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

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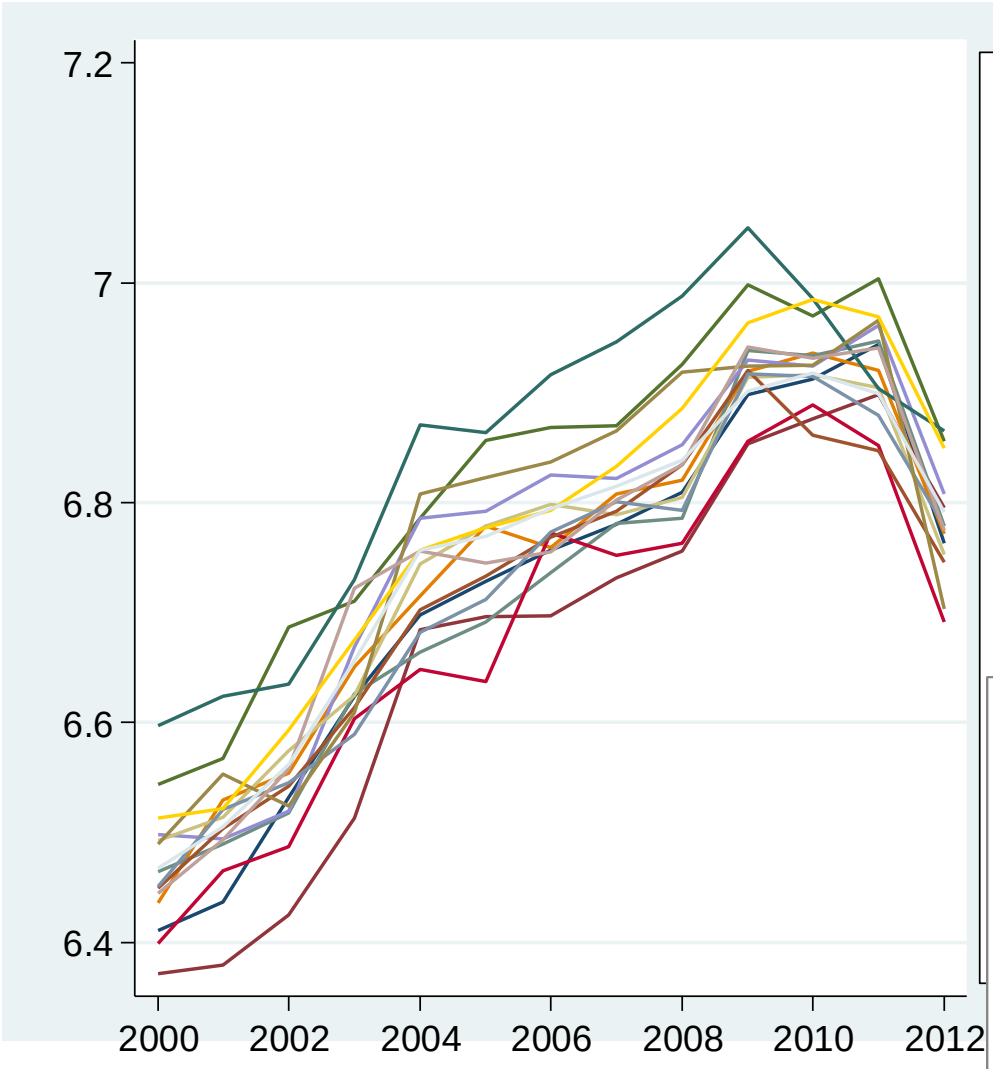
Introduction – motivation

- **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

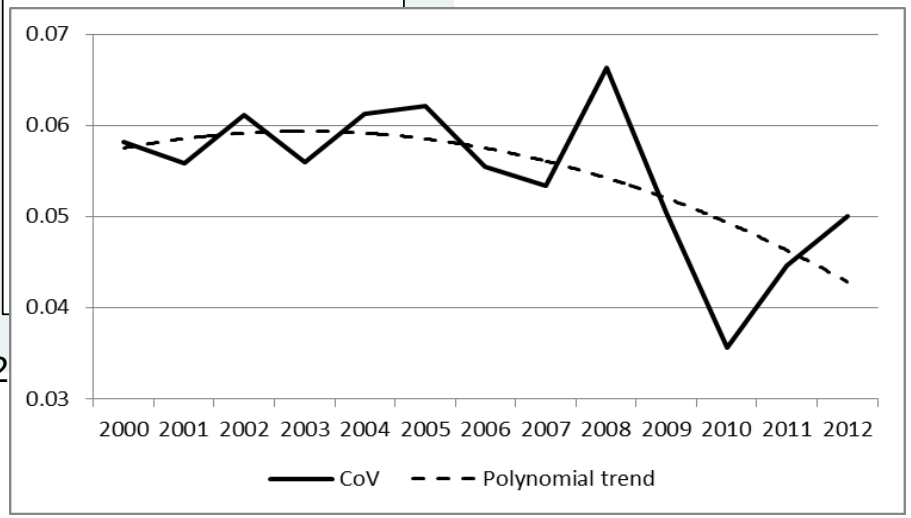
Average nominal wages by region and year



- Nominal wages returning to pre-2006 levels
- (Naturally, in real terms decline is more marked)
- But much noise / heterogeneity (overshooting etc)

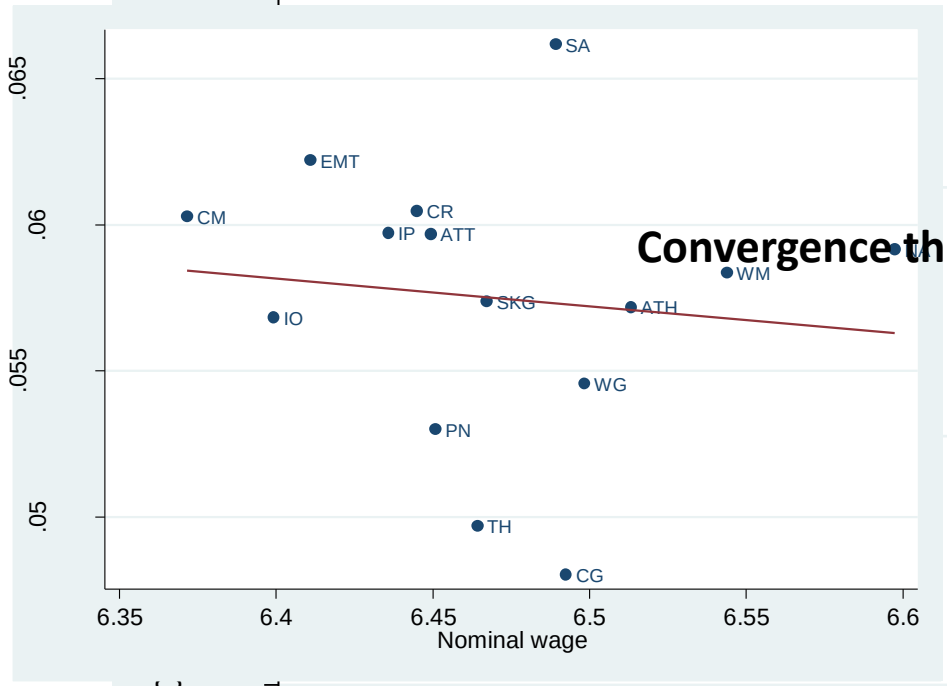
Coefficient of variation

- Disparities declining at first; but strong rebound since 2010…

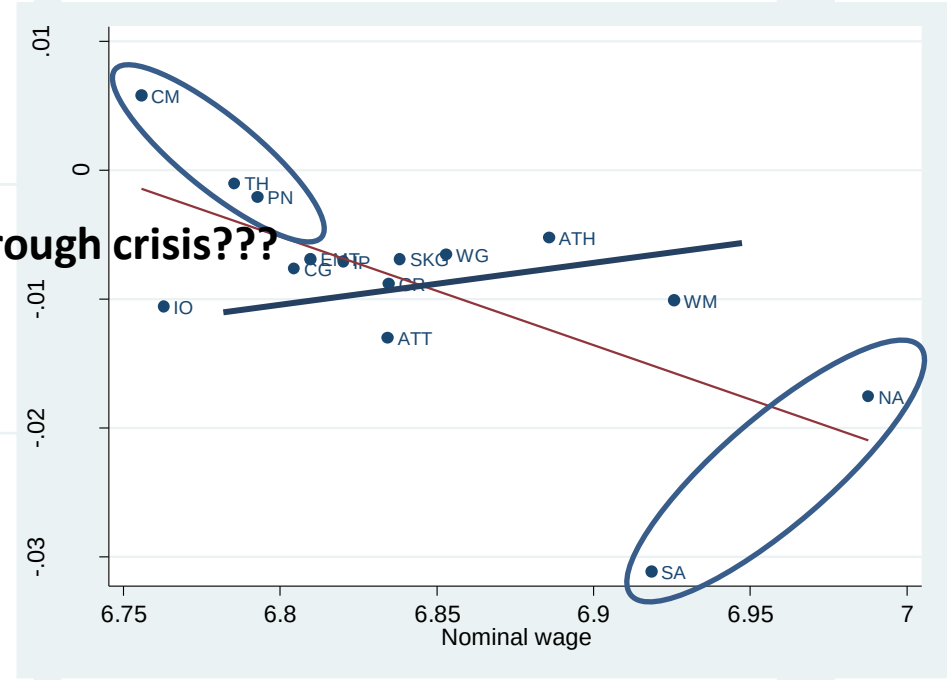


T-I plot (beta-convergence) by period

- 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**



Convergence through crisis???



