The vulnerability of regions in Euroland in relation to monetary union

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The vulnerability of regions in Euroland

• I expected Euroland regions to have different levels of vulnerability to economic shocks
• Because they evidently did not conform to the ideal of an Optimal Currency Area (OCA)
• From a regional perspective, Euroland is heterogeneous, not homogeneous
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• Magnifico(1973) warned us!
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• there are still ways in which the shock effects can be moderated

• But evidently labour migration and wage flexibility across Euroland was not sufficient to moderate shock impacts
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• Uncoordinated National automatic stabilizers produced wide regional disparities across Euroland
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• Euroland does not have automatic stabilizers capable of evening out the differential impact of a shock
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• Evidence for the heterogeneity of Euroland regions
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Figure 3: Regional Productivity Levels in Northern and Southern Eurozone States, 1980-2011
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Figure 5: The Variance in Regional Employment Growth in Northern and Southern Eurozone States, 1980-2011
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• The evidence is that many Euroland regions did not conform to the ideal of an OCA
• But the authorities pursued the Euroland project anyway, possibly with political reasons uppermost
• And the hope was, presumably, that Euroland would become an OCA as an endogenous outcome of its creation
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• The big test of whether, despite all, Euroland was on a path towards an OCA, came as a result of the 2007/8 crisis

• In an OCA, the shock should impact all regions more or less equally

• But big regional disparities would support the view that the Eurozone was far from becoming an OCA
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• In order to show the impact by region of the 2007/8 shock and its aftermath, we need a model
• The counterfactual provided by the model shows what would have happened in each region had the shock not occurred
• We then compare the counterfactual to the actual data, in our case, keeping to the Mundell tradition, focussing on employment
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• Clearly the model used for the counterfactual is crucial to our interpretation
• My approach is theory neutral
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- The model is written with the level of employment as the dependent variable, and elaborated by introducing
  - temporal spillovers
  - spatial spillovers
the model

\[ \ln E_t = \gamma \ln E_{t-1} + \rho_1 W_N \ln E_t + \beta_1 \ln Q_t + \beta_2 \ln K_t + \varepsilon_t \]

Trade-based connectivity matrix

Temporal lag

Endogenous spatial lag giving SAR process
Calculation of the endogenous spatial lag $W_N \ln E_t$

**Hypothetical matrix of export shares 5 region system**

<table>
<thead>
<tr>
<th>region</th>
<th>export shares</th>
<th>employment</th>
<th>spatial lag of employment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>[0 0.95 0.05 0 0]</td>
<td>10</td>
<td>2.95</td>
</tr>
<tr>
<td>2</td>
<td>[0.75 0 0.20 0 0.05]</td>
<td>3</td>
<td>8.20</td>
</tr>
<tr>
<td>3</td>
<td>$W_N = \begin{bmatrix} 0.50 &amp; 0.25 &amp; 0 &amp; 0.25 &amp; 0 \ 0 &amp; 0.75 &amp; 0 &amp; 0.25 &amp; 0 \ 0.10 &amp; 0.30 &amp; 0.10 &amp; 0.50 &amp; 0 \end{bmatrix}$</td>
<td>6</td>
<td>4.10</td>
</tr>
</tbody>
</table>

in detail

$W_N \ln E_{1t} = 0.00*10 + 0.95*3 + 0.05*2 + 0.00*4 + 0.00*6 = 2.95$

$W_N \ln E_{2t} = 0.75*10 + 0.00*3 + 0.20*2 + 0.00*4 + 0.05*6 = 8.20$

etc

75% of region 2’s exports go to region 1, which has the highest employment level (10)

So this connection means there is a relatively big contribution to region 2’s employment level

Equal to $\rho_1 W_N \ln E_{2t} = \rho_1 8.20$
Here unlike previous estimation, I assume that the error dependence follows a SMA, not a SAR, process.
A typical row-normalised contiguity matrix

Hypothetical row-normalised contiguity matrix for 5 regions

\[ M_N = \begin{bmatrix}
0 & 0.333 & 0.333 & 0.333 & 0 \\
0.25 & 0 & 0.25 & 0.25 & 0.25 \\
0.5 & 0.5 & 0 & 0 & 0 \\
0.333 & 0.333 & 0 & 0 & 0.333 \\
0 & 0.5 & 0 & 0.5 & 0 \\
\end{bmatrix} \]
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• Estimation is in the spirit of Arellano and Bond, mixing spatial and non-spatial instruments together with a GMM estimator for spatially dependent errors

