How does labour market structure affect the response of economies to shocks?

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Roadmap

• Introduction and motivation
• WDN evidence
• The model
• Labour market characteristics
• Results
• Conclusions
Introduction and motivation

Euro-Area Unemployment rates % (2000-2014)
Introduction and motivation

• Euro-area countries experienced divergent unemployment paths in response to the financial crisis

• Three types of countries:
  – Those relatively unaffected by the financial crisis
    • Austria, Belgium, Finland, Luxembourg and Malta
  – Those whose unemployment rate rose and fell
    • Estonia, Ireland, Latvia and Lithuania
  – Those badly affected
    • Cyprus, Greece, Italy, Portugal, Slovakia, Slovenia & Spain
Introduction and motivation

Euro-Area Unemployment rates % (2000-2014)
Introduction and motivation

Euro-Area Unemployment rates % (2000-2014)

[Graph showing unemployment rates for Latvia, Lithuania, Estonia, and Ireland from 2000 to 2014]
Introduction and motivation

Euro-Area Unemployment rates % (2000-2014)
Introduction and motivation

• To what extent is this due to differences in labour market structure?

• And which differences in particular?
  – Wage flexibility
    • How often wages are set
    • Degree of unionisation
    • Flexibility in the pay of new hires
  – Flexibility in hiring and firing workers
  – Unemployment benefits
WDN evidence

- Wage Dynamics Network set up in late 2006
- Wage-setting surveys developed and carried out in late 2007/early 2008, 2009 and 2014
- The evidence we use is drawn from the first survey
## WDN evidence

<table>
<thead>
<tr>
<th>Country</th>
<th>Employment protection</th>
<th>Wage indexation</th>
<th>Median frequency of wage changes</th>
<th>Implied wage duration (months)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austria</td>
<td>2.15</td>
<td>9.8</td>
<td>Once a year</td>
<td>12.5</td>
</tr>
<tr>
<td>Belgium</td>
<td>2.50</td>
<td>98.2</td>
<td>Once a year</td>
<td>12.6</td>
</tr>
<tr>
<td>Estonia</td>
<td>2.33</td>
<td>4.4</td>
<td>Once a year</td>
<td>12.7</td>
</tr>
<tr>
<td>France</td>
<td>2.89</td>
<td>9.6</td>
<td>Once a year</td>
<td>12.0</td>
</tr>
<tr>
<td>Greece</td>
<td>2.90</td>
<td>20.0</td>
<td>Once a year</td>
<td>11.9</td>
</tr>
<tr>
<td>Ireland</td>
<td>1.32</td>
<td>9.5</td>
<td>Once a year</td>
<td>12.8</td>
</tr>
<tr>
<td>Italy</td>
<td>2.44</td>
<td>1.7</td>
<td>Less than once a year</td>
<td>20.3</td>
</tr>
<tr>
<td>Lithuania</td>
<td>2.81</td>
<td>10.8</td>
<td>Once a year</td>
<td>11.4</td>
</tr>
<tr>
<td>Netherlands</td>
<td>2.27</td>
<td>-</td>
<td>Once a year</td>
<td>13.9</td>
</tr>
<tr>
<td>Portugal</td>
<td>3.49</td>
<td>9.0</td>
<td>Once a year</td>
<td>12.9</td>
</tr>
<tr>
<td>Slovenia</td>
<td>2.63</td>
<td>23.5</td>
<td>Once a year</td>
<td>11.8</td>
</tr>
<tr>
<td>Spain</td>
<td>3.01</td>
<td>54.8</td>
<td>Once a year</td>
<td>11.9</td>
</tr>
</tbody>
</table>
WDN evidence

- Wage Dynamics Network survey highlighted large differences between countries
- But what do these differences mean for the way economies respond to shocks?
- One way to get at this is to look at some scatter plots
Effect of employment protection legislation

- Rise in the unemployment rate (percentage points)
- Strength of employment protection legislation
WDN evidence

**Effect of wage indexation**

- Greece
- Spain
- Estonia
- Lithuania
- Ireland
- Portugal
- Italy
- Austria
- Slovenia
- Belgium

**Rise in the unemployment rate (percentage points)**

- Greece
- Spain
- Estonia
- Ireland
- Portugal
- Italy
- Austria
- Slovenia

**Effect of wage indexation**

- Greece
- Spain
- Estonia
- Lithuania
- Ireland
- Portugal
- Italy
- Austria
- Slovenia
WDN evidence

• Italy an outlier on wage flexibility
  – Could suggests that lower wage flexibility is associated with a larger and more persistent response of unemployment to shocks