EMU period (2000-2008)

Regression line: dW=0.12-0.009*W

(p_W=0.68, R^2=0.01)

Crisis period (2008-2012)

Regression line: dW=0.57-0.084*W

(p_W=0.07, R^2=0.44)

Graphs by Period

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, **N**ationality, **E**ducation, e**X**perience, **M**arried, **D**ependants, **P**art-time, **T**emps, **F**irm-size, **S**ectors

- Analyse the **evolution & spatial differentiation** of valuation of these characteristics
  - Take t-series of 'returns', to estimate for each region: $b^{k}_{rt} = a^{k}_{rt} + \gamma^{k}_{rt}t_t + u^{k}_{rt}$
    - α^{k}_{rt} is an estimate of the base-year value; γ^{k}_{rt} is an estimate of the annual growth rate over the period
  - Use x-section of estimates to fit, for each characteristic: $\gamma^{k}_{r} = \delta^{k}_{0} + \delta^{k}_{1}a^{k}_{r} + \varepsilon^{k}_{r}$
    - δ^{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) top 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

Category and variable	*Pre-crisis*		*Crisis*	
	Slope (δ_1)	*Fit (R^2)*	*Slope (δ_1)*	*Fit (R^2)*
Discrimination				
Female penalty	-0.107***	0.512	-0.359***	0.616
Foreign-born penalty	-0.178***	0.675	-0.326**	0.396
Skills				
Education premium	-0.118*	0.199	-0.288***	0.440
Experience premium	-0.153***	0.793	-0.393**	0.376
Household				
Marital status premium	-0.234***	0.773	-0.402***	0.431
Dependants premium	-0.168***	0.783	-0.418**	0.341
Employment relationship				
Part-time penalty	-0.119***	0.796	-0.372***	0.680
Temping penalty	-0.069	0.155	-0.242***	0.590
Workplace characteristics				
Small-firm penalty	-0.062	0.136	-0.183***	0.573
Regional fixed-effect	-0.151***	0.469	-0.358***	0.584

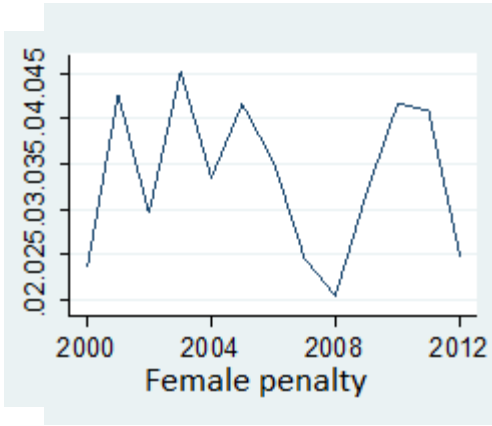
Note: The table reports slope coefficients and the overall fit (R-squared) from simple linear OLS regressions of the estimated trend-change of each shadow price on the corresponding estimate for the 'initial value' (intercept), as depicted in eq.3. *, ** and *** show significance at the 10%, 5% and 1%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

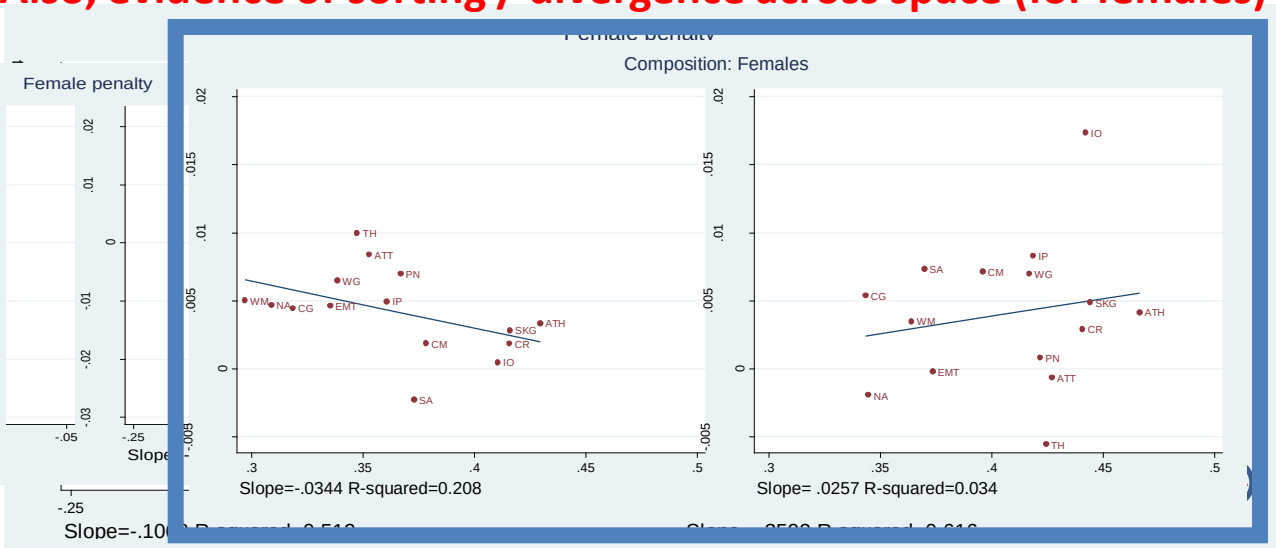
- **Functional homogeneity / 'spatial fairness' through crisis??**

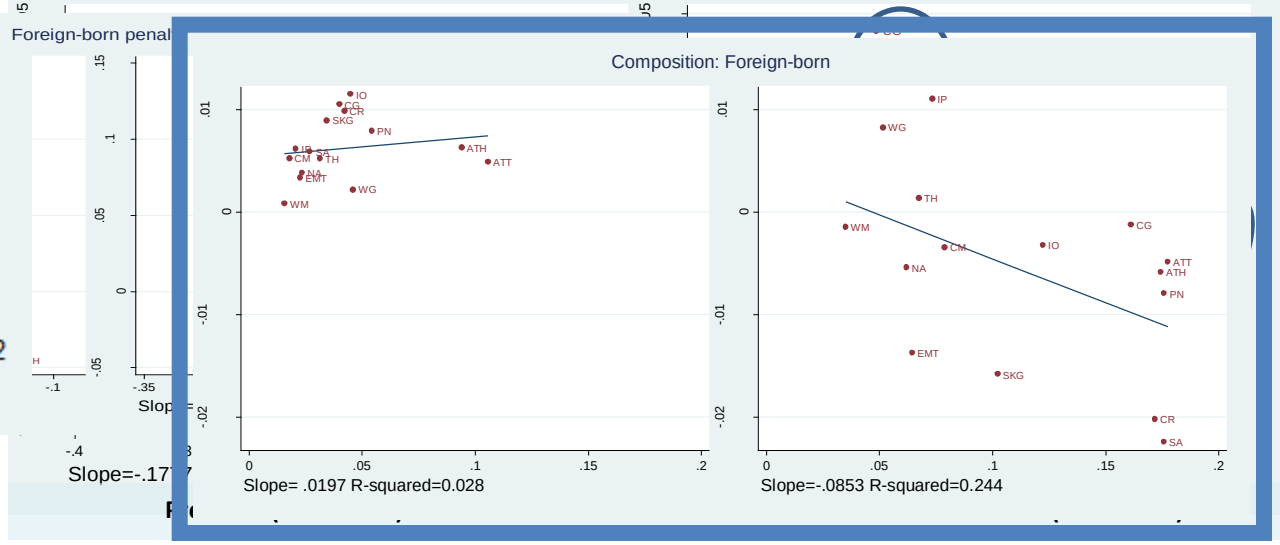
A closer look

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)



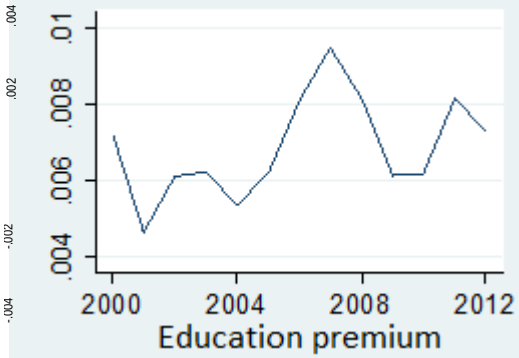


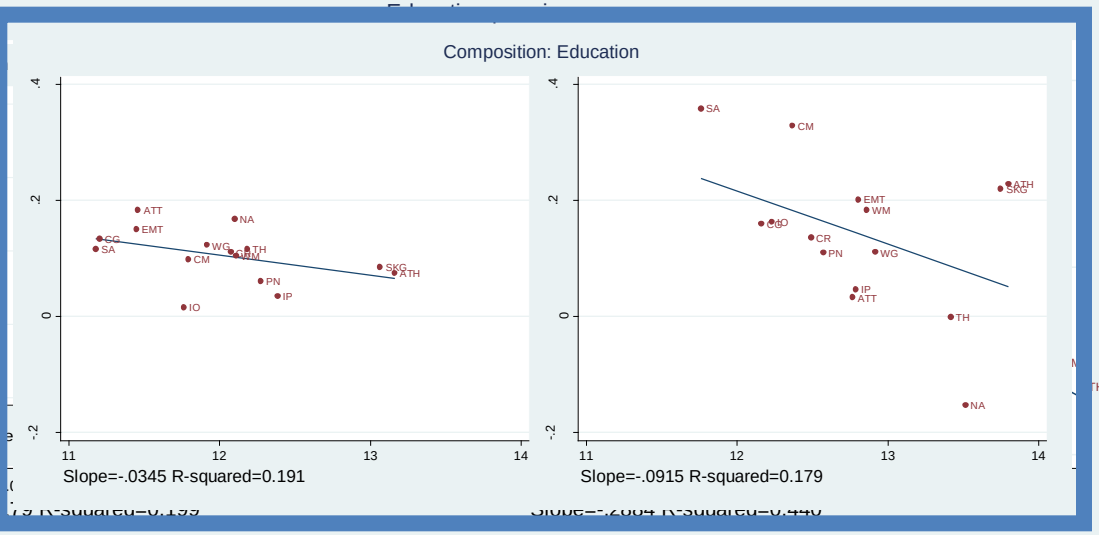


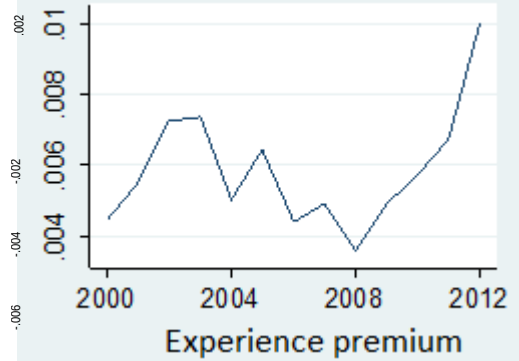
A closer look

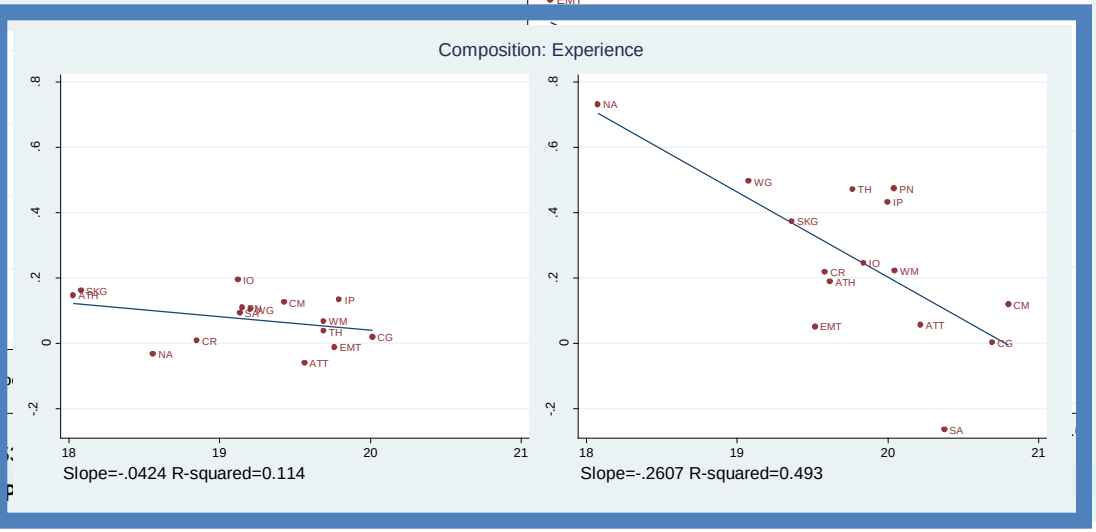
Skills-related variables

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









A closer look

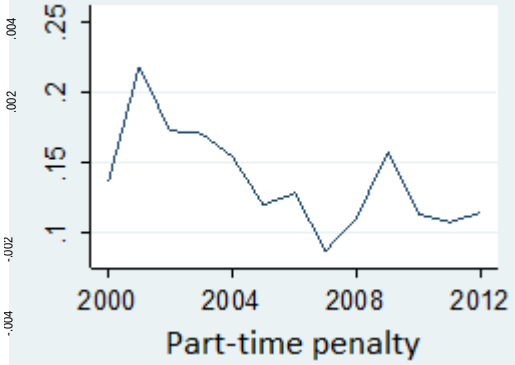
'Employment relationship'

