On the Design of an European Unemployment Insurance Mechanism

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ADEMU Galatina Workshop
Policies for Economic Stability:
Lessons and the Way Forward
August 28, 2017
Should there be EU Unemployment Insurance?
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- High unemployment + low deficit requirements: national UI is costly in recessions, resulting in pro-cyclical fiscal policies.

- Business cycles not perfectly correlated across EU: room for risk-sharing.

- Can strengthen European Labour Market Integration.
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- Business cycles not perfectly correlated across EU: room for risk-sharing.

- Can strengthen European Labour Market Integration.

- Differences in U levels and flows: permanent cross-country transfers.

- Labour market differences: no agreement on a common design.

- Can violate the subsidiarity principle.
Answering the Policy Question

• Multi-region model with heterogenous labour markets: EU countries;
Answering the Policy Question

- Multi-region model with heterogeneous labour markets: EU countries;

- Individual risk: Unemployment insurance;
Answering the Policy Question

- Multi-region model with heterogeneous labour markets: EU countries;

- Individual risk: Unemployment insurance;

- Aggregate risk, not perfectly correlated across countries: Country risk sharing;
This Project: The Model

First structural model of EU labour markets to evaluate EU-UI policy reform (see Dolls et al. (2015) and Beblacy and Maselli (2014)).
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- Long run differences between countries (LM institutions, UI systems, technology).
- Short run differences (similar economic fluctuations), in a parsimonious way.
- Calibration to EU countries, LM data from Lalé and Tarasonis (2017).
- Map of labour market institutions across Europe.
This project: answering the question with policy experiments in dynamic calibrated economies

- Exp. 1 - On UI risk-sharing: Country specific severe shocks

- Exp. 3 and 5 - On EU-UI: Steady state fluctuations
  - Exp. 3 - 'Average' UI policy resulting in permanent country transfers, that depend on country specific labour markets
  - Exp. 5 - 'Countries' Pareto improving' UI policy with zero permanent country transfers and differential tax rates
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Model: Main Elements

- A Bewley economy:
  - Continuum of agents, live forever: idiosyncratic labour productivity risk, save in a riskless asset with return $1 + r$. 
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• Agents optimize whether to work or actively search for a job: Employed, Unemployed or Inactive.

• No labour mobility across countries!
Model: Dynamic labour markets

- Employed Labour income, utility cost $\alpha$ of work:
  - may quit (not eligible for UI);
  - or loose the job with probability $\sigma$ (eligible for UI).
Model: Dynamic labour markets

- **Employed** Labour income, utility cost \( \alpha \) of work:
  - may **quit** (not eligible for UI);
  - or loose the job with probability \( \sigma \) (eligible for UI).

- **Unemployed** Costly search effort \( \gamma \):
  - receive job offers with probability \( \lambda_u \)
  - may **reject** offers.
  - if eligible, receive UI benefits. Lose eligibility with probability \( \mu \).
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  - receive job offers at a lower rate: $\lambda_n$
  - may reject offers
  - not eligible for UI benefits
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  - not eligible for UI benefits

- UI financed with proportional tax $\tau$ on labour income: replacement rate $b_0$ and average duration $1/\mu$, conditional on search. Balanced budget.
Model: Value Functions

Decision with an employment opportunity:

\[ V(a, z, \iota^b) = \max_{w \in \{0, 1\}} \left\{ wW(a, z) + (1 - w)J(a, z, \iota^b) \right\} \]

\( W \): value of working and \( J \): value of not working.
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Decision without an employment opportunity:

\[ J(a, z, \iota^b) = \max_{s \in \{0, 1\}} \left\{ sU(a, z, \iota^b) + (1 - s)N(a, z) \right\} \]

\(U\): value of searching (Unemployed) and \(N\): value of not searching (Inactive).
Model: Value Functions

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\]

\(U\): value of searching (Unemployed) and \(N\): value of not searching (Inactive).

\(a\): asset level; \(z\): productivity level; \(\iota^b\): eligibility for benefits; \(\gamma\): cost of search, i.i.d. with mean \(\bar{\gamma}\) and variance \(\sigma_{\gamma}^2\).
Model: Employed

Bellman equation of employed:

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

\( \alpha \): utility cost of working; \( \sigma \): separation rate; \( \lambda_u \): job finding rate while searching.
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\(\alpha\): utility cost of working; \(\sigma\): separation rate; \(\lambda_u\): job finding rate while searching.