• Higher persistence in unemployment rises associated with:
  – Stricter employment protection legislation
  – Higher degree of wage indexation
The model

• In what follows, we use a model to examine the links between labour market features (including those identified by the WDN survey) and the response of unemployment to shocks

• By way of illustration, we concentrate on three countries:
  – Estonia, Finland and Spain
The model

• Estonia
  – Large rise in unemployment followed by a swift fall back to pre-crisis rate
  – Flexible labour market

• Finland
  – Little movement in unemployment
  – Fairly flexible labour market but with large downward nominal wage rigidity

• Spain
  – Large and persistent rise in unemployment
  – Not very flexible labour market with large downward nominal wage rigidity
The model

• Small open economy model developed by Jakab and Konya
• Search and matching in the labour market
• Wage stickiness for both new and existing workers
  – But we allow the degrees of wage stickiness to potentially differ
The model

• Households choose consumption, investment and (foreign) bond holdings to maximise utility
• Habits in consumption
• Costs of adjusting investment
• Shocks to the domestic risk premium (spread)

\[
\frac{(c_t - h\bar{c}_{t-1})^{-\varphi}}{P_t} = \beta e^{\epsilon_t^c} R_t E_t \frac{(c_{t+1} - h\bar{c}_t)^{-\varphi}}{P_{t+1}}
\]
The model

• The labour market is subject to search and matching frictions

• These are summarised in the matching function

\[ m_t = \sigma_m \nu_t^\sigma u_t^{1-\sigma}, \]

• Labour markets that are more ‘flexible’ will be characterised by \( \sigma_m \) being higher
The model

- Wholesale firms produce output using capital, labour and imports
- Cobb-Douglas production function
- One worker per firm
- Standard demand functions for capital and imports
- Labour demand equation determines flow value of job for the firm
The model

• For existing jobs, wages can be renegotiated with probability 0.75
  – Implies a mean duration of wages of one year, in line with the WDN evidence

• If not renegotiated they are indexed to inflation
  – Degree of indexation in line with WDN evidence
The model

• For newly-formed jobs, wages are negotiated with probability $1 - \varphi_w$
  – If not negotiated, wage simply set to average of previous period’s wages
  – WDN survey evidence on the importance of outside labour market conditions in determining the wages of new hires used to set this probability

• Wages are determined via Nash bargaining
  – Worker bargaining power related to WDN evidence on union coverage, density and principal bargaining level
The model

• Retail firms combine wholesale goods to produce a retail good
• Operate in a monopolistically competitive market
• Standard NKPC

\[ \hat{\pi}_t - \xi_p \hat{\pi}_{t-1} = \beta E_t (\hat{\pi}_{t+1} - \xi_p \hat{\pi}_t) + \frac{(1 - \beta \gamma_p)(1 - \gamma_p)}{\gamma_p} \hat{p}_t^w \]
The model

- Government spends an exogenous, time-varying, amount and recoups it through lump sum taxes and by borrowing from domestic and foreign consumers.
- As these countries are all within the euro area, the interest rate is taken as set by the ECB and, so, exogenous.
- Export demand depends on relative prices and exogenous world demand.
<table>
<thead>
<tr>
<th>Labour market characteristics</th>
<th>Estonia</th>
<th>Finland</th>
<th>Spain</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Net replacement rate</strong></td>
<td>0.52</td>
<td>0.54</td>
<td>0.62</td>
</tr>
<tr>
<td><strong>Job finding rate</strong></td>
<td>0.31</td>
<td>0.40</td>
<td>0.12</td>
</tr>
<tr>
<td><strong>Job destruction rate</strong></td>
<td>0.033</td>
<td>0.037</td>
<td>0.015</td>
</tr>
<tr>
<td><strong>Unionization</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Union density</td>
<td>Very low</td>
<td>Moderate</td>
<td>Very low</td>
</tr>
<tr>
<td>Union coverage, %</td>
<td>22</td>
<td>90</td>
<td>80</td>
</tr>
<tr>
<td>Principal bargaining level</td>
<td>Company</td>
<td>National/sectoral</td>
<td>Regional/sectoral</td>
</tr>
<tr>
<td>Average length of collective bargaining agreements, years</td>
<td>1</td>
<td>2 ½</td>
<td>2 ½</td>
</tr>
<tr>
<td><strong>Wage changes</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frequency of wage changes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- higher than yearly, % of firms</td>
<td>19.9</td>
<td>Na</td>
<td>11.9</td>
</tr>
<tr>
<td>- yearly, % of firms</td>
<td>64.4</td>
<td>Na</td>
<td>84.1</td>
</tr>
<tr>
<td>Implied duration of wages, months</td>
<td>12.7</td>
<td>Na</td>
<td>11.9</td>
</tr>
<tr>
<td>Institutionalized wage indexation</td>
<td>None</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>Automatic (rule-based) indexation, % of firms</td>
<td>4</td>
<td>Na</td>
<td>55</td>
</tr>
<tr>
<td>No rule, but inflation considered, % of firms</td>
<td>46</td>
<td>Na</td>
<td>16</td>
</tr>
</tbody>
</table>
## Labour market characteristics

