On the Design of an European Unemployment Insurance Mechanism

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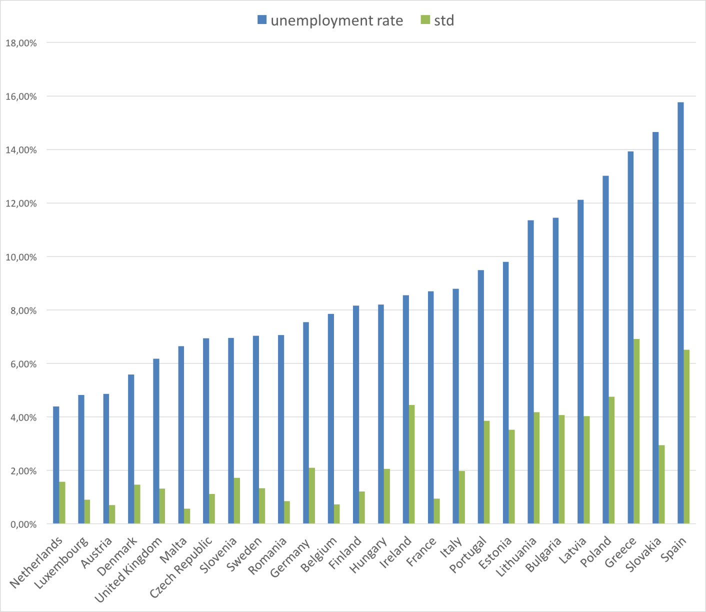
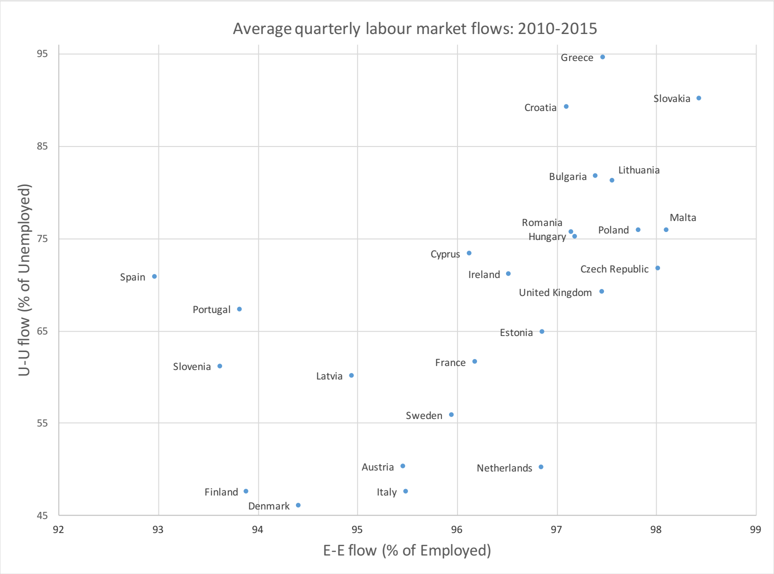
Motivation

- High unemployment rates and low deficit requirements imposed by the Fiscal Compact make national delivery of unemployment insurance very difficult in countries under economic distress.
- Business cycles are not perfectly correlated across European countries: a European Unemployment Insurance (UI) mechanism can alleviate this problem.
- Several policy proposals were already made regarding an European UI system.
- No systematic work on how to design such a system and what the implications in terms labour market outcomes, cross-country transfers and eventual risk sharing benefits might be.

Unemployment Rate in Europe (2001q1-2014q4)



Employment and Unemployment flows



Key Issues

- Unemployment and Employment different across European countries for (at least) four reasons:
  - Frequency and amplitude of business cycles.
  - Phase of the business cycle.
  - Labour market institutions.
  - National unemployment insurance systems (replacement rates, duration and taxes).