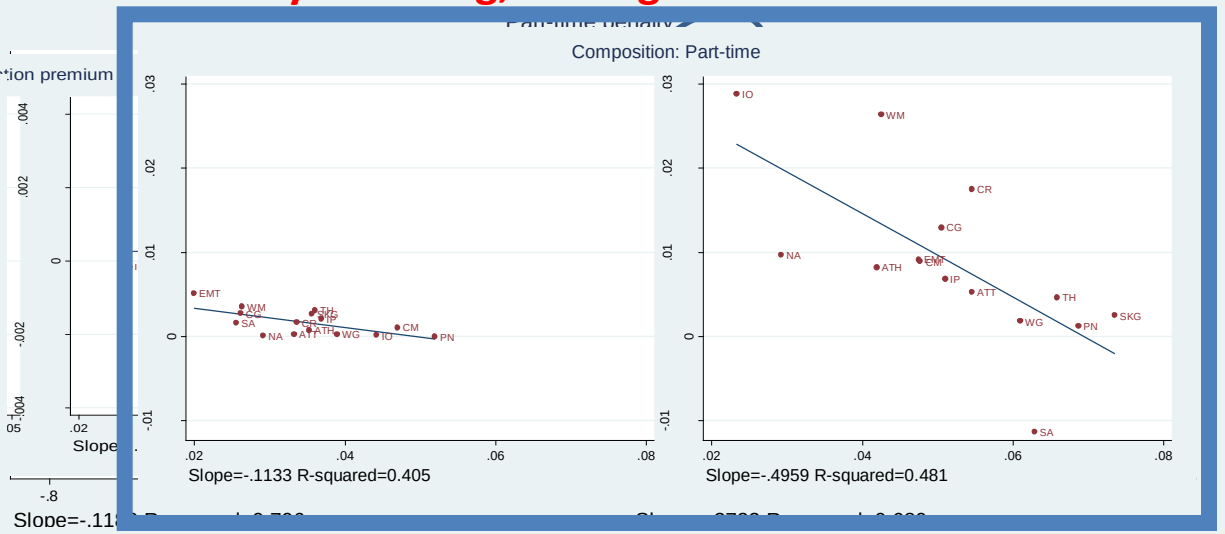
As before, evidence of faster convergence – at least for the PT penalty

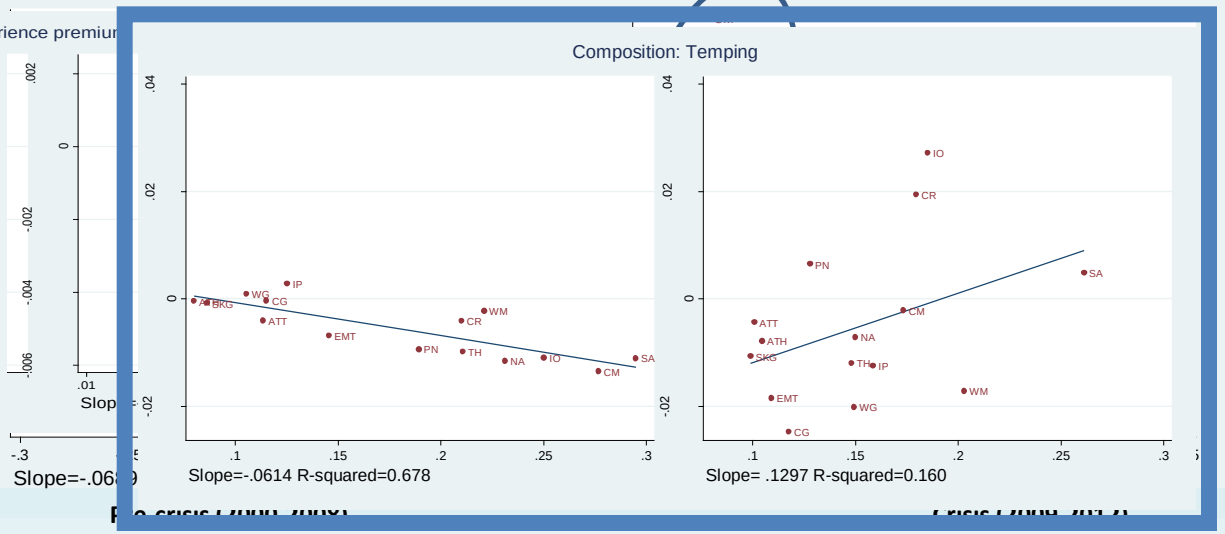
But again, much heterogeneity in this relationship (also/esp in whether decline or rise)

