Convergence through crisis?
The impact of the crisis on the returns to workforce characteristics across the Greek regions

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Introduction – motivation

- **Ambiguity** about the ‘geographical footprint’ (spatial impact) of the crisis – partly due to Greece’s “multiple geographies”

- **Pre-crisis** evidence of weak only convergence; on the face of it, the crisis has instigated faster convergence
  - Empirical claim: Crisis affecting more the ‘core’ and ‘extrovert’ regions
  - Theoretical claim: ‘Natural’ tendency of pro-cyclicality of disparities

- **Research / policy question:** are the Greek regions becoming more similar with the crisis?

- Separation between outcomes and fundamentals; here:
  - Outcomes: average regional wages
  - Fundamentals: workforce composition (skills) and its valuation (returns)

- **Method: Mincerian wage equations**
  - Assuming exogeneity of characteristics; or, more accurately, **no systematic shifts** in endogeneity (of skills) and selection (into employment)
  - **No decomposition analysis**, given ‘multiplicity’ and heterogeneity
Average nominal wages by region and year

- Nominal wages returning to pre-2006 levels
- (Naturally, in real terms decline is more marked)
- But much noise / heterogeneity (overshooting etc)
- Disparities declining at first; but strong rebound since 2010...

**Coefficient of variation**

- Disparities declining at first; but strong rebound since 2010...
- No/weak convergence prior to the crisis
- Seemingly a speeding-up of convergence post-2009
- But barring outliers, little/no convergence in the country’s core: **heterogeneous evolutions**

**EMU period (2000-2008)**
Regression line: \( dW = 0.12 - 0.009 \times W \)  
\( (p_W = 0.68, R^2 = 0.01) \)

**Crisis period (2008-2012)**
Regression line: \( dW = 0.57 - 0.084 \times W \)  
\( (p_W = 0.07, R^2 = 0.44) \)
Methodology – T&I analysis (Duranton & Monastiriotis, 2002)

- Extended **Mincerian wage equations per year–region** (15 regions, 13 years)

\[
\ln(w_{irt}) = \alpha_{rt} + b^G_{rt}G_{irt} + b^N_{rt}N_{irt} + b^E_{rt}E_{irt} + b^X_{rt}X_{irt} + b^M_{rt}M_{irt} + \\
b^D_{rt}D_{irt} + b^P_{rt}P_{irt} + b^T_{rt}T_{irt} + b^F_{rt}F_{irt} + b^S_{rt}S_{irt} + \varepsilon_{irt}
\]

- **Gender, Nationality, Education, Experience, Married, Dependents, Part-time, Temps, Firm-size, Sectors**

- Analyse the **evolution & spatial differentiation** of valuation of these characteristics
  - Take t-series of ‘returns’, to estimate for each region: \( b^k_{rt} = a^k_{rt} + \gamma^k_{rt}t_t + u^k_{rt} \)
    - \( a^k_{rt} \) is an estimate of the base-year value; \( \gamma^k_{rt} \) is an estimate of the annual growth rate over the period
  - Use x-section of estimates to fit, for each characteristic: \( \gamma^k_r = \delta^0_k + \delta^1_k a^k_r + \varepsilon^k_r \)
    - \( \delta^k_{rt} \) gives the ‘speed of convergence’ in the T&I analysis

- Apply this **separately** for pre- and post-crisis and compare
- Repeat for **characteristics** (instead of prices) to see ‘sorting’ / composition effects
- Discuss along **analytical categories** (discrimination, skills, supply, jobs, employers)
- **Complement** by analysis of sigma-convergence in returns
T&I analysis – results

Table 1. Trend-and-intercept analysis – summary results

<table>
<thead>
<tr>
<th>Category and variable</th>
<th>Pre-crisis</th>
<th>Crisis</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Slope ($\delta_1$)</td>
<td>Fit ($R^2$)</td>
</tr>
<tr>
<td><strong>Discrimination</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female penalty</td>
<td>-0.107***</td>
<td>0.512</td>
</tr>
<tr>
<td>Foreign-born penalty</td>
<td>-0.178***</td>
<td>0.675</td>
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<tr>
<td><strong>Skills</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education premium</td>
<td>-0.118*</td>
<td>0.199</td>
</tr>
<tr>
<td>Experience premium</td>
<td>-0.153***</td>
<td>0.793</td>
</tr>
<tr>
<td><strong>Household</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marital status premium</td>
<td>-0.234***</td>
<td>0.773</td>
</tr>
<tr>
<td>Dependants premium</td>
<td>-0.168***</td>
<td>0.783</td>
</tr>
<tr>
<td><strong>Employment relationship</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Part-time penalty</td>
<td>-0.119***</td>
<td>0.796</td>
</tr>
<tr>
<td>Temping penalty</td>
<td>-0.069</td>
<td>0.155</td>
</tr>
<tr>
<td><strong>Workplace characteristics</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Small-firm penalty</td>
<td>-0.062</td>
<td>0.136</td>
</tr>
<tr>
<td>Regional fixed-effect</td>
<td>-0.151***</td>
<td>0.469</td>
</tr>
</tbody>
</table>

Note: The table reports slope coefficients and the overall fit (R-squared) from simple linear OLS regressions of the estimated trend-change of each shadow price on the corresponding estimate for the ‘initial value’ (intercept), as depicted in eq.3. *, ** and *** show significance at the 10%, 5% and 1% level, respectively.

- Functional homogeneity / ‘spatial fairness’ through crisis??
A closer look
Discrimination variables

Seemingly, acceleration of convergence

But comparison with pre-crisis may be misleading

In any case, spread much wider; process less homogenous

And ‘sigma’ analysis suggests (partly) non-convergence...