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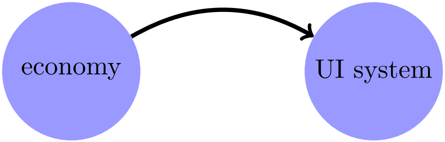

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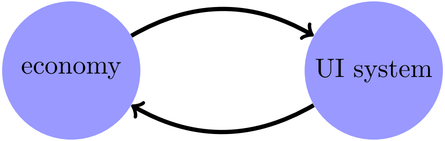

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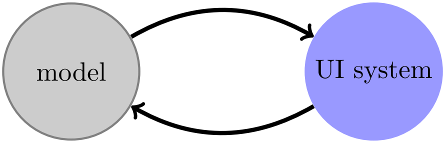

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- Structural model to generate workers' flows and distributions across the three states
  - Employment
  - Unemployment
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- Novel Experiment: What is the effect of creating a joint Unemployment Insurance Mechanism?
  - Analyze potential risk-sharing benefits
  - Study optimal balance between redistribution, insurance and allocative efficiency
  - Quantitative estimate of effects (calibration to Euro area)

Preview

- Multi-country model of labour markets

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- Calibration using two EU countries

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- Calibration using two EU countries
- UI policy experiments:
  - Steady state: cross country transfers
  - Country specific shocks: welfare gains and losses

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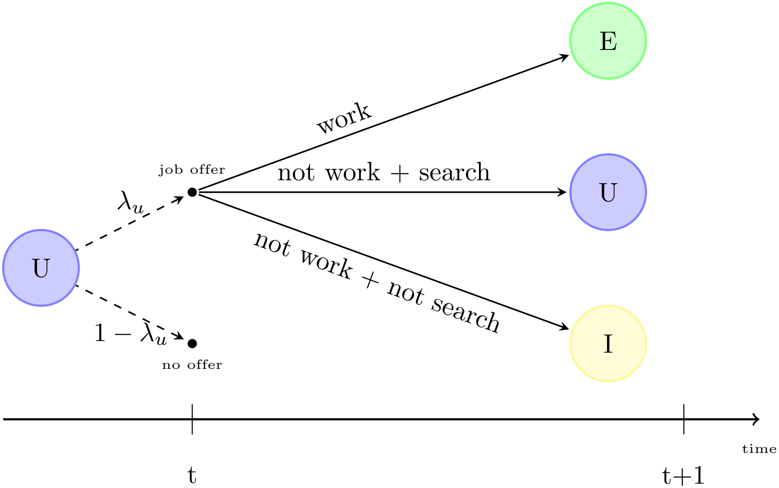
- Non-quitter unemployed: unemployment benefits for a random number of periods (μ).
- UI financed by a tax on employed agents and it is parametrized with a replacement rate b_0 and a cap $\bar{b}$.

Previously unemployed: with a job offer



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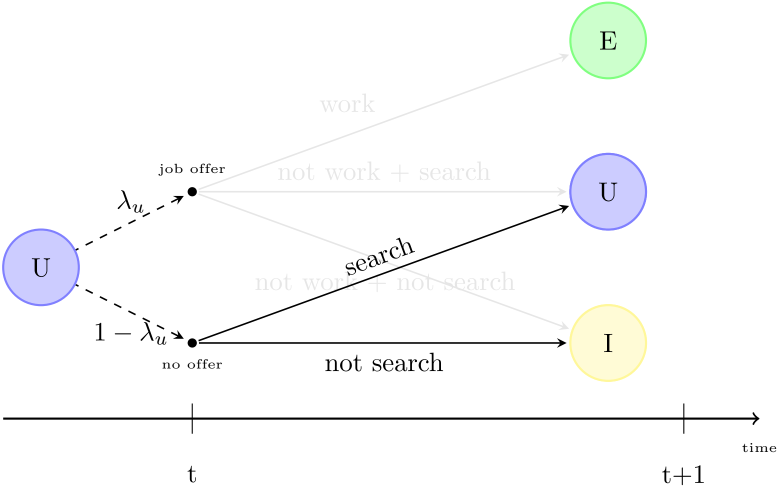
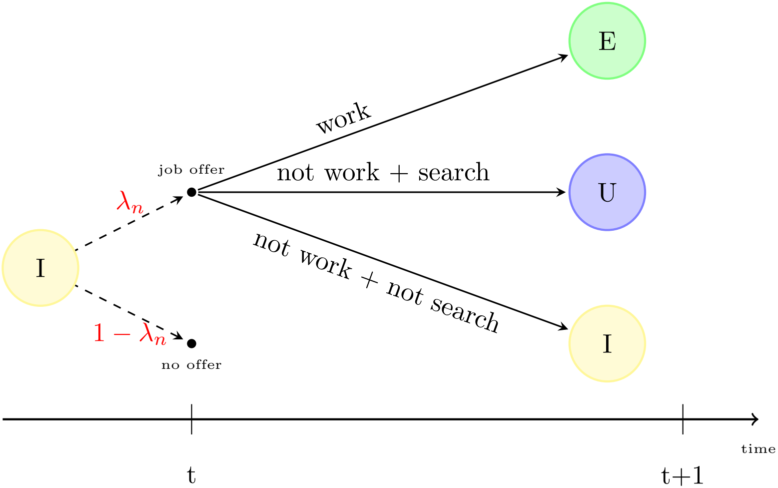