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



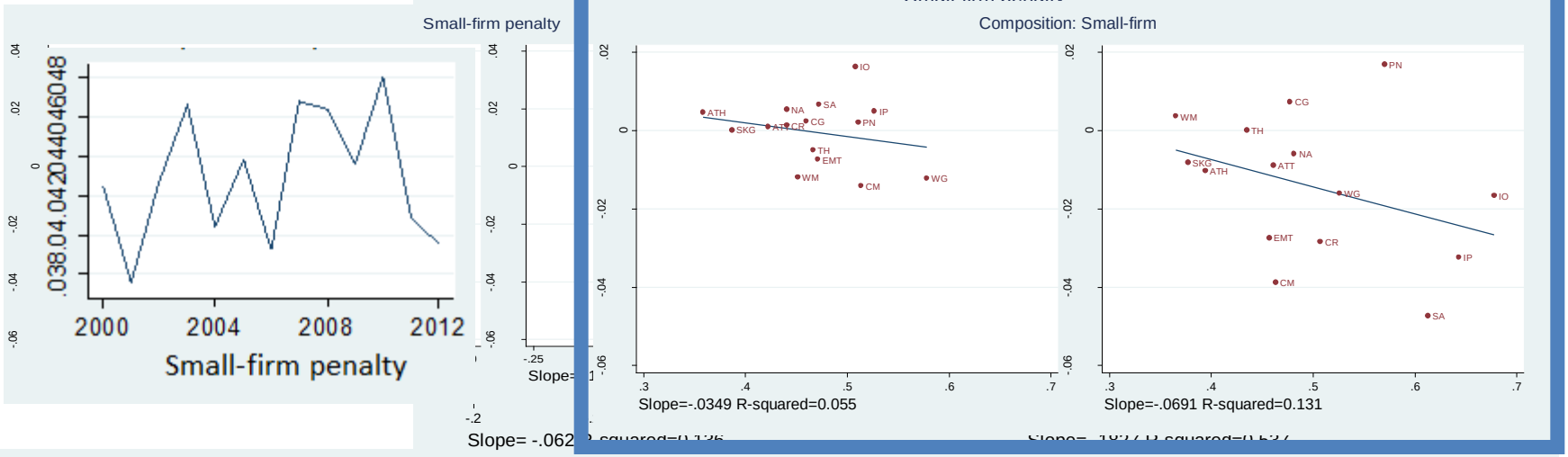




A closer look

Firm/region effects

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

    → ***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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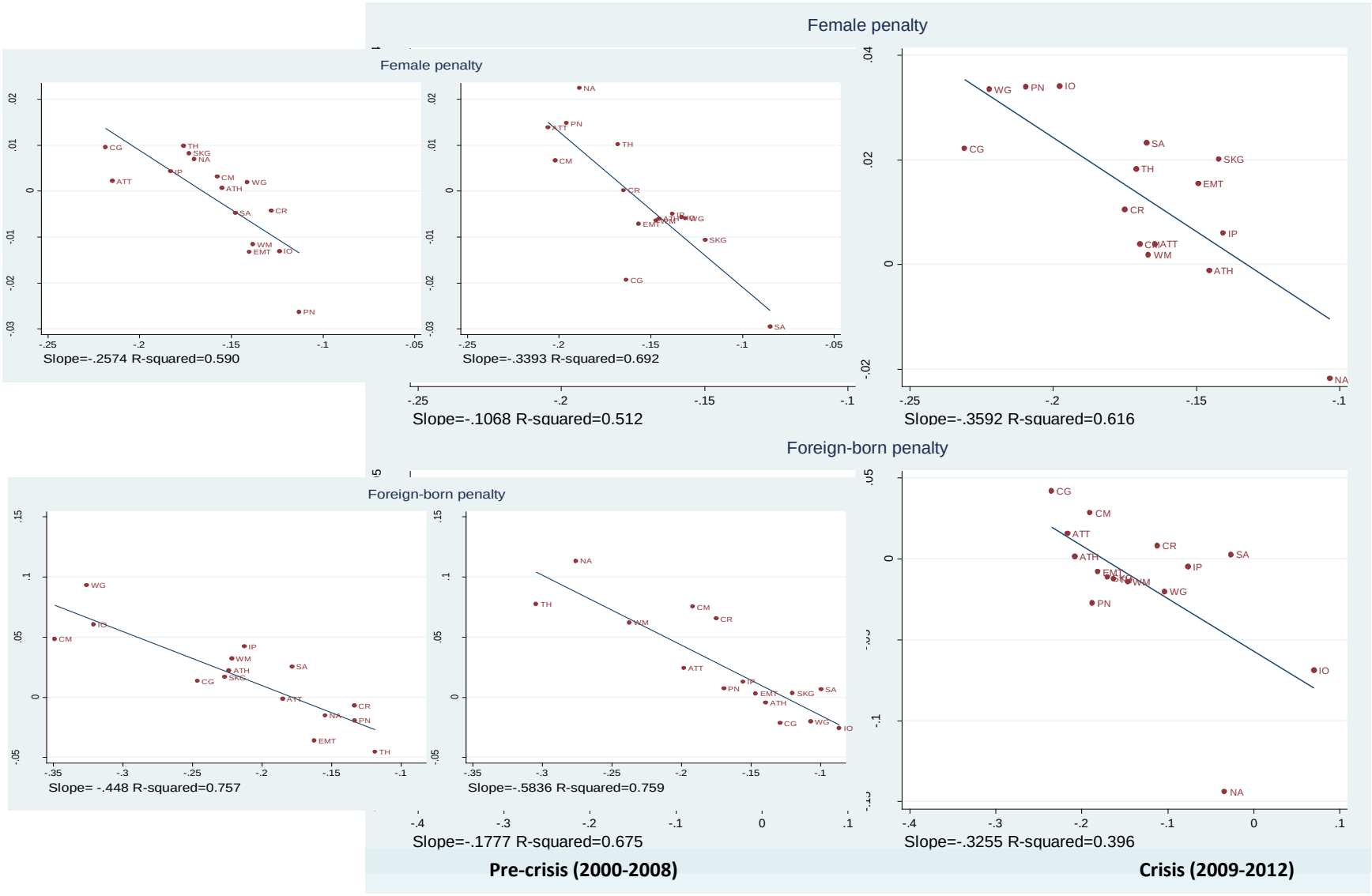
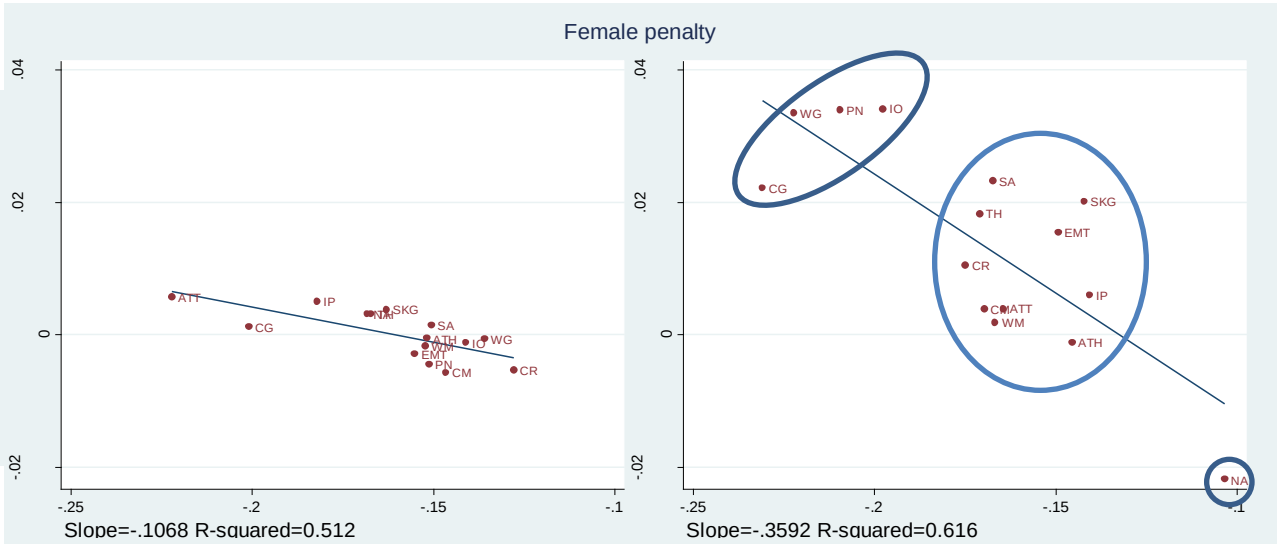
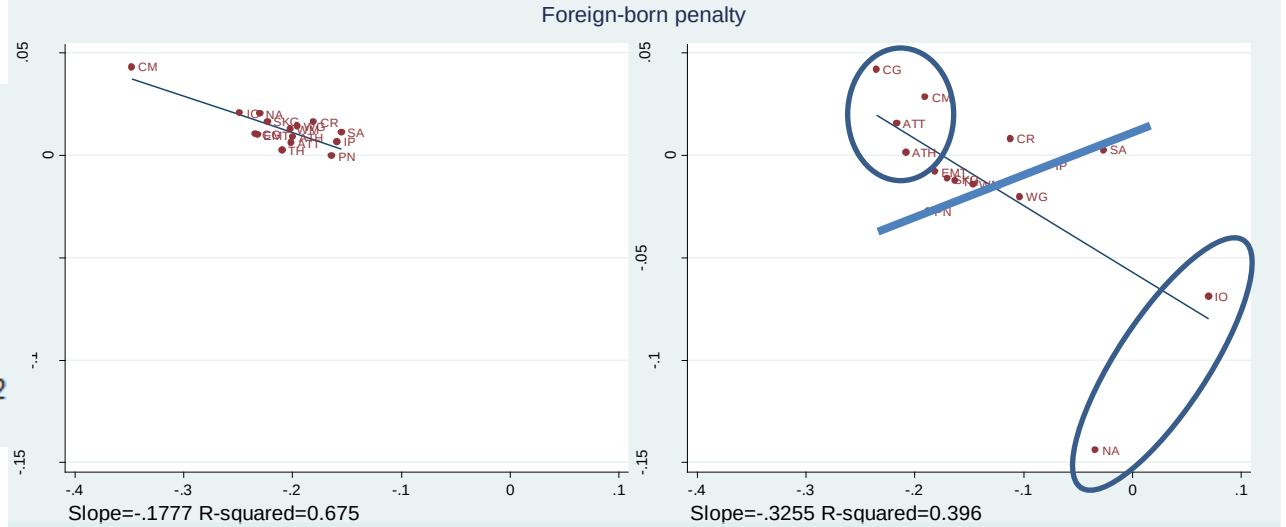
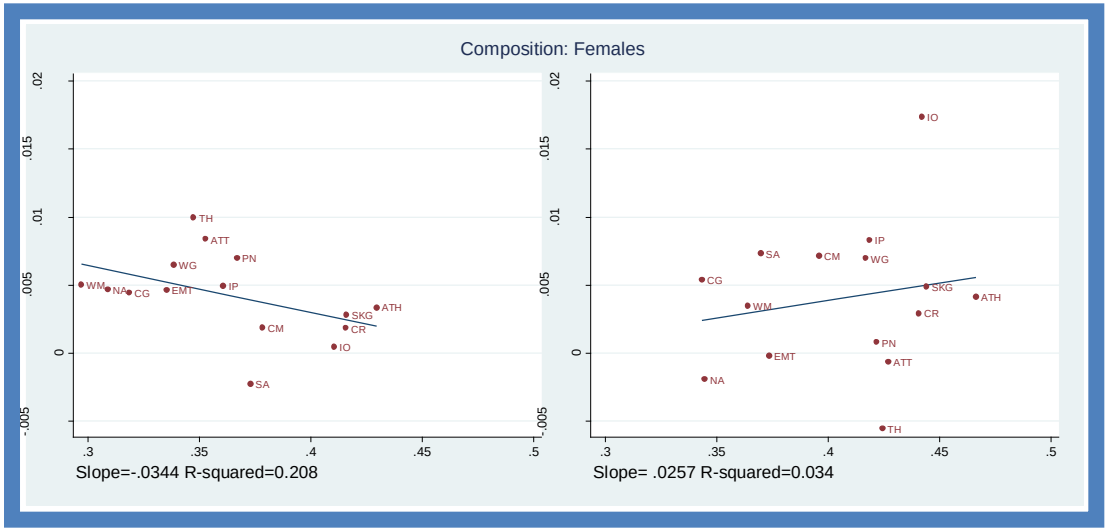

Female penalty
Female penalty
Slope=-.2574 R-squared=0.590
Slope=-.3393 R-squared=0.692
Slope=-.1068 R-squared=0.512
Female penalty
Slope=-.3592 R-squared=0.616
Foreign-born penalty
Foreign-born penalty
Slope= -.448 R-squared=0.757
Slope=-.5836 R-squared=0.759
Slope=-.1777 R-squared=0.675
Foreign-born penalty
Slope=-.3255 R-squared=0.396
Pre-crisis (2000-2008)
Crisis (2009-2012)

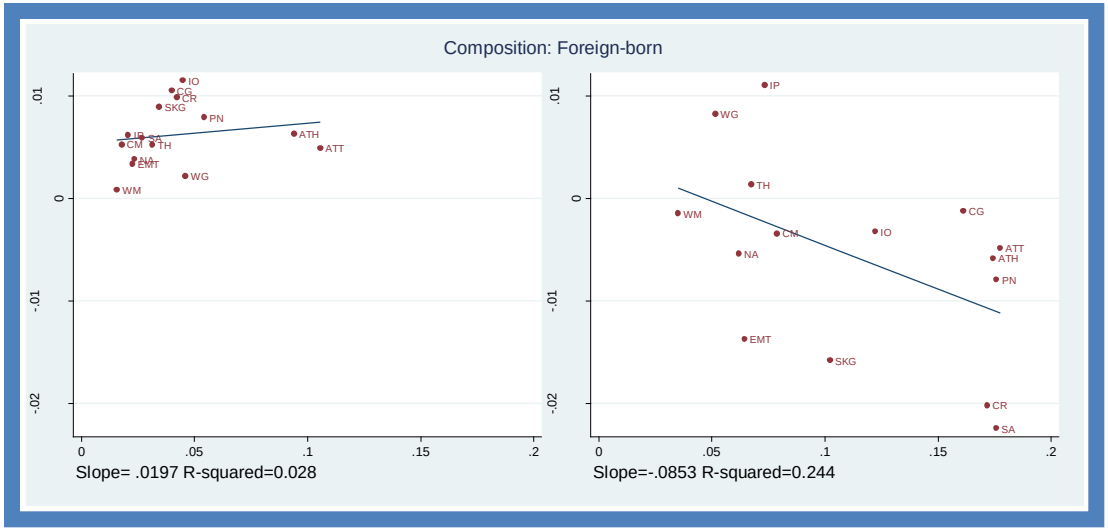




Pre-crisis (2000-2008)

Crisis (2009-2012)


Composition: Females
.02
.015
.01
.005
0
-.005
.3
.35
.4
.45
.5
TH
ATT
PN
WG
WM
NA
CG
EMT
IP
ATH
SKG
CR
CM
IO
SA
Slope=-.0344 R-squared=0.208
IO
IP
SA
CM
WG
CG
SKG
ATH
WM
CR
PN
EMT
ATT
NA
TH
Slope= .0257 R-squared=0.034