• Additionally, unlike previous estimation, I assume that the drivers of employment, namely output and capital, are endogenous not exogenous
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<table>
<thead>
<tr>
<th>Table 1: Parameter Estimates</th>
<th>Exogenous $x_{1t}, x_{2t}$</th>
<th>Endogenous $x_{1t}, x_{2t}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>variable</td>
<td>parameter</td>
<td>Param. Est.</td>
</tr>
<tr>
<td>$y_{t-1} = \ln E_{t-1}$</td>
<td>$\gamma$</td>
<td>0.6261</td>
</tr>
<tr>
<td>$W_Ny_t = W_N \ln E_t$</td>
<td>$\rho_1$</td>
<td>0.2068</td>
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<tr>
<td>$x_{1t} = \ln Q_t$</td>
<td>$\beta_1$</td>
<td>0.1390</td>
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<tr>
<td>$x_{2t} = \ln K_t$</td>
<td>$\beta_1$</td>
<td>0.01542</td>
</tr>
<tr>
<td>&amp; $\rho_2$</td>
<td>-0.3431</td>
<td>-0.2864</td>
</tr>
<tr>
<td>&amp; $\sigma^2_\mu$</td>
<td>0.5283</td>
<td>0.5870</td>
</tr>
<tr>
<td>&amp; $\sigma^2_\nu$</td>
<td>0.0008</td>
<td>0.0007</td>
</tr>
</tbody>
</table>
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• The counterfactual employment series depends on the assumed paths for each region’s output and capital. What could happen to these variables?
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How were the counterfactual series for output and capital in each region created?

\[ \ln \tilde{Q}_t = \tau_0 + \tau_1 \ln \tilde{Q}_{t-1} + \tau_2 \ln \tilde{Q}_{t-2} + \tau_3 \ln \tilde{K}_{t-1} + \tau_4 \ln \tilde{K}_{t-2} + D_{1t} + D_{2t} + \zeta_t \]

Region \( k \)'s output at time \( t \)

\[ \ln \tilde{K}_t = \kappa_0 + \kappa_1 \ln \tilde{Q}_{t-1} + \kappa_2 \ln \tilde{Q}_{t-2} + \kappa_3 \ln \tilde{K}_{t-1} + \kappa_4 \ln \tilde{K}_{t-2} + D_{1t} + D_{2t} + \zeta_t \]

Region \( k \)'s capital stock at time \( t \)

dummy variable(s) to allow for the slowdown in GVA growth across the EU in the years 2002 and 2003 and also in 1993
Prediction equation

\[
\ln \hat{E}_t = \hat{B}_N^{-1} \left[ \gamma \ln \hat{E}_{t-1} + \beta_1 \ln \hat{Q}_t + \beta_2 \ln \hat{K}_t + \hat{H}_N \bar{\mu} \right]
\]

\[
\hat{B}_N^{-1} = (I_N - \hat{\rho}_1 W_N)^{-1}
\]

\[
\hat{H}_N = (I_N - \hat{\rho}_2 M_N)
\]

This is solved recursively. We start with 2008 and predict employment up to 2011.
One step ahead prediction
Difference: Counterfactual employment minus actual employment in 2011
Implications of growth rate differences

After shock:
Permanently lower level growth rates same

After shock:
Levels diverge actual growth rate lower than counterfactual
Employment growth 2008-2011
Counterfactual employment growth 2008-2011
Employment growth difference 2008-2011
Conclusions 1

• The early academic consensus that the Eurozone did not constitute an OCA has been highlighted by the differentiated response to the shock

• Evidence comes from reactions following the most severe economic recession since the 1930s

• The reaction to the crisis was different in different parts of the Eurozone

• when it came to the acid test of the 2008 shock, some regions lacked the adjustment mechanisms needed to avoid a severe negative impact, as is evident in the employment data
Conclusions 2

• there does appear to be two Eurolands
• the dramatic recessionary shock, caused by the financial crisis of 2008 emphasised this division
• The evidence comes from a counterfactual methodology
Conclusions 3

• What have we learned?
Conclusions 4

• What have we learned?
Conclusions 5

• Thank you
• And Happy Christmas!