Previously inactive: with a job offer



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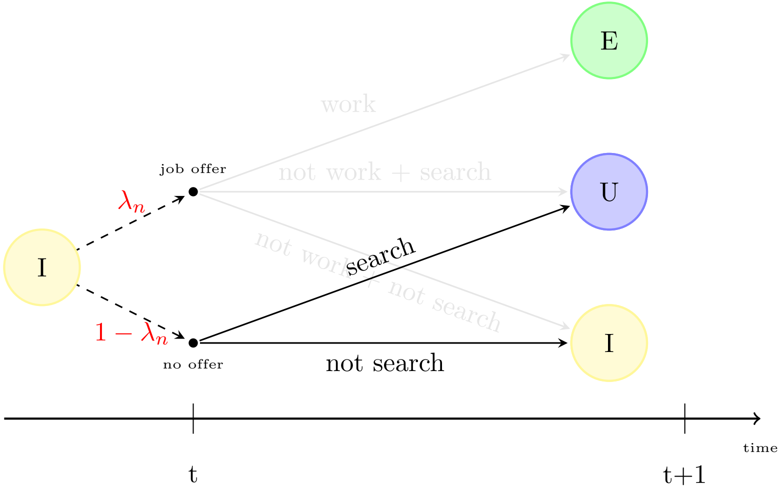
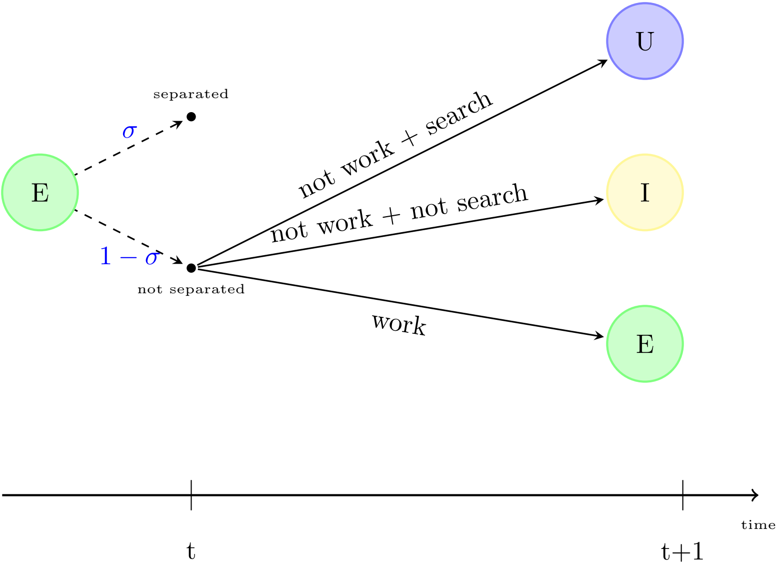
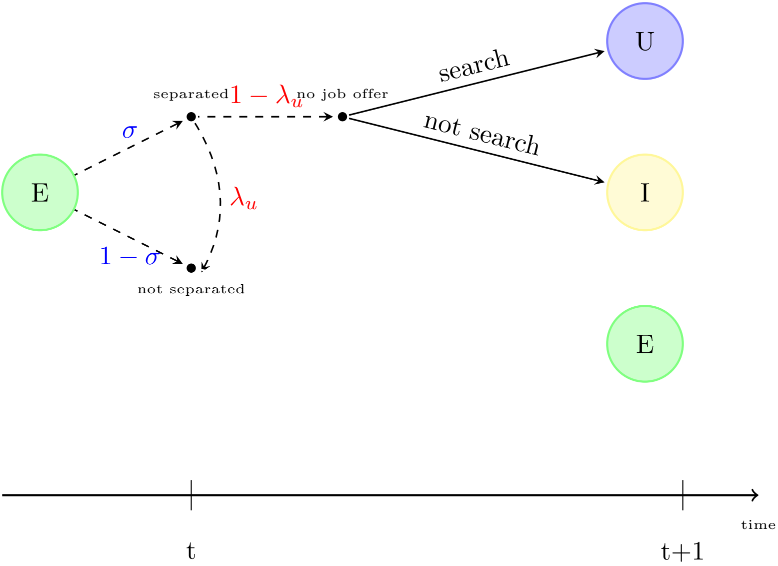