Composition: Foreign-born
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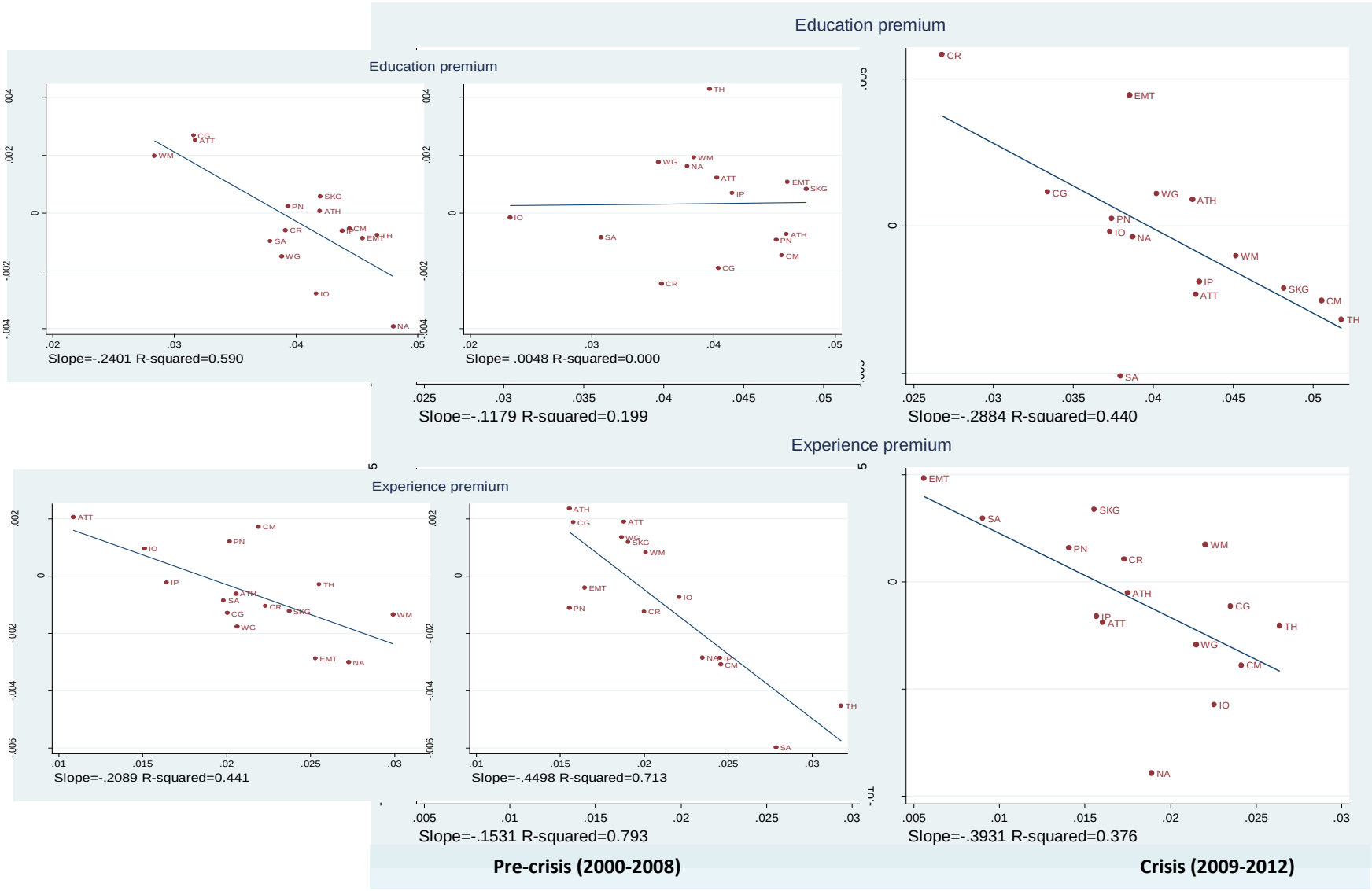
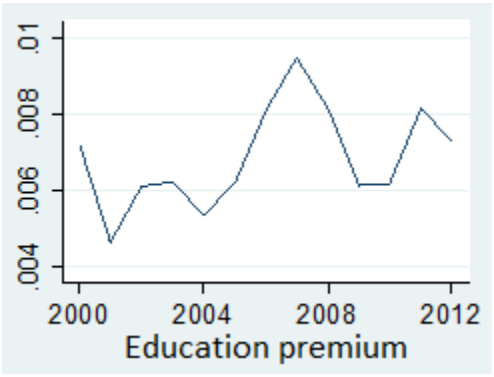
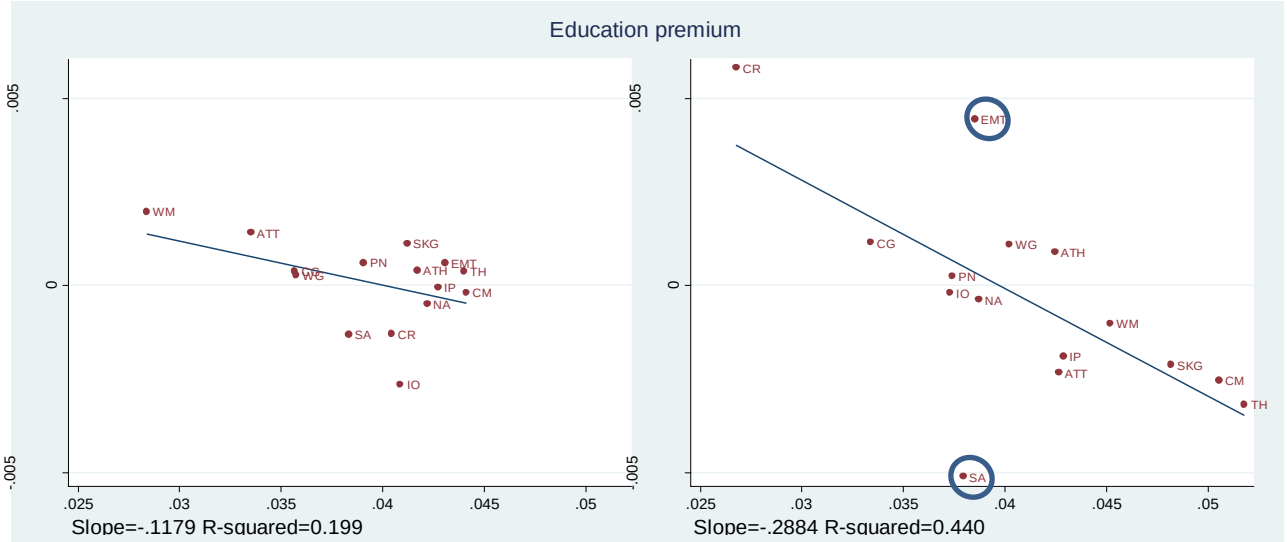
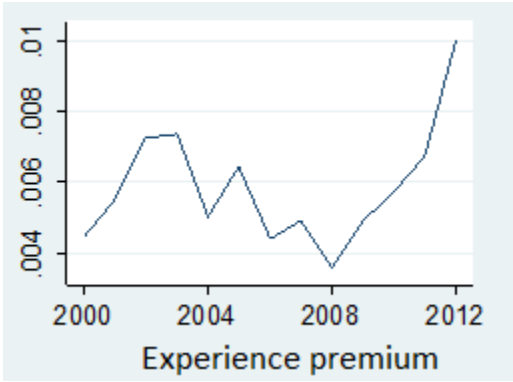
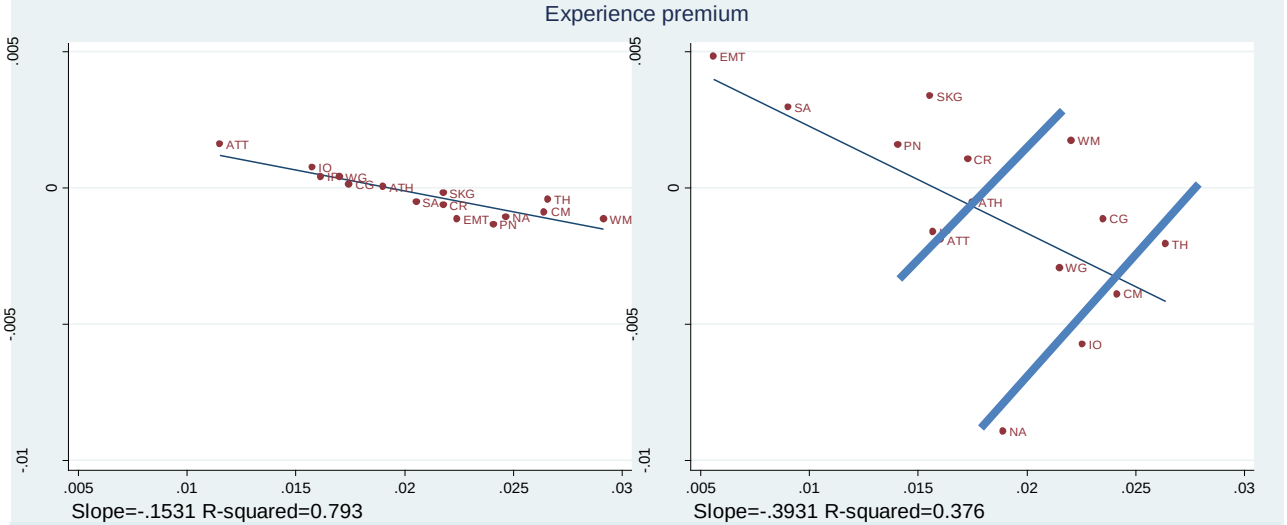
0
-.01
-.02
0
.05
.1
.15
.2
IO
CG
CR
SKG
PN
IP
SA
ATH
CM
TH
ATT
NA
EMT
WG
WM
Slope= .0197 R-squared=0.028
IP
WG
TH
WM
CG
CM
IO
NA
ATT
ATH
PN
EMT
SKG
CR
SA
Slope=-.0853 R-squared=0.244


Education premium
Slope=-.2401 R-squared=0.590
Slope= .0048 R-squared=0.000
Slope=-.1179 R-squared=0.199
Slope=-.2884 R-squared=0.440
Experience premium
Slope=-.2089 R-squared=0.441
Slope=-.4498 R-squared=0.713
Slope=-.1531 R-squared=0.793
Slope=-.3931 R-squared=0.376
Pre-crisis (2000-2008)
Crisis (2009-2012)

