

# Labor Market Reform and the Cost of Business Cycles

Tom Krebs

University of Mannheim

Martin Scheffel

University of Cologne

## Motivation

- Recessions are very costly (Great Recession)
- Large literature: How to reduce costs of recessions using macroeconomic stabilization policy
- This paper: How to reduce the cost of recessions using labor market reform

## Our Approach

- Follow Lucas (1987, 2003) and compute the welfare costs of business cycles – cost of recessions is a special case of costs of business cycles
- In contrast to Lucas (1987, 2003), no representative household assumption
- Analyze how labor market reform affects the welfare costs of business cycles

## Our Approach

$$\frac{\partial \Delta}{\partial \mathbf{z}} = ?$$

$$\frac{\partial \Delta}{\partial \mathbf{b}} = ?$$

$\Delta$ : Welfare cost of business cycles

$\mathbf{b}$ : unemployment benefits

$\mathbf{z}$ : matching efficiency

## Results

- States conditions under which an increase in “labor market flexibility” (reduction in unemployment benefits, increase in matching efficiency) reduces the welfare cost of business cycles
- Provides a quantitative application to the case of the German labor market reform of 2003-2005 (Hartz reforms)

## Results

- German labor market reforms of 2003-2005 reduced unemployment benefits (Hartz IV) and improved matching efficiency through restructuring of Public Employment Agency (Hartz III)
- Quantitative analysis suggests that these reforms reduced the non-cyclical unemployment rate by almost 2.6 percentage points and reduced the welfare cost of business cycles by 20 – 40 percent

## Intuition

- Recessions are costly because unemployment goes up and earnings losses associated with unemployment go up
- An increase in labor market flexibility increases the non-cyclical component of the job finding rate
- This reduces the increase in unemployment during recessions and may reduce the increase of earnings losses during recessions

## Policy Implication

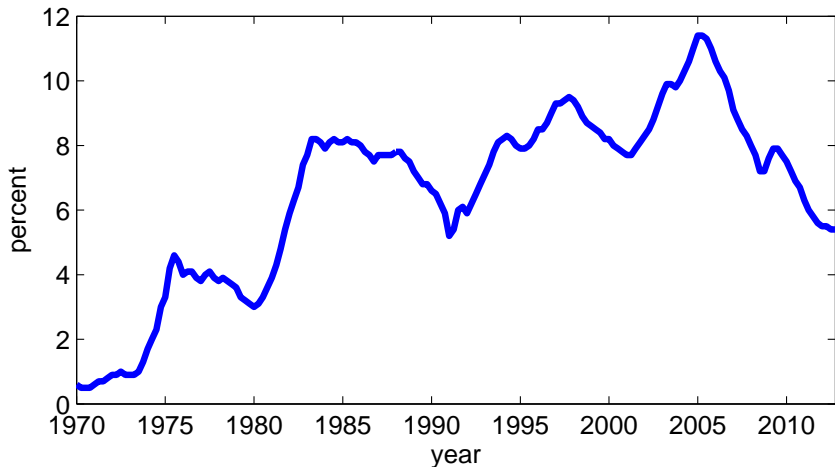
- Labor market reform changes the design of optimal stabilization policy
- Well-designed labor market reform reduces the need for fiscal stimulus packages
- Warning: this is not a paper about optimal timing of labor market reform



## Literature

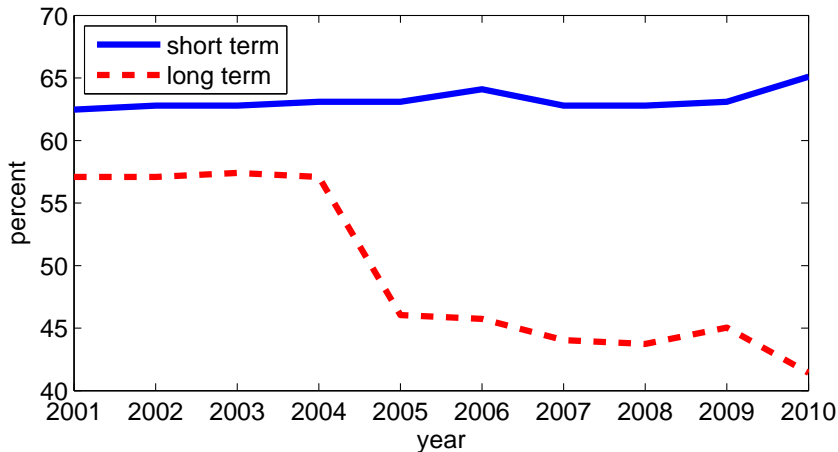
- **Welfare Costs of Business Cycles:** Lucas (1987, 2003), Alvarez and Jermann (2004), Barlevy (2004), DenHaan and Sedlack 2013), Krebs (2003, 2007), Krusell and Smith (1999, 2002), Storesletten, Telmer, and Yaron (2001)
- **Labor Market Institutions and Macro Shocks:** Blanchard and Wolfers (2000), Ljungqvist and Sargent (1998), Bentolila et. al (2012), Jung and Kuhn (2013)