Previously employed: not separated



Previously employed: separated



Aggregation

- The economy is a stationary environment.
- We solve for the individual decision problems, given prices r, ω and policy $\tau, b(z)$;
- $\zeta(a, z, \iota^b)$: the stationary distribution of agents across states.
- Labour supply: $N = \int n(a, z, \iota^b) z d\zeta(a, z, \iota^b)$
- Savings: $B = \int a'(a, z, \iota^b) d\zeta(a, z, \iota^b)$
- Labour demand: L; capital K.
- Aggregate production: $Y = AK^\theta L^{(1-\theta)}$, A stands for TFP.

Equilibrium

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- Stationary distribution over states: $\zeta(a, z, \iota^b)$.
- Benefit policy $(b_0, \overline{b}, \mu)$ and τ satisfy the GBC.
- Labour market clears: $N = L$.
- Capital market clears: $B = K$.
- Resource constraint satisfied: $Y = C + \delta K$

Model: Calibration

Parameter	Definition	Austria	Slovakia
θ	Capital share of output	0.3	0.3
δ	Capital depreciation rate	0.02	0.02
β	Discount factor	0.984	0.984
ρ_z	Persistence of productivity	0.991	0.991
σ_z^2	Cariance of prod. shock	0.16^2	0.16^2
α	Disutility of labor	1.45	1.45
A	Total factor productivity	1	0.534
γ	Disutility of search	$\alpha \times 6.75/40$	$\alpha \times 137/40$
σ	Job separation rate	0.0195	0.0185
λ_u	Job finding rate for unemployed	0.54	0.1085
λ_n	Job finding rate for inactive	0.276	0.011
μ	Prob. of loosing UB eligibility	0.433	0.520
b_0	UB replacement rate	40%	46.5%
$\bar{b}$	Cap on UB	4110/2817	no cap
τ	UI payroll tax rate	0.91%	0.45%

Table: Model parameters.