<table>
<thead>
<tr>
<th>Wage rigidity</th>
<th>Estonia</th>
<th>Finland</th>
<th>Spain</th>
</tr>
</thead>
<tbody>
<tr>
<td>Downward wage rigidity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- nominal</td>
<td>Na</td>
<td>0.31</td>
<td>0.16</td>
</tr>
<tr>
<td>- real</td>
<td>Na</td>
<td>0.64</td>
<td>0.24</td>
</tr>
<tr>
<td>Importance of external labour market conditions in hiring pay determination, % of firms</td>
<td>32.0</td>
<td>Na</td>
<td>4.4</td>
</tr>
</tbody>
</table>

| Employment protection legislation                                             | 2.39    | 2.29    | 3.11  |

| Size, GDP, euro billion (2007)                                                 | 15.8    | 179.7   | 1053.5|
## Labour market characteristics

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\gamma_w$</td>
<td>Calvo parameter: wages of existing employees</td>
<td>0.75</td>
</tr>
<tr>
<td>$\gamma_w$</td>
<td>Calvo parameter: wages of new employees</td>
<td>0.5</td>
</tr>
<tr>
<td>$\xi_w$</td>
<td>Degree of wage indexation</td>
<td>0.5</td>
</tr>
<tr>
<td>$\xi_w$</td>
<td>Degree of wage indexation</td>
<td>0.7</td>
</tr>
<tr>
<td>$\sigma$</td>
<td>Matching elasticity</td>
<td>0.5</td>
</tr>
<tr>
<td>$\sigma$</td>
<td>Matching elasticity</td>
<td>0.5</td>
</tr>
<tr>
<td>$b_u$</td>
<td>Unemployment benefit replacement ratio</td>
<td>0.52</td>
</tr>
<tr>
<td>$b_u$</td>
<td>Unemployment benefit replacement ratio</td>
<td>0.54</td>
</tr>
<tr>
<td>$\sigma_m$</td>
<td>Matching efficiency</td>
<td>0.4658</td>
</tr>
<tr>
<td>$\sigma_m$</td>
<td>Matching efficiency</td>
<td>0.5292</td>
</tr>
<tr>
<td>$\rho$</td>
<td>Job destruction rate</td>
<td>0.033</td>
</tr>
<tr>
<td>$\rho$</td>
<td>Job destruction rate</td>
<td>0.037</td>
</tr>
<tr>
<td>$\eta$</td>
<td>Worker bargaining power</td>
<td>0.2</td>
</tr>
<tr>
<td>$\eta$</td>
<td>Worker bargaining power</td>
<td>0.5</td>
</tr>
</tbody>
</table>
Results

Chart 5: Effect of a domestic risk premium shock on output

Chart 6: Effect of a domestic risk premium shock on real wage growth
Results

Chart 7: Effect of a domestic risk premium shock on the unemployment rate

Chart 10: Effect of a world demand shock on the unemployment rate
Results

• Rise in unemployment greatest in country whose labour market has ‘Finnish features’
• But in reality, little rise in unemployment in Finland; why?
• Because the shock in Finland was much smaller
Results

Chart 12: Effect of higher matching efficiency on the unemployment response

Chart 13: Effect of lower unemployment benefits on the unemployment response
Results

Chart 14: Effect of lower bargaining power on the unemployment response

Chart 15: Effect of greater wage flexibility for new employees on the unemployment response
Conclusions

• Parameterised a small open economy model to match some relevant features of Estonian, Finnish and Spanish labour markets
• Looked at the responses of labour market variables to shocks in these countries
• Would have expected unemployment to be worst hit in Finland
Conclusions

• Results driven by high turnover in Estonia and Finland and low worker bargaining power in Estonia
• In reality Spain worst hit
• Likely because the financial shock was effectively much worse in Spain than in the other countries
  – As evidenced by spreads