Figure: Quarterly Unemployment Rate, Germany 1970Q1-2012Q4



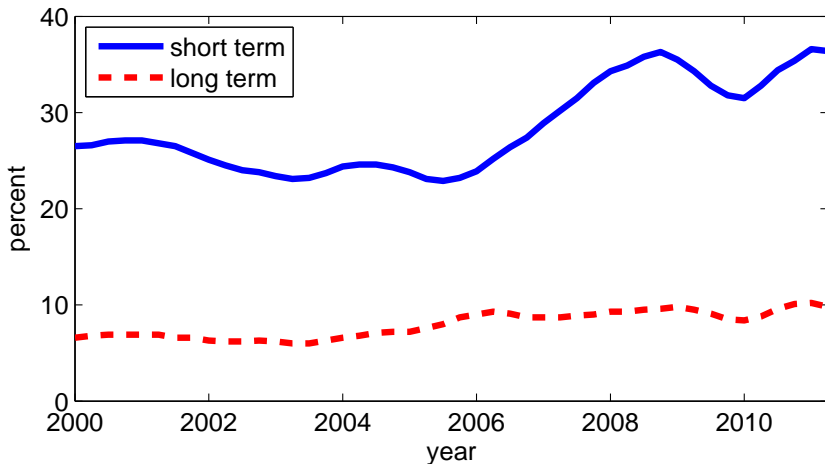
Source: OECD: 1970-1990, quarterly unemployment rate for West Germany; 1991-2012, quarterly harmonized unemployment rate for Germany.

Figure: Average Net Replacement Rate, Germany 2001-2010



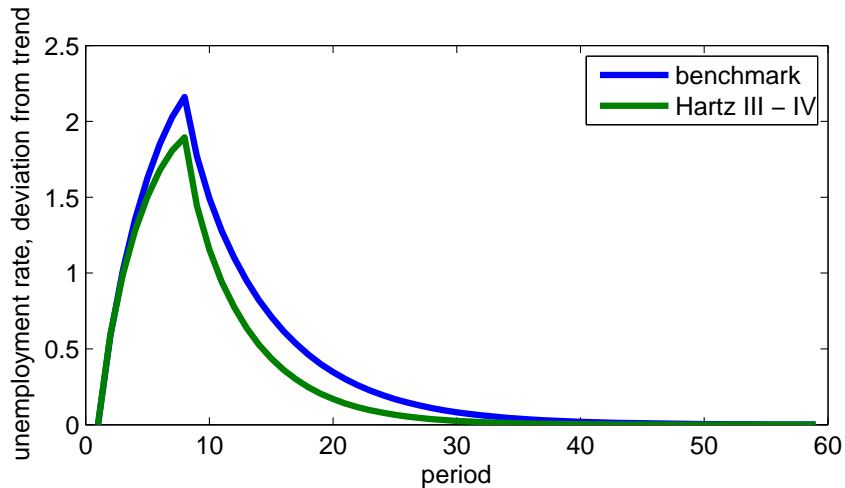
Source: OECD: (1) net replacement rates: OECD Tax-Benefit Modes, (2) population weights: OECD Family Database.

Figure: Quarterly Job Finding Rates by Unemployment Duration, Germany 2000Q1-2011Q2



Source: Bundesagentur für Arbeit (2011).

