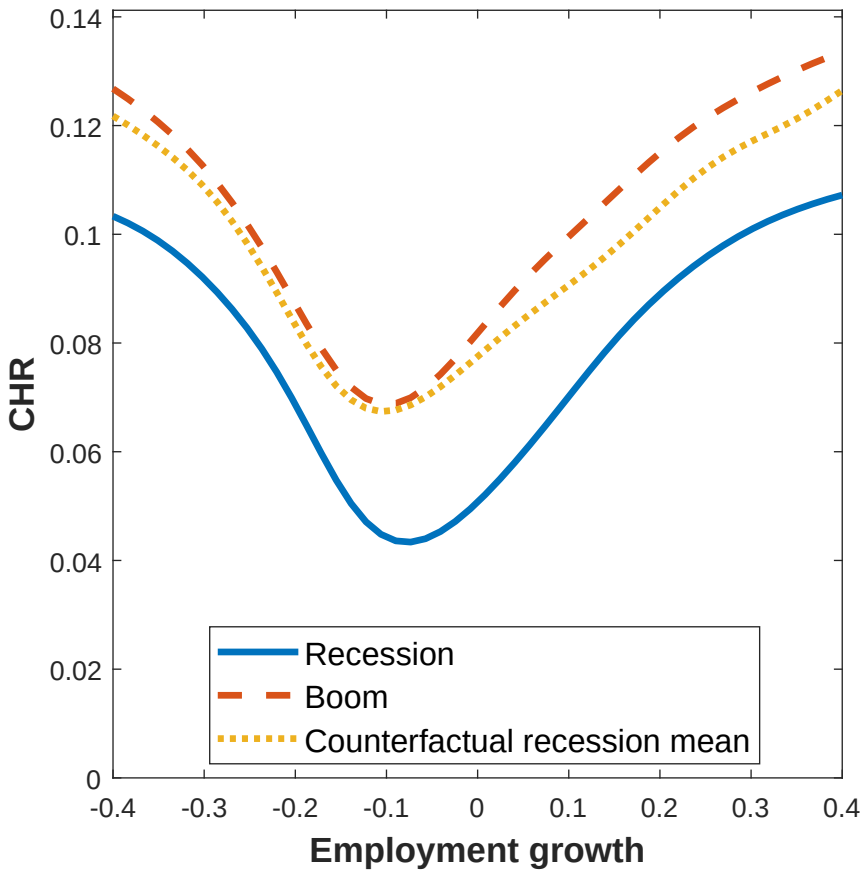
- Early in boom, short period of hiring from non-employment (job-creation).
- Worker reallocation through job-to-job transitions remains high throughout the boom.
- This lead to no further job reallocation.
- Consistent with job-ladders being idiosyncratic.

Conclusion

- Churn is V-shaped in employment growth.
- Most churn results within worker observables and is linked to uncertainty.
- Separation rate shocks with time-to-hire rationalize the data.
- Churn is procyclical because separations become more frequent and predictable during booms.
- All procyclical churn results from job-to-job transitions.

Burgess, S., J. Lane, and D. Stevens (2000): "Job Flows, Worker Flows, and Churning," Journal of Labor Economics, 18, 473–502.

Raw data



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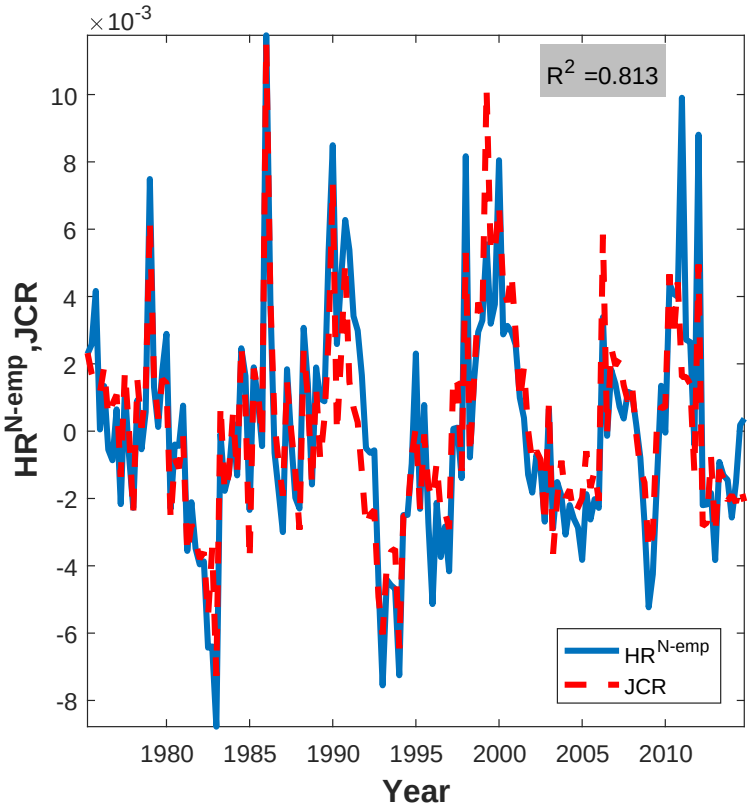

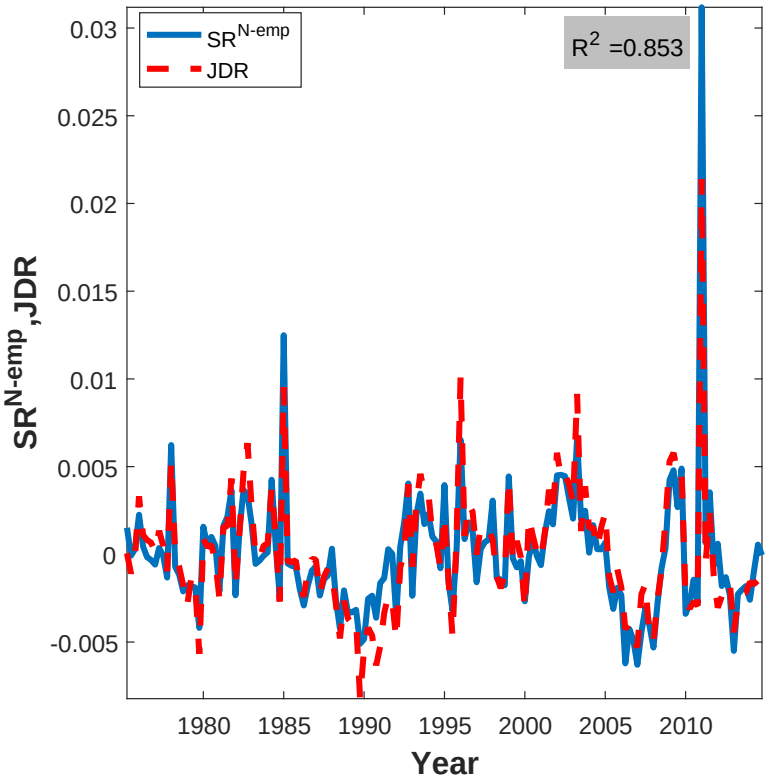

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