- Quitters are not entitled for unemployment benefits.
- Entitlement for unemployment benefits in 1st period of unemployment: with prob. 1 if after separation & with prob. 0 if after quitting.
- Budget constraint: \(c + a' = (1 + r)a + (1 - \tau)\omega z\).
Bellman equation of unemployed (searcher):

\[
U(a, z, \iota^b) = \max_{(c, a') \in \mathcal{B}_t} \left\{ \log c - \gamma + \beta \mathbb{E} \left[ \lambda_u V(a', z', \iota^{b'}) \right] + (1 - \lambda_u) J(a', z', \iota^{b'}) | z \right\}
\]
Model: Unemployed

Bellman equation of unemployed (searcher):

\[
U(a, z, \iota^b) = \max_{(c, a') \in B_t} \left\{ \log c - \gamma + \beta \mathbb{E} \left[ \lambda_u V(a', z', \iota^{b'}) \right] + (1 - \lambda_u) J(a', z', \iota^{b'}) | z \right\}
\]

- \( \text{Prob}(\iota^{b'} = 1 | \iota^b = 1) = \mu \) and non-eligibility is an absorbing state.
- Budget constraint: \( c + a' = (1 + r)a + \iota^b b(z) \).
- Unemployment benefits are given by \( b(z) = b_0 \omega z \).
### Calibration: Common Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Definition</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\theta$</td>
<td>Capital share of output</td>
<td>0.3</td>
</tr>
<tr>
<td>$\beta$</td>
<td>Discount factor</td>
<td>0.98</td>
</tr>
<tr>
<td>$\rho_z$</td>
<td>Persistence of productivity</td>
<td>0.89</td>
</tr>
<tr>
<td>$\sigma_z$</td>
<td>Standard deviation of prod. shock</td>
<td>0.1</td>
</tr>
<tr>
<td>$\alpha$</td>
<td>Utility cost of labor</td>
<td>0.8</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>Utility cost of search</td>
<td>0.4</td>
</tr>
</tbody>
</table>

- Equilibrium interest rate $r \rightarrow$ clears capital market of 6 largest EU economies: Germany, France, Italy, Spain, Netherlands, Sweden. $r = 1.7\%$
### Calibration: Country-Specific Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Definition</th>
<th>Related Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>$A$</td>
<td>Total factor productivity</td>
<td>Average wage</td>
</tr>
<tr>
<td>$\sigma$</td>
<td>Job separation rate</td>
<td>Flow $E - U$</td>
</tr>
<tr>
<td>$\lambda_u$</td>
<td>Job arrival rate for searchers</td>
<td>Flow $U - E$</td>
</tr>
<tr>
<td>$\lambda_n$</td>
<td>Job arrival rate for inactive</td>
<td>Unemployment $U/(E + U)$</td>
</tr>
<tr>
<td>$\mu$</td>
<td>Prob. of loosing UB eligibility</td>
<td>max duration</td>
</tr>
<tr>
<td>$b_0$</td>
<td>UB replacement rate</td>
<td>Benefits/GDP</td>
</tr>
<tr>
<td>$\tau$</td>
<td>UI payroll tax rate</td>
<td>Budget clearing</td>
</tr>
</tbody>
</table>

- The first panel of parameters is related to a country’s labour market institutions.
- The second panel refers to unemployment policies.
Unemployment Rates in Europe (2004q1-2013q4)
Persistence of Empl. & Unempl. (2004q1-2013q4)
A new picture of EU labour markets: **LM Rigidity**
A new picture of EU labour markets: Job Arrival Rates
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Policy Experiments
Policy Experiment 1

• The UI system insures country aggregate shocks.
• National benefit systems fixed: $b_0$ and $\mu$. 
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• Autarky: taxes increase in recessions and decrease in expansions (i.e. *pro-cyclical fiscal policy*):
  - fluctuations in consumption of the employed,
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  - distortions in labour supply (quits, job acceptance).
- UI System: *smoothes tax rates*.
- Insurance is actuarially fair: government’s intertemporal budget constraint is satisfied.
Policy Experiment 1

- Economy is in steady state at $t = 0$. 

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- At the end of $t = 0$, agents learn that in $t = 1$ the country will be hit either by a good or a bad persistent shock.
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- Each shock has probability 1/2.