Figure: Unemployment Response to Job Separation Shock, Hartz III-IV



## Model

- Search model with a a large number of workers
- Workers are risk-averse, employed or unemployed, and can trade a risk-free asset
- Unemployed workers lose skills, receive unemployment benefits and choose search effort
- Job destruction process is exogenous

## Model

- Job finding rate depends on search effort and unemployment rate, but not on vacancies (matching function with constant vacancy rates)
- Production is linear in labor employed
- Stabilization policy affects process of job destruction (black-box approach)

# Workers

## Job Search:

- $s = e, u$  individual state (employed, unemployed)
- $\pi(e|u, l, z, U)$ : probability of transition from  $u$  to  $e$  if effort choice is  $l$  – depends on matching efficiency  $z$  and unemployment rate  $U$
- $\pi(u|e, S)$  probability of transition from  $e$  to  $u$  if aggregate state is  $S$



## Workers

Workers choose  $\{c_t, l_t, a_t\}$  subject to the budget constraint:

$$a_{t+1} = \begin{cases} (1 + (1 - \tau_{kt})r_t)a_t + \phi_t h_t - c_t & \text{if } a_{t+1} \geq 0 \\ (1 + r_t + \varphi)a_t + \phi_t h_t - c_t & \text{otherwise} \end{cases}$$

$$h_{t+1} = (1 + \epsilon(s_{t+1}))h_t$$

$$a_0 = 0$$

$$\phi_t = \begin{cases} (1 - \tau_{ht})w_t & \text{if } s_t = e \\ b & \text{if } s_t = u \end{cases}$$

# Workers

Skill loss during unemployment:

$$\epsilon(\mathbf{s}_{t+1}) = \begin{cases} +g & \text{if } \mathbf{s}_{t+1} = \mathbf{e} \\ -\delta_h & \text{if } \mathbf{s}_{t+1} = \mathbf{u} \end{cases}$$

## Workers

Preferences:

$$U(\{\mathbf{c}_t, \mathbf{l}_t\}) = \mathbf{E}_{\{\mathbf{l}_t\}} \left[ \sum_{t=0}^{\infty} \beta^t (\ln \mathbf{c}_t - \mathbf{d}(\mathbf{l}_t, \mathbf{s}_t)) \mid \mathbf{s}_0, \mathbf{S}_0 \right]$$

Workers choose a plans  $\{\mathbf{c}_t, \mathbf{a}_t, \mathbf{l}_t\}$

## Labor Market Reform

- permanent change in unemployment benefit payments  $b$  (Hartz IV)
- permanent change in matching efficiency  $z$  (Hartz III)

## How to Close the Model

- Production linear in employment
- Government: balanced budget

## Result

### Proposition

If cost of financial intermediation  $\varphi$  is large enough an equilibrium with  $a_t = 0$  exists. The value function of workers is

$$V(s, h, S) = v(s, S) + \frac{1}{1 - \beta} \ln h$$

**Remark:** Proof is non-trivial since worker max problem may have a non-concave objective function (repeated moral hazard with saving choice)

# Eliminating Business Cycles

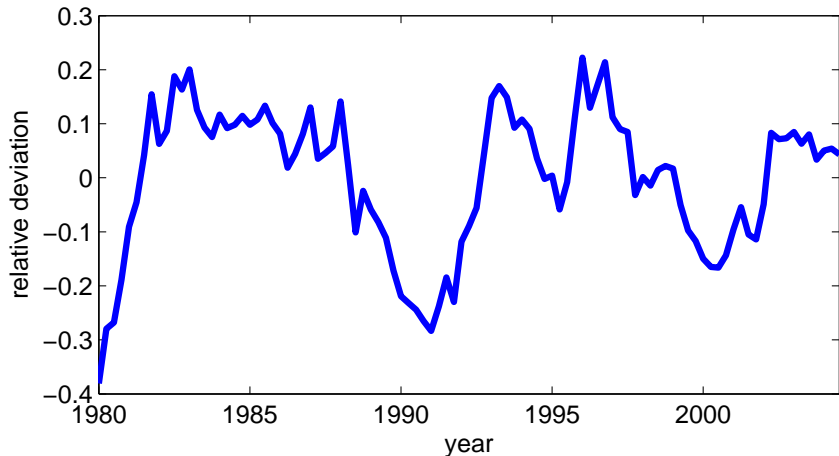
$$\hat{\pi}(\mathbf{u}|\mathbf{e}) = \sum_{\mathbf{S}} \pi(\mathbf{u}|\mathbf{e}, \mathbf{S})\alpha(\mathbf{S}|\mathbf{e})$$