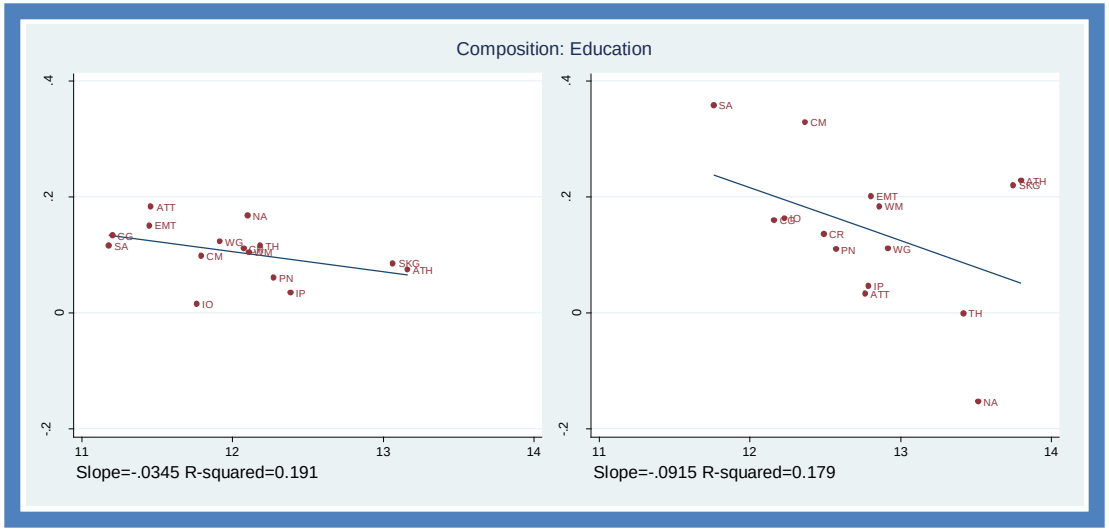








Pre-crisis (2000-2008) **Crisis (2009-2012)**


Composition: Education
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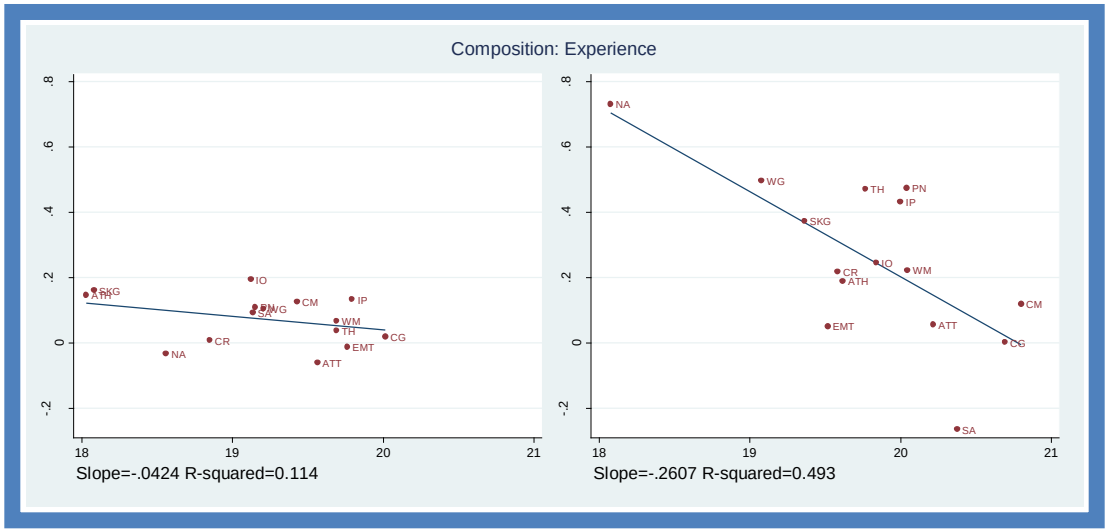
.2
0
-.2
11
12
13
14
ATT
EMT
NA
CG
SA
WG
TH
CM
SKG
ATH
PN
IP
IO
Slope=-.0345 R-squared=0.191
SA
CM
ATH
SKG
EMT
WM
CR
PN
WG
IP
ATT
TH
NA
Slope=-.0915 R-squared=0.179


Composition: Experience
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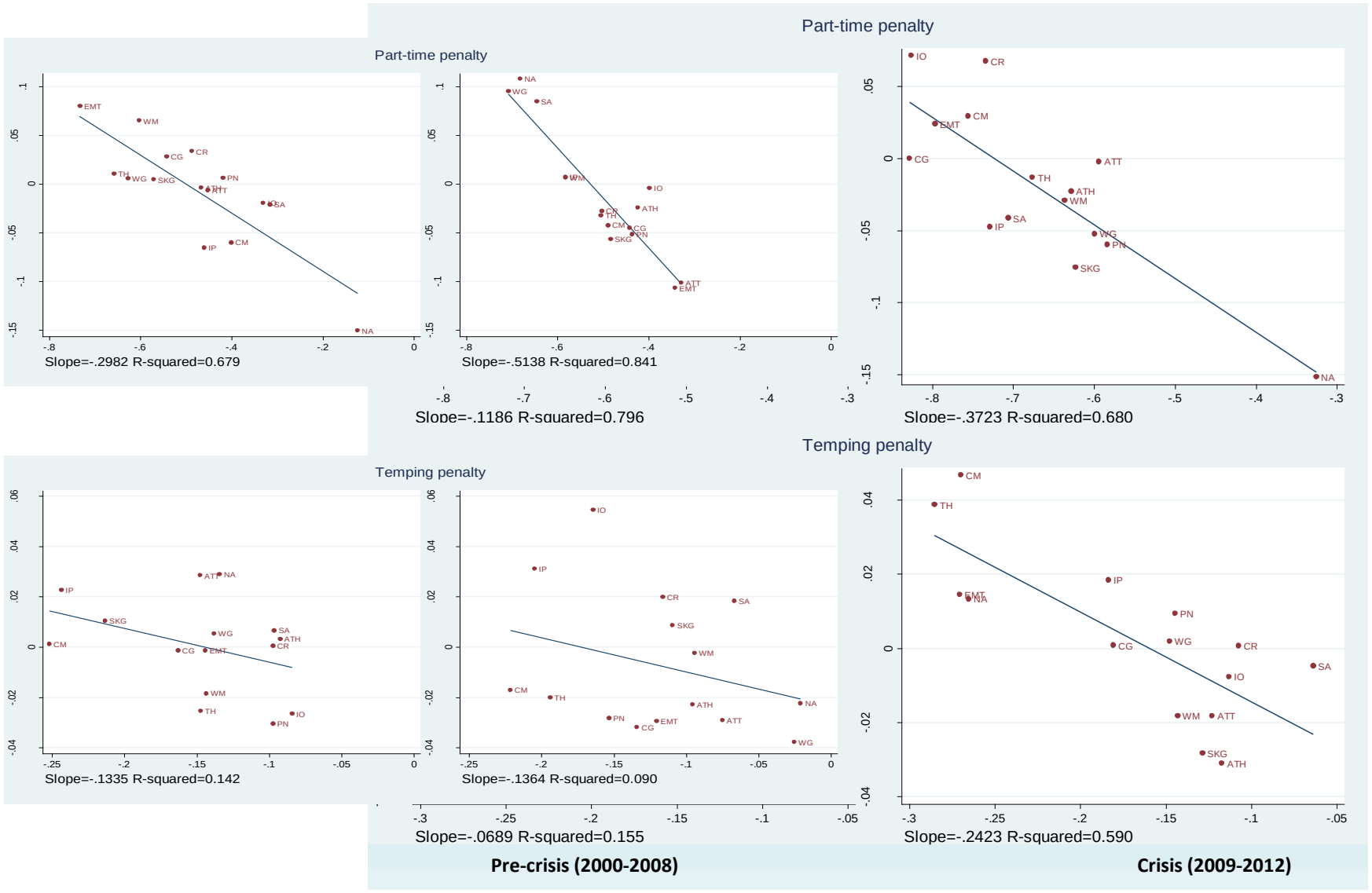
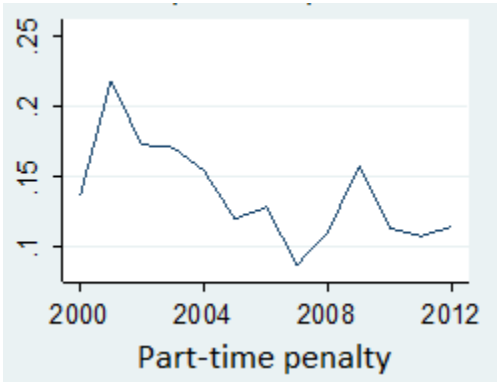
.6
.4
.2
0
-.2
18
19
20
21
IO
SKG
ATH
CM
IP
WG
WM
TH
CG
CR
EMT
NA
ATT
Slope=-.0424 R-squared=0.114
NA
WG
TH
PN
IP
SKG
IO
WM
CR
ATH
CM
EMT
ATT
CG
SA
Slope=-.2607 R-squared=0.493


Part-time penalty
Slope=-.2982 R-squared=0.679
Slope=-.5138 R-squared=0.841
Slope=-.1186 R-squared=0.796
Part-time penalty
Slope=-.3723 R-squared=0.680
Temping penalty
Slope=-.1335 R-squared=0.142
Slope=-.1364 R-squared=0.090
Slope=-.0689 R-squared=0.155
Temping penalty
Slope=-.2423 R-squared=0.590
Pre-crisis (2000-2008)
Crisis (2009-2012)


.1
.15
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2000
2004
2008
2012
Part-time penalty


.05
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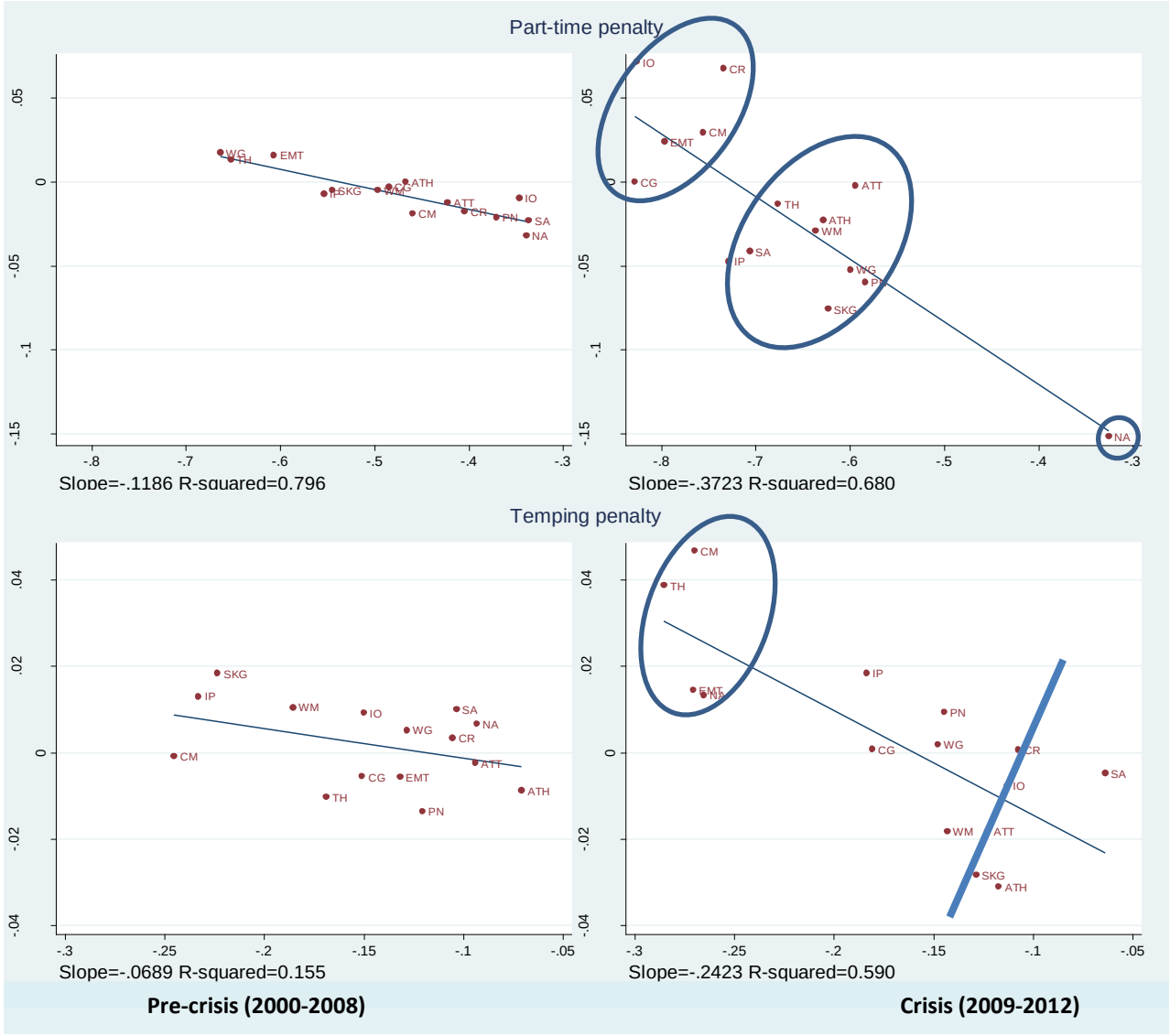
2000
2004
2008
2012
Temping penalty