Model: Austria

	E	U	I
E	0.954	0.014	0.032
U	0.284	0.500	0.216
I	0.062	0.026	0.912

Table: Transitions: Data

	E	U	I
E	0.946	0.014	0.040
U	0.426	0.486	0.088
I	0.062	0.029	0.909

Table: Transitions: Model

Country	Austria
e	0.645
u	0.035
i	0.320

Table: Stationary distribution: Data

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Model: Slovakia

	E	U	I
E	0.984	0.008	0.008
U	0.078	0.903	0.019
I	0.009	0.009	0.982

Table: Transitions: Data

	E	U	I
E	0.980	0.008	0.012
U	0.108	0.818	0.074
I	0.009	0.028	0.963

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Country	Slovakia
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- Transfers (% GDP, < 0 if net receiver):
  - $\mathbf{T_{AT}} = -\mathbf{0.005}\%$
  - $\mathbf{T_{SL}} = \mathbf{0.009}\%$

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Table: National budget, Slovakia

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Table: EU budget, Slovakia

Model	Slovakia
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Table: National budget, Slovakia

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Table: EU budget, Slovakia

Policy Experiment 2

- Introduce a common benefits system:
  - Average replacement rate $b_0 = (b_0^{AT} + b_0^{SK})/2$;
  - No cap: $\bar{b}$ never binds;
  - **Extended duration: $\mathbf{1/\mu = 8}$ quarters.**

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  - $\boldsymbol{\tau_{\mathbf{EU}} = 1.12\%}$
  - $\mathbf{T_{AT} = -0.046\%}$ of GDP
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  - $\mathbf{T_{AT}} = -\mathbf{0.046}\%$ of GDP
  - $\mathbf{T_{SL}} = \mathbf{0.094}\%$ of GDP
- Compare it to national policy (country level tax and benefits).

Policy Experiment 2: Austria

	E	U	I
E	0.946	0.014	0.040
U	0.426	0.486	0.088
I	0.062	0.029	0.909

Table: National policy, Austria

	E	U	I
E	0.947	0.016	0.037
U	0.195	0.768	0.037
I	0.062	0.028	0.910

Table: EU policy, Austria

Model	Austria
e	0.645
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i	0.320

Table: National policy, Austria

Model EU	Austria
e	0.631
u	0.079
i	0.290

Table: EU policy, Austria

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E	0.980	0.008	0.012
U	0.108	0.818	0.074
I	0.009	0.028	0.963

Table: National policy, Slovakia

	E	U	I
E	0.980	0.009	0.010
U	0.108	0.847	0.045
I	0.009	0.022	0.969

Table: EU policy, Slovakia

Model	Slovakia
e	0.579
u	0.079
i	0.342

Table: National policy: Slovakia

Model EU	Slovakia
e	0.598
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i	0.318

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- Just before $t = 0$ starts, the agents learn that the economy will be hit by a TFP shock:

$$A_0^i = A_{ss}^i(1+\epsilon)$$

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- They also learn that this shock evolves according to:

  $\log(A_{t+1}^i) = \rho_A \log(A_t^i) + (1-\rho_A)\log(A_{ss}^i)$ for all $t > 0, \rho_A \in (0,1)$,

  so that eventually everything goes back to the steady state.
- However, before $t = 0$ they **do not know** which ϵ is going to happen.

Negative TFP shock: Austria

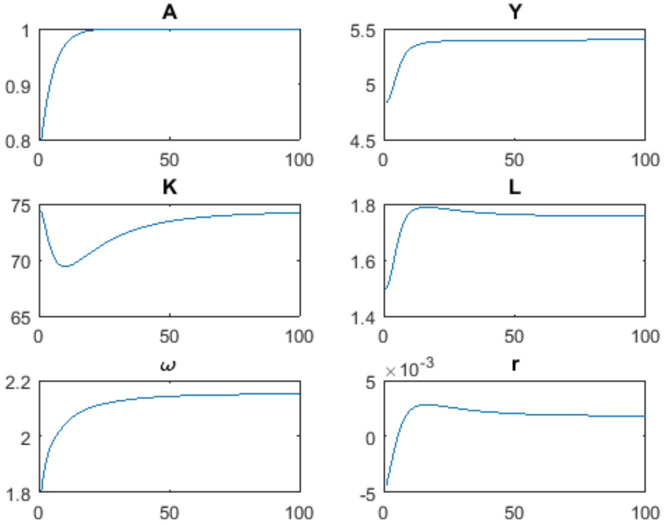

Figure: Response to a negative shock on A in Austria.