$\mathbf{S} = \text{boom, recession}$

$\pi(\mathbf{u}|\mathbf{e}, \mathbf{S})$ : Job destruction rate in economy with business cycles

$\hat{\pi}(\mathbf{u}|\mathbf{e})$ : Job destruction rate in economy without business cycles

Figure: Deviation of Job Separation Rate from Trend, Germany 1980Q1-2004Q4



Source: Jung and Kuhn (2013).



## Cost of Business Cycles

The welfare cost of business cycles  $\Delta$  is defined as the solution to

$$\begin{aligned} \sum_{\mathbf{s}_0, \mathbf{S}_0} v(\mathbf{s}_0, \mathbf{S}_0; \Delta) \pi(\mathbf{S}_0 | \mathbf{s}_0) \pi(\mathbf{s}_0) \mu(\mathbf{s}_0) \\ = \sum_{\mathbf{s}_0} \hat{v}(\mathbf{s}_0) \hat{\pi}(\mathbf{s}_0) \mu(\mathbf{s}_0) \end{aligned}$$

$\Delta$ : additional consumption

$\mu$ : social welfare weights

## Cost of Business Cycles

Suppose  $\alpha(\text{recession}|\mathbf{e}) = 0$ . Then

$$\Delta = \text{cost of recessions}$$

Suppose  $\mu(\mathbf{e} = 0)$ . Then

$$\Delta \propto \mathbf{L}_u \Delta \mathbf{U} + \Delta \mathbf{L}_u \mathbf{U}$$

## Result

### Proposition

An increase in matching efficiency reduces the welfare cost of business cycles:

$$\frac{\partial \Delta}{\partial z} < 0$$

For high levels of unemployment benefits a reduction in benefits reduces the cost of business cycles

$$\frac{\partial \Delta}{\partial b} > 0$$

# Quantitative analysis: German labor market reforms

- Why Germany?
- Comprehensive labor market reform in 2003-2005 (Hartz reforms) aimed at improving labor market flexibility
- There is substantial evidence that these reforms increased the non-cyclical component of the job finding rate

## German Labor Market Reforms 2003-2005

- Jan 2003 (Hartz I+II): Some wage subsidies and some deregulation of labor market
- Jan 2004 (Hartz III): Complete overhaul of the Federal Employment Agency  $z \uparrow$
- Jan 2005 (Hartz IV): Complete overhaul of the unemployment insurance system  $b \downarrow$

## Hartz Reforms

- Increase in matching efficiency by 7% (Hartz III)
- Large reduction in unemployment benefits for the long-term unemployed ( $\geq$  one year)

## Calibration

- Match a number of long-run macro facts
- Match estimates of elasticity of search effort with respect to unemployment benefits
- Match mean and volatility of empirical job destruction rate and job finding rate
- Choose  $\delta_h$  to match estimates of earnings losses associated with job loss

## Results

Long-run effects of labor market reform on unemployment rate and social welfare using

$$\mu(\mathbf{e}) = \mu(\mathbf{u}) = 1:$$

- Hartz III:  $\Delta U = -1.58\%$  and  $\Delta W = 3.43\%$
- Hartz IV:  $\Delta U = -1.29\%$  and  $\Delta W = 1.75\%$
- Hartz III + IV:  $\Delta U = -2.53\%$  and  $\Delta W = 4.93\%$



# Results

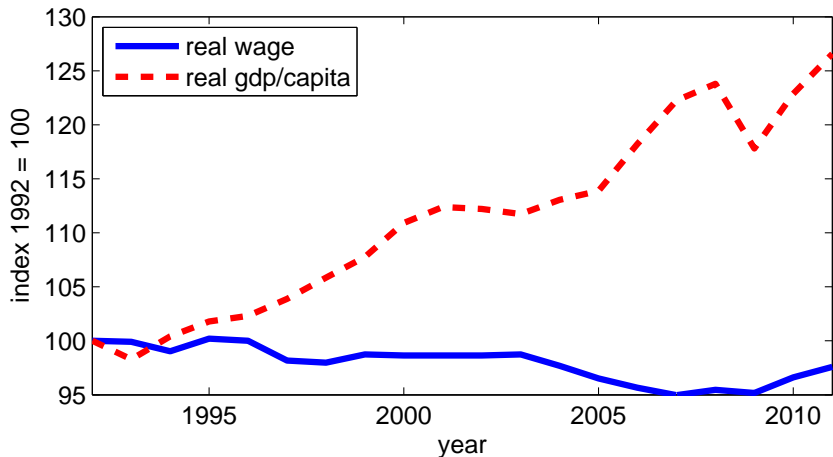
## Welfare Cost of Business Cycles (Recessions)