- After $t = 1$ shock, economy returns to steady state. Agents have perfect foresight.
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• Welfare measure (weighted E, U, I): compare ex-ante expected utility of going through the crisis/expansion in Autarky vs. with a constant tax.
Experiment 1: Country Specific Shock
### Policy Experiment 1: Welfare comparison

**Experiment 1: National level UB policy, fixed national tax after the shock.**

<table>
<thead>
<tr>
<th></th>
<th>Welfare gain**</th>
<th>Approval E*</th>
<th>Approval Ue*</th>
<th>Approval Une*</th>
<th>Approval I*</th>
<th>Approval Total*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Germany</td>
<td>0.005%</td>
<td>91%</td>
<td>11%</td>
<td>10%</td>
<td>31%</td>
<td>85%</td>
</tr>
<tr>
<td>Spain</td>
<td>0.007%</td>
<td>78%</td>
<td>4%</td>
<td>21%</td>
<td>1%</td>
<td>62%</td>
</tr>
<tr>
<td>France</td>
<td>0.003%</td>
<td>86%</td>
<td>0%</td>
<td>17%</td>
<td>5%</td>
<td>74%</td>
</tr>
<tr>
<td>Italy</td>
<td>0.002%</td>
<td>84%</td>
<td>14%</td>
<td>4%</td>
<td>7%</td>
<td>69%</td>
</tr>
<tr>
<td>Netherlands</td>
<td>0.006%</td>
<td>88%</td>
<td>2%</td>
<td>21%</td>
<td>1%</td>
<td>81%</td>
</tr>
<tr>
<td>Sweden</td>
<td>0.002%</td>
<td>91%</td>
<td>9%</td>
<td>0%</td>
<td>0%</td>
<td>83%</td>
</tr>
</tbody>
</table>

** consumption equivalent, % of autarky consumption

* % population group/Total
Policy Experiment 3

- Introduce common UI policy: average $b^U_0$ and duration $d^U$, financed jointly: $\tau^U$.
  
  - Transfers from countries with low to countries with high eligible unemployed (post reform).
  
  - The common UI system also affects job acceptance and search decisions.
  
  - Transfers and welfare gains need not have the opposite sign.

- We calculate these steady state transfers and the welfare gains/losses from the joint scheme.
### Policy Experiment 3: National Policies

**Experiment 3: Common UB policy, common tax (joint budget)**

<table>
<thead>
<tr>
<th></th>
<th>E</th>
<th>U</th>
<th>I</th>
<th>τ (%)</th>
<th>b0</th>
<th>d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Germany</td>
<td>84.4%</td>
<td>6.6%</td>
<td>8.9%</td>
<td>2.1%</td>
<td>0.83</td>
<td>3.9</td>
</tr>
<tr>
<td>Spain</td>
<td>72.9%</td>
<td>14.0%</td>
<td>13.1%</td>
<td>4.2%</td>
<td>0.31</td>
<td>7.8</td>
</tr>
<tr>
<td>France</td>
<td>86.3%</td>
<td>8.2%</td>
<td>5.6%</td>
<td>2.0%</td>
<td>0.36</td>
<td>7.9</td>
</tr>
<tr>
<td>Italy</td>
<td>74.3%</td>
<td>9.5%</td>
<td>16.2%</td>
<td>1.5%</td>
<td>0.43</td>
<td>2.6</td>
</tr>
<tr>
<td>Netherlands</td>
<td>87.5%</td>
<td>5.0%</td>
<td>7.5%</td>
<td>2.3%</td>
<td>0.98</td>
<td>3.5</td>
</tr>
<tr>
<td>Sweden</td>
<td>89.1%</td>
<td>3.7%</td>
<td>7.2%</td>
<td>2.3%</td>
<td>0.64</td>
<td>4.5</td>
</tr>
</tbody>
</table>
### Policy Experiment 3: Policy Reform