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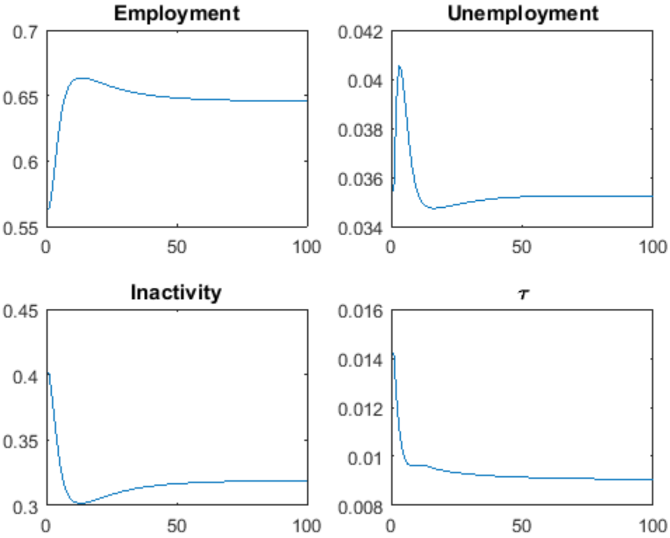

Figure: Labour market dynamics, Austria.

Policy Experiment 3

- We keep national benefit systems: $(\mathbf{b_0}, \bar{\mathbf{b}}, \mu)$ **fixed**.
- Common tax that clears EU budget every period: $\tau_{\mathbf{t}}^{\mathbf{EU}}$.

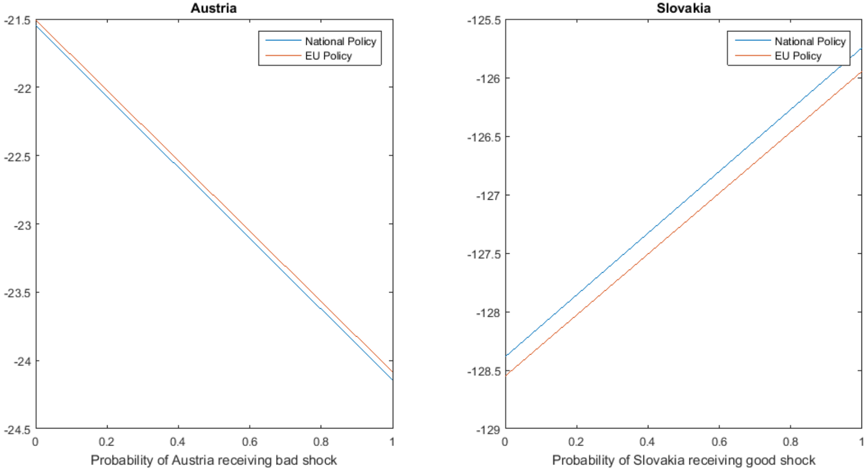

Figure: Welfare comparison.

Policy Experiment 4

- Keep benefits, τ_{AT} and τ_{SK} fixed as in the steady state national policies.

- Add an common tax/subsidy on top of each country's tax, so that a joint budget finances UI benefits every period during the transition after the shock:

$$(\tau_{\mathbf{t}}^{\mathbf{EU}} + \tau_{AT}) \quad \text{and} \quad (\tau_{\mathbf{t}}^{\mathbf{EU}} + \tau_{SK})$$

- **Are both countries willing to join the common policy, $\tau_{\mathbf{t}}^{\mathbf{EU}}$?**