|              | $\mu(\mathbf{e}) = \mu(\mathbf{u}) = 1$ |        | $\mu(\mathbf{e}) = 0$ |        |
|--------------|---|--------|-----------------------|--------|
| Pre-Reform   | 5.16%                                   |        | 7.70%                 |        |
| Hartz III    | 4.42%                                   | -14.3% | 5.78%                 | -25.8% |
| Hartz IV     | 4.68%                                   | -9.5%  | 6.48%                 | -16.8% |
| Hartz III+IV | 4.06%                                   | -21.4% | 4.89%                 | -37.2% |

## Conclusion

- Economic theory suggests that labor market reforms that increase labor market flexibility reduce non-cyclical unemployment and! reduce the welfare cost of business cycles
- German experience shows that these effects can be large

Figure: Real Wage and Real GDP per Capita (1992 = 100), Germany 1992-2011



Source: Statistisches Bundesamt: annual real wage index (series: Reallohnindex) and annual real gdp per capita (series: Bruttoinlandsprodukt) normalized to 1992.

Quarterly Job Separation Rate, Germany 2005Q1 - 2011Q4

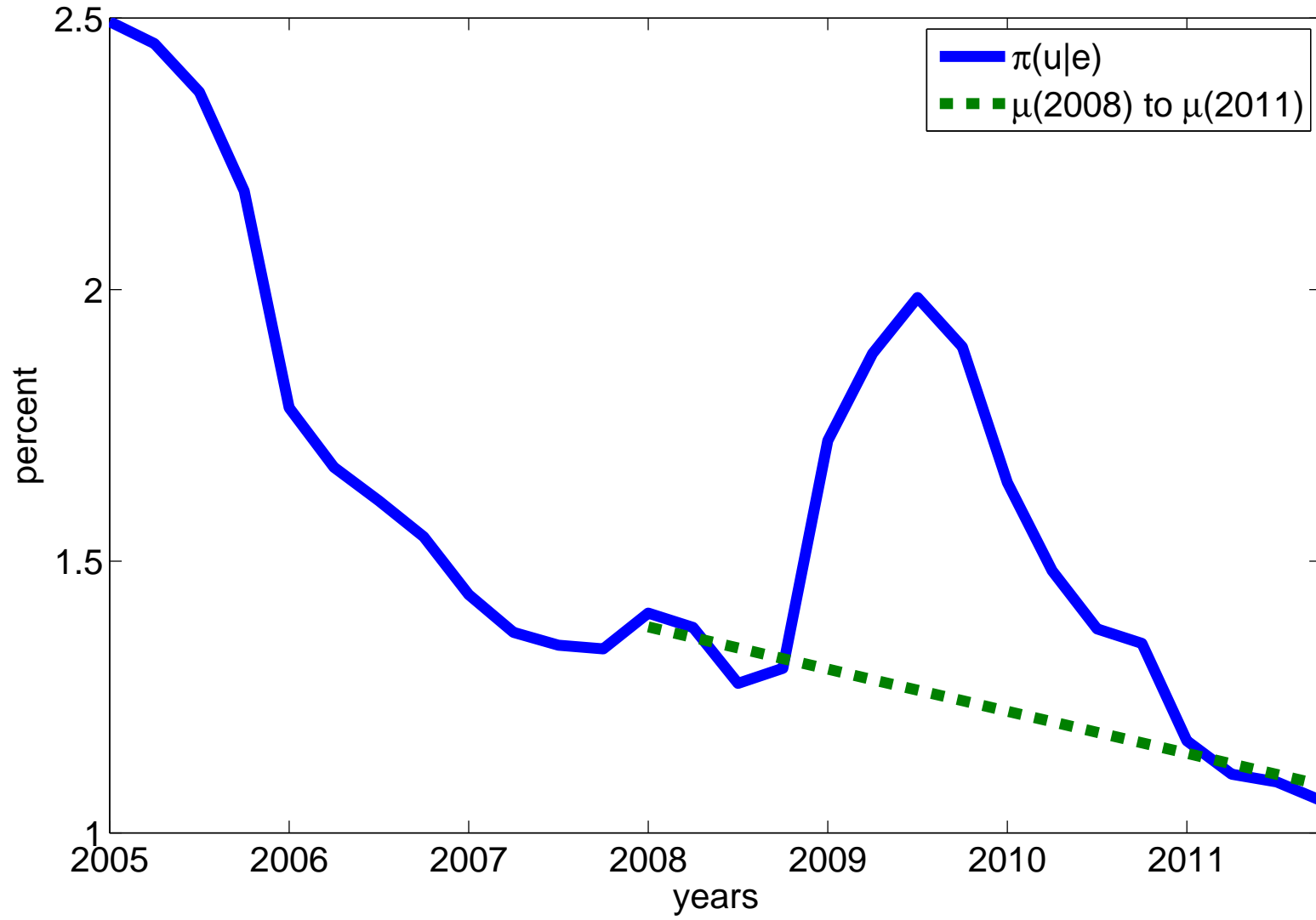
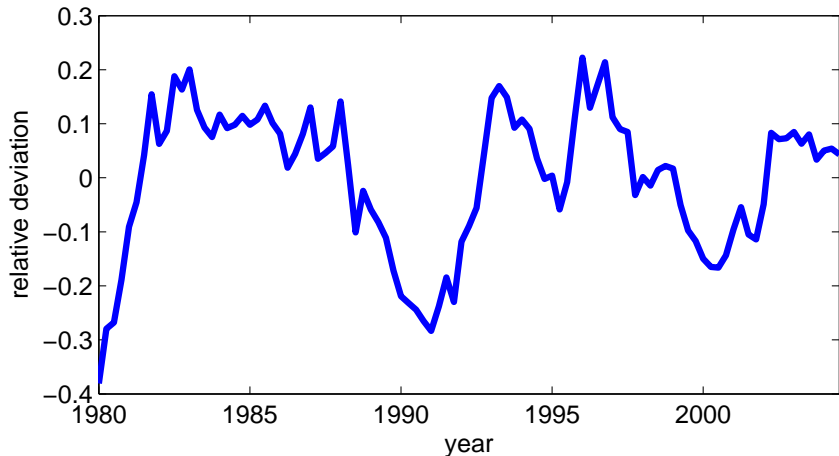
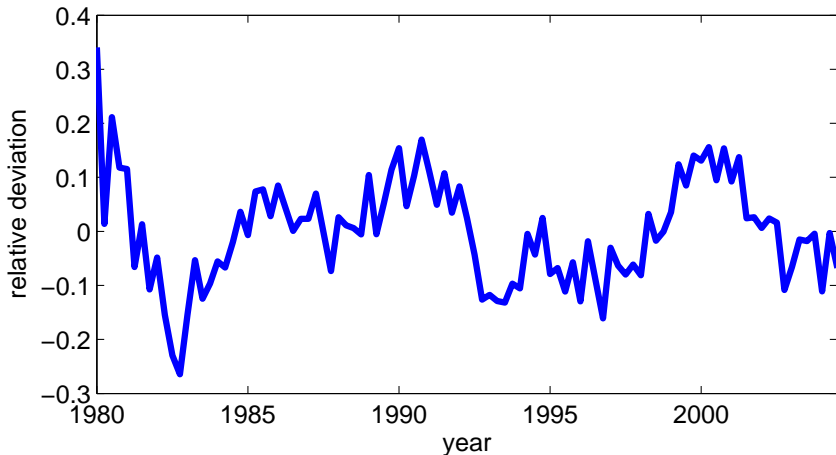


Figure: Deviation of Job Separation Rate from Trend, Germany 1980Q1-2004Q4



Source: Jung and Kuhn (2013).

Figure: Deviation of Job Finding Rate from Trend, Germany 1980Q1-2004Q4



Source: Jung and Kuhn (2013).