Part-time penalty
Slope=-.1186 R-squared=0.796
Slope=-.3723 R-squared=0.680
Temping penalty
Slope=-.0689 R-squared=0.155
Slope=-.2423 R-squared=0.590
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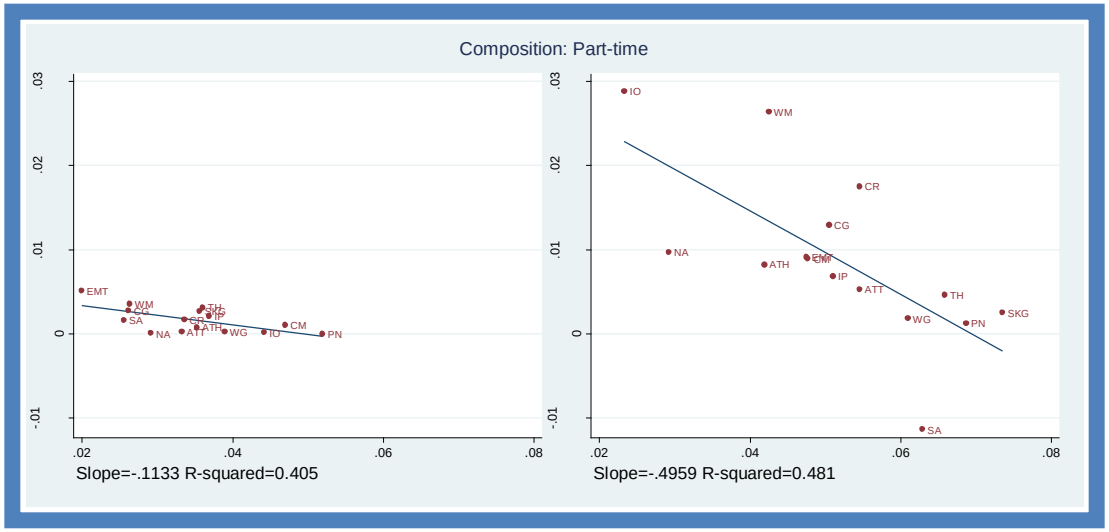
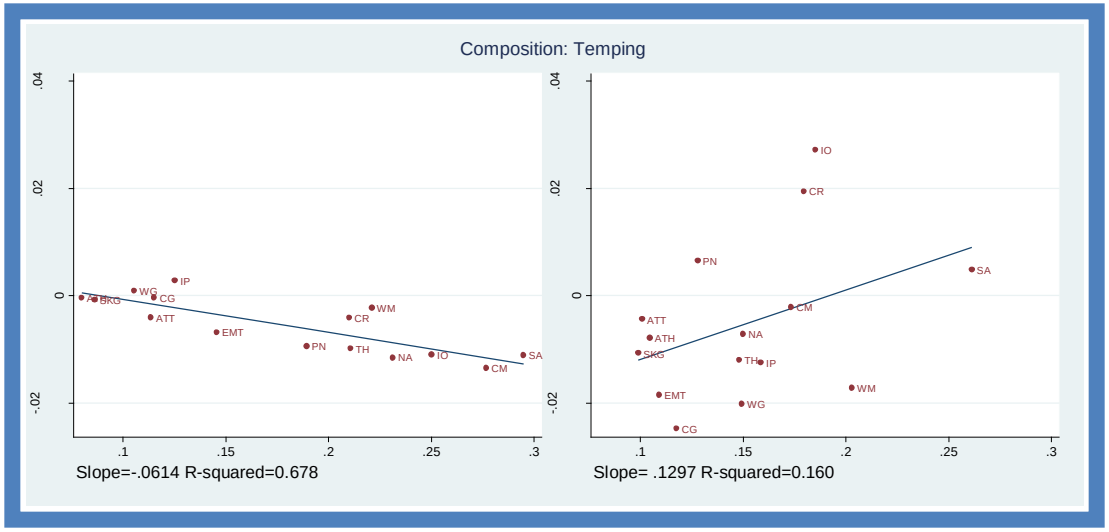
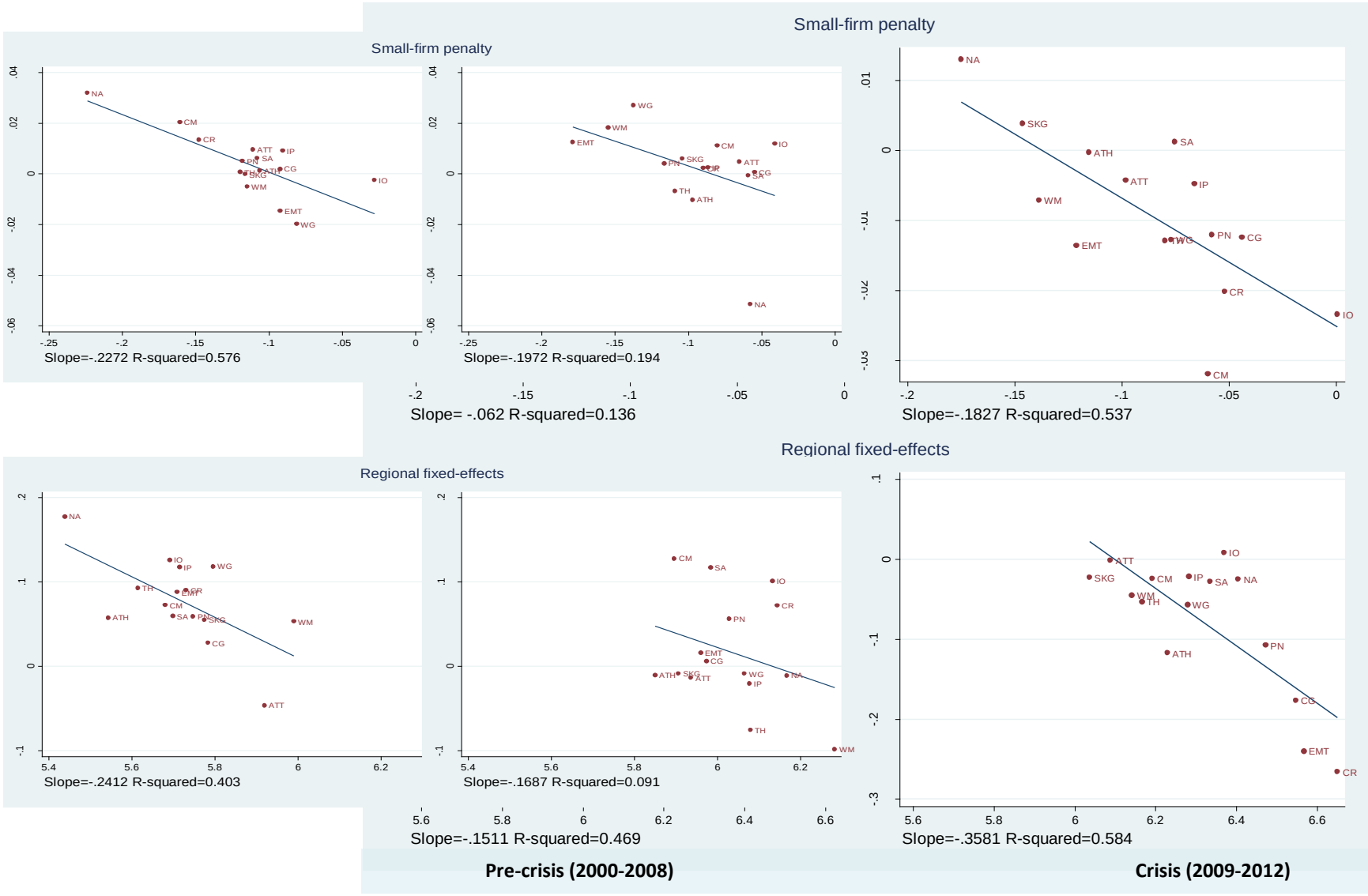
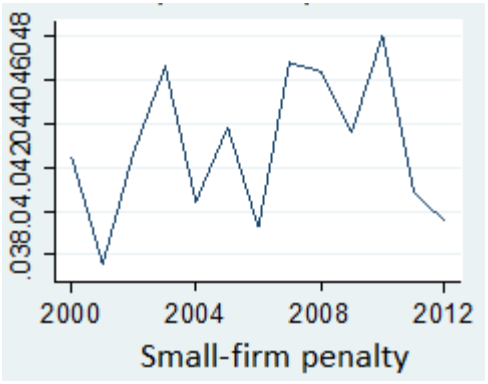
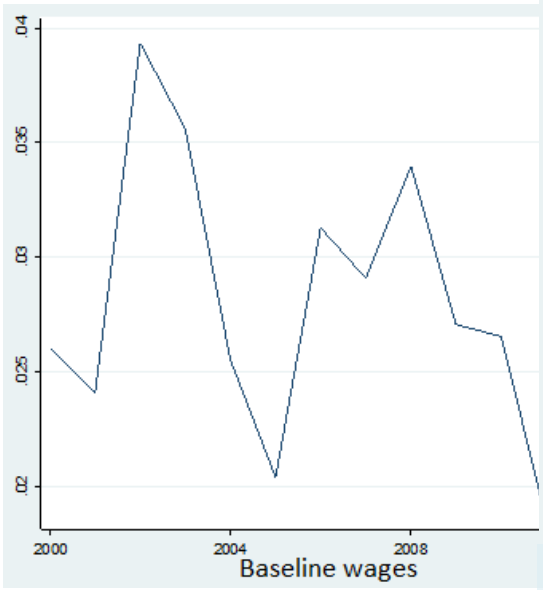
Crisis (2009-2012)