Welfare comparison

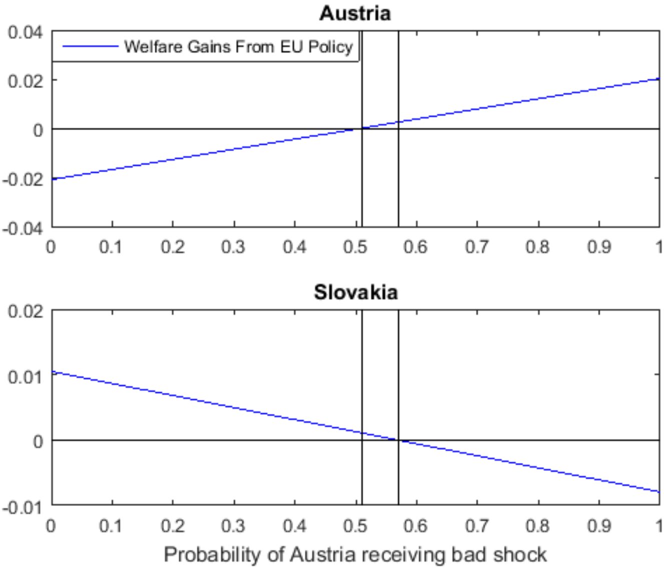

Figure: Utilitarian welfare comparison.

Conclusions

- We provide the first structural analysis of a EU UI policy reform.
- The preliminary results suggest labour market institutions shape significantly the way economies react to business cycles, UI policies less so.
- Some issues and further steps:
  - Low payroll taxes do not matter much
  - Implied wealth distribution may be counter factual
  - Model LM institutions

Model: Value Functions

Decision of a worker with an employment opportunity:

$$V(a, z, I^B) = \max_{w \in \{0,1\}} \left\{ W(a, z, I^B), J(a, z, I^B) \right\}$$

$W(a, z, I^B)$ is the value of working and $J(a, z, I^B)$ is the value of not working.

Decision of a worker without an employment opportunity:

$$J(a, z, I^B) = \max_{s \in \{0,1\}} \left\{ U(a, z, I^B), N(a, z, 0) \right\}$$

Here $U(a, z, I^B)$ is the value of searching (Unemployed) and $N(a, z, 0)$ is the value of not searching (Inactive).

Model: Employed

Bellman equation of employed:

$$W(a, z, I^B) = \max_{(c,a')\in\mathcal{B}_t} \Big\{ \log c - \alpha + \beta\mathbb{E}_{z'}\Big[(1-\sigma)V(a', z', 0) + \sigma\Big((1-\lambda_u)J(a', z', 1) + \lambda_u V(a', z', 1)\Big)\Big]\Big\}.$$

α is utility cost of working, σ is the separation rate and λ_u is the job finding rate under search.

Some observations:

- Quitters are not entitled for unemployment benefits.
- The next period after separations everyone searches and hence entitled for unemployment benefits.
- Budget constraint: $c + a' = (1 + r)a + (1 - \tau)\omega z$.

Back

Model: Unemployed

Bellman equation of unemployed (searcher):

$$U(a,z,I^B) = \max_{(c,a')\in\mathcal{B}_t} \left\{ \log c - \gamma + \beta \mathbb{E}_{z',I^{B'}} \Big[\lambda_u V(a',z',I^{B'}) \right.$$
$$\left. + (1-\lambda_u) J(a',z',I^{B'}) \Big] \right\}$$

γ is utility cost of searching.

Some observations:

- $Prob(I^{B'} = 1 | I^B = 1) = \mu$ and non-eligibility is an absorbing state.
- Budget constraint: $c + a' = (1+r)a + I^B b(z)$.
- Unemployment benefits are given by $b(z) = \min\{\bar{b}, b_0 \omega z\}$.

Back

Model: Inactive

Bellman equation of inactive (non-searcher):

$$N(a,z,0) = \max_{(c,a')\in\mathcal{B}_t} \left\{ \log c + \beta \mathbb{E}_{z'} \Big[\lambda_n V(a',z',0) \right.$$
$$\left. + (1-\lambda_n) J(a',z',0) \Big] \right\}$$

λ_n is the employment opportunity arrival rate for non-searchers.

Some observations:

- Budget constraint: $c + a' = (1+r)a$. Inactive rely fully on their assets for consumption.
- Labour productivity always follows the same Markov chain (E,U,I).

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