#### Experiment 3: Common UB policy, common tax (joint budget)

<table>
<thead>
<tr>
<th>Country</th>
<th>E (%)</th>
<th>U (%)</th>
<th>I (%)</th>
<th>$\tau$ U (%)</th>
<th>b0 U</th>
<th>d U</th>
<th>Transfer***</th>
<th>Welfare gain**</th>
</tr>
</thead>
<tbody>
<tr>
<td>Germany</td>
<td>84.3%</td>
<td>6.8%</td>
<td>8.9%</td>
<td>2.9%</td>
<td>0.59</td>
<td>5.0</td>
<td>0.80</td>
<td>-1.13</td>
</tr>
<tr>
<td>Spain</td>
<td>72.6%</td>
<td>14.1%</td>
<td>13.3%</td>
<td>2.9%</td>
<td>0.59</td>
<td>5.0</td>
<td>-3.08</td>
<td>3.39</td>
</tr>
<tr>
<td>France</td>
<td>84.5%</td>
<td>8.0%</td>
<td>7.5%</td>
<td>2.9%</td>
<td>0.59</td>
<td>5.0</td>
<td>0.03</td>
<td>0.02</td>
</tr>
<tr>
<td>Italy</td>
<td>78.8%</td>
<td>10.7%</td>
<td>10.5%</td>
<td>2.9%</td>
<td>0.59</td>
<td>5.0</td>
<td>-0.44</td>
<td>0.76</td>
</tr>
<tr>
<td>Netherlands</td>
<td>84.9%</td>
<td>5.0%</td>
<td>10.0%</td>
<td>2.9%</td>
<td>0.59</td>
<td>5.0</td>
<td>0.83</td>
<td>-1.30</td>
</tr>
<tr>
<td>Sweden</td>
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<td>3.6%</td>
<td>7.7%</td>
<td>2.9%</td>
<td>0.59</td>
<td>5.0</td>
<td>0.54</td>
<td>-0.69</td>
</tr>
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</table>

*** % gdp

** consumption variation, % of autarky consumption
## Experiment 3: Common UB policy, common tax (joint budget)

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<tr>
<th></th>
<th>Approval E*</th>
<th>Approval Ue*</th>
<th>App. Une*</th>
<th>Approval I*</th>
<th>Total*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Germany</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Spain</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>France</td>
<td>18%</td>
<td>100%</td>
<td>0%</td>
<td>65%</td>
<td>24%</td>
</tr>
<tr>
<td>Italy</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Netherlands</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Sweden</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
</tbody>
</table>

* % population group/Total
Policy Experiment 5: Optimal EU-UI

- Calculate the optimal \((b_0, \mu)\) policy for union of 6 countries.

- For many countries an optimal EU system may be preferable to current national policies.

- Transfers are prevented by varying contribution payments (taxes) that depend on LM institutions. These transfers:
  - can now be smooth: a risk-sharing effect not accounted for here;
  - are possibly the best statistic of the cost of having bad LM institutions,
  - creating an explicit incentive to improve them!
Preliminary exercise 5: Welfare improving EU-UI

**Experiment 5: Common UB policy reform, without transfers.**

<table>
<thead>
<tr>
<th>Country</th>
<th>$\tau$ (%)</th>
<th>$\tau'$ (%)</th>
<th>$b_0$</th>
<th>$b_0$</th>
<th>$d$</th>
<th>$d$</th>
<th>Welfare gain* (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Italy</td>
<td>1.5%</td>
<td>2.3%</td>
<td>0.43</td>
<td>0.2</td>
<td>2.6</td>
<td>∞</td>
<td>1.49%</td>
</tr>
<tr>
<td>Germany</td>
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<td>0.01%</td>
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Baseline policy
Better EU policy

* consumption variation, % of autarky consumption
## Preliminary exercise 5: Approval rates

### Experiment 5: Common UB policy reform, without transfers.

<table>
<thead>
<tr>
<th></th>
<th>Approval E*</th>
<th>Approval Ue*</th>
<th>Approval Une*</th>
<th>Approval I*</th>
<th>Approval Total*</th>
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</tbody>
</table>

* % population group/Total
## Preliminary exercise 5: Aggregate variables

### Experiment 5: Aggregate variables

<table>
<thead>
<tr>
<th></th>
<th>E *</th>
<th>I *</th>
<th>Y *</th>
<th>K *</th>
<th>S *</th>
<th>L Efficiency*</th>
<th>Welfare **</th>
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<td>-9%</td>
<td>40%</td>
<td>1.21%</td>
<td>0.01%</td>
</tr>
</tbody>
</table>

* % change, relative to baseline policy

** consumption variation, % of autarky consumption
Conclusions

- We provide a framework and the first structural analysis of EU-UI policy reforms.

- Results:
  - A new map of EU labour markets: LM institutions are key in explaining cross-country differences.
  - Different LM institutions lead to different unemployment outcomes.
  - Gains from insuring shocks at the country level are small.
  - Gains from reforming national systems in a similar way can be large (inactivity drastically reduced).
  - There is room for agreement on an EU-UI system that smooths taxes and better integrates the EU labour market!
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Thanks!