Also, evidence of sorting / divergence across space (for females)

Composition: Females

Slope = -0.1068, R-squared = 0.512

Female penalty

Composition: Foreign-born

Slope = -0.3592, R-squared = 0.616

Foreign-born penalty

Slope = -0.1777, R-squared = 0.675

Female penalty

Slope = -0.3255, R-squared = 0.396

Foreign-born penalty

Slope = -0.448, R-squared = 0.757

Female penalty

Slope = -0.5836, R-squared = 0.759

Foreign-born penalty
A closer look

Skills-related variables

Again, prima-facie evidence of faster convergence

Which is more robust, at least for the returns to education

EDU: conv despite outliers; but driven mainly by declining returns...

EXP: ecological fallacy? Indeed, ‘sigma’ shows strong divergence

But here no evidence of spatial sorting; skill-levels converge
As before, evidence of faster convergence – at least for the PT penalty
But again, much heterogeneity in this relationship (also/esp in whether decline or rise)
Although ‘sigma’ analysis here also suggests convergence (esp. for TMP)
Interesting compositional evolutions – showing difference in types of L-use:
  sorting for TMP and mostly declining; homogenisation and increases in PT

A closer look

‘Employment relationship’
Here evidence of convergence is more ‘robust’ and persistent Irrespective of the time-period considered and also in ‘sigma’ terms But for ‘baseline W’ still some heterogeneity: general decline, but most vibrant regions were hit most – although this is not universally true Small-firm empl declined almost everywhere – but heterogeneously
General remarks

- **A dual concern**
  - Has the crisis led to convergence or divergence? ...and of what?
  - How has it affected spatial differences in labour market *functioning*?

- **On a first reading** the results show strong convergence with the crisis
  - Regions becoming more similar in returns *and* characteristics
  - Disparities subsiding in outcomes (wages) *and* functioning (returns)
    - *Convergence, at least in part, due to price equalisation*
    - *Thus, better functioning and more spatial fairness*

- But sigma convergence analysis doesn’t really support these claims
  - A case of ‘*overshooting*’? (beta-convergence with sigma-divergence...)
Main findings

- The **T&I analysis** offers much more detail on the spatio-temporal patterns and trends

  - **Discrimination**: pre-crisis convergence and secular reduction in these penalties with the crisis (as ‘favoured’ groups were also exposed)

  - **Skills-related**: despite rise in returns nationally, many regions experienced declining returns – a process of bumping-down? (also supported by rise in composition of skills); thus disparate evolutions across space; for experience, this is more evident also in ‘sigma’ terms (and in the T&I plots)

  - **Empl relationship**: here, more robust convergence; but evolutions again disparate: (a) declining & diverging temping, rising & converging part-timing; (b) penalties rising in some regions but declining in others (incl in the metro)

  - **Baseline wages**: again, evidence of convergence with much spatial and temporal heterogeneity: convergence mostly (a) in ‘early crisis’ and (b) driven by ‘strong shock’ regions (>10%); modest/heterogeneous decline elsewhere

  \[\rightarrow \text{Variables demand shocks across space and variable responses...}\]
Conclusions

- Regional wage disparities on the decline, but possibly re-emerging recently

- No evidence of strong spatial sorting, nor huge divergences in the valuation of characteristics

- Thus, an element of ‘spatial fairness’ in the crisis; although with much heterogeneity in the dynamics underpinning regional LM adjustment

- Is there scope for regional policy?
  - **No**: regional ‘functioning’ & outcomes not diverging on the whole
  - **Yes**: extent of disparate evolutions shows different conditions and responses (e.g., rise in returns to education in EMT shows skills-based wage sorting; fall in SA shows intensified job-sorting by skills)

→ Not necessarily regional policy per se, but case-/context-specific (and thus place-based) employment policies / LM interventions
Thank you!

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Female penalty

Female penalty

Foreign-born penalty

Foreign-born penalty

Pre-crisis (2000-2008)

Crisis (2009-2012)
Female penalty

Pre-crisis (2000-2008)

Slope = -0.1068, R-squared = 0.512

Slope = -0.3592, R-squared = 0.616

Foreign-born penalty

Pre-crisis (2000-2008)

Slope = -0.1777, R-squared = 0.675

Slope = -0.3255, R-squared = 0.396

Crisis (2009-2012)
Education premium

Experience premium

Pre-crisis (2000-2008)  
Crisis (2009-2012)
Education premium

Experience premium

Pre-crisis (2000-2008)

Crisis (2009-2012)
Composition: Education

Slope=-.0345 R-squared=0.191

Composition: Experience

Slope=-.2607 R-squared=0.493
Part-time penalty

Pre-crisis (2000-2008)

Slope=-.1186 R-squared=0.796

Part-time penalty

Part-time penalty

Temping penalty

Crisis (2009-2012)

Slope=-.3723 R-squared=0.680

Temping penalty

Temping penalty

Slope=-.1364 R-squared=0.090

Slope=-.0689 R-squared=0.142
Small-firm penalty

Regional fixed-effects

Pre-crisis (2000-2008)

Crisis (2009-2012)
Small-firm penalty

Pre-crisis (2000-2008)

Slope=-.062 R-squared=0.136

Slope=-.1827 R-squared=0.537

Crisis (2009-2012)

Slope=-.1511 R-squared=0.469

Slope=-.3581 R-squared=0.584

Regional fixed-effects

Baseline wages

Small-firm penalty
PROFILES ANALYSIS
Regional disparities in predicted wages, by profile
Evolution of regional wage disparities

Average nominal wages

Predicted wage, ‘breadwinner’

Predicted wage, ‘precarious’

Predicted wage, ‘old worker’

Predicted wage, ‘migrant’

Predicted wage, ‘fem prof/nal’
Convergence-divergence of regional wages by period

Average nominal wages

Predicted wage, ‘breadwinner’

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