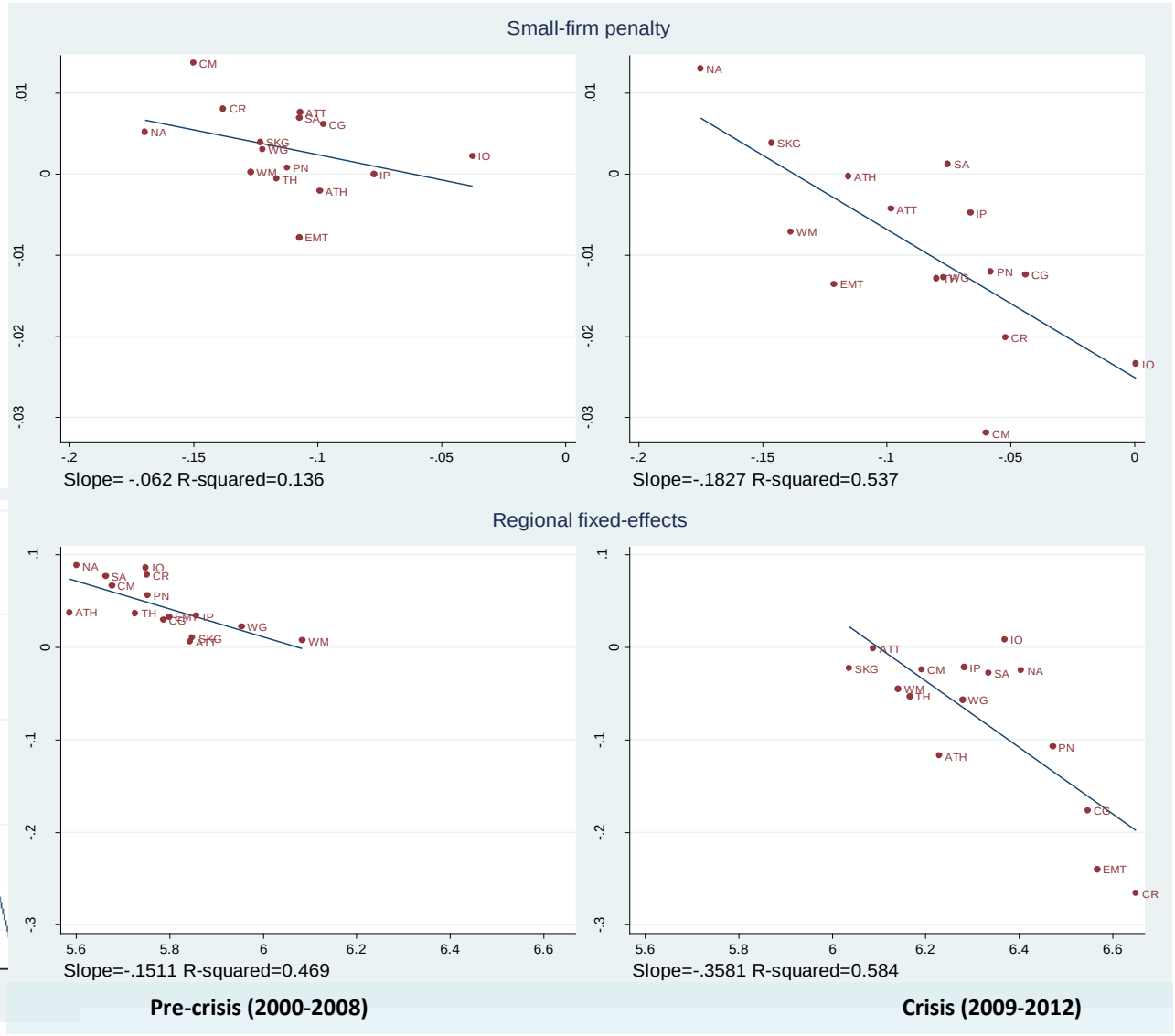

Composition: Part-time
.03
.02
.01
0
-.01
.02
.04
.06
.08
EMT
WM
CG
SA
TH
SKG
IP
CR
ATH
CM
NA
ATT
WG
IO
PN
Slope=-.1133 R-squared=0.405
IO
WM
CR
CG
NA
ATH
IP
ATT
TH
SKG
WG
PN
SA
Slope=-.4959 R-squared=0.481

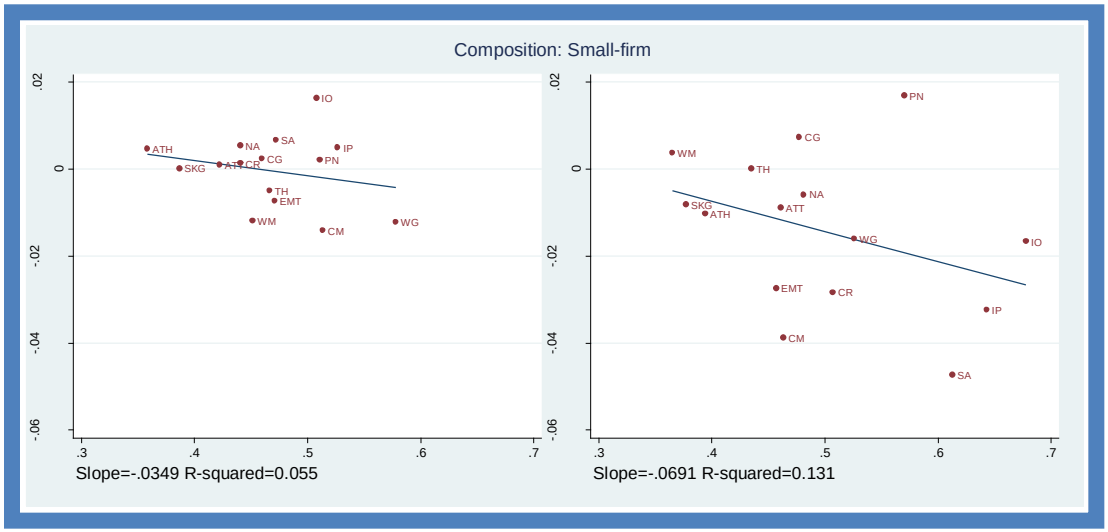

Composition: Temping
.04
.02
0
-.02
.1
.15
.2
.25
.3
IP
WG
CG
SKG
ATT
EMT
PN
WM
CR
TH
NA
IO
SA
CM
Slope=-.0614 R-squared=0.678
IO
CR
PN
SA
ATT
CM
ATH
NA
SKG
TH
IP
WM
EMT
WG
CG
Slope= .1297 R-squared=0.160


Small-firm penalty
Small-firm penalty
Slope=-.2272 R-squared=0.576
Slope= -.062 R-squared=0.136
Slope=-.1827 R-squared=0.537
Regional fixed-effects
Regional fixed-effects
Slope=-.2412 R-squared=0.403
Slope=-.1687 R-squared=0.091
Slope=-.1511 R-squared=0.469
Slope=-.3581 R-squared=0.584
Pre-crisis (2000-2008)
Crisis (2009-2012)


.038.04.042044046048
2000
2004
2008
2012
Small-firm penalty


.02
.025
.03
.035
.04
2000
2004
2008
Baseline wages

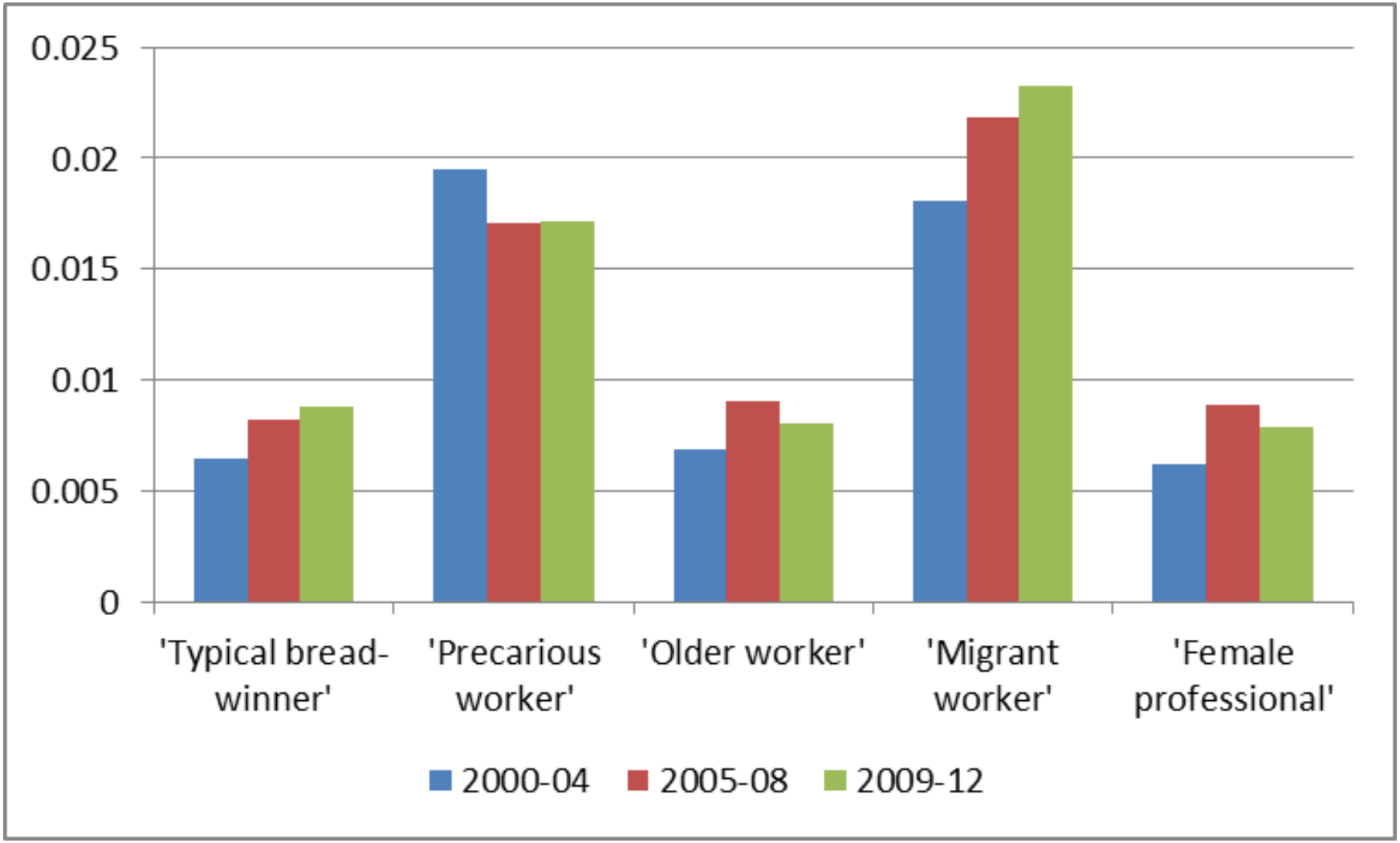

Small-firm penalty
CM
CR
ATT
SA
CG
NA
SKG
WG
IO
WM
PN
IP
TH
ATH
EMT
.01
0
-.01
-.02
-.03
-.2
-.15
-.1
-.05
0
Slope= -.062 R-squared=0.136
NA
SKG
SA
ATH
ATT
IP
WM
EMT
PN
CG
WG
CR
IO
CM
Slope=-.1827 R-squared=0.537
Regional fixed-effects
NA
SA
IO
CR
CM
PN
ATH
TH
EM
CG
IP
WG
SKG
ATT
WM
.1
0
-.1
-.2
-.3
5.6
5.8
6
6.2
6.4
6.6
Slope=-.1511 R-squared=0.469
IO
ATT
SKG
CM
IP
SA
NA
WM
TH
WG
PN
ATH
CG
EMT
CR
Slope=-.3581 R-squared=0.584
Pre-crisis (2000-2008)
Crisis (2009-2012)


Composition: Small-firm
.02
0
-.02
-.04
-.06
.3
.4
.5
.6
.7
IO
ATH
NA
SA
IP
CG
PN
SKG
ATT
CR
TH
EMT
WM
CM
WG
Slope=-.0349 R-squared=0.055
PN
CG
WM
TH
NA
SKG
ATT
ATH
WG
IO
EMT
CR
IP
CM
SA
Slope=-.0691 R-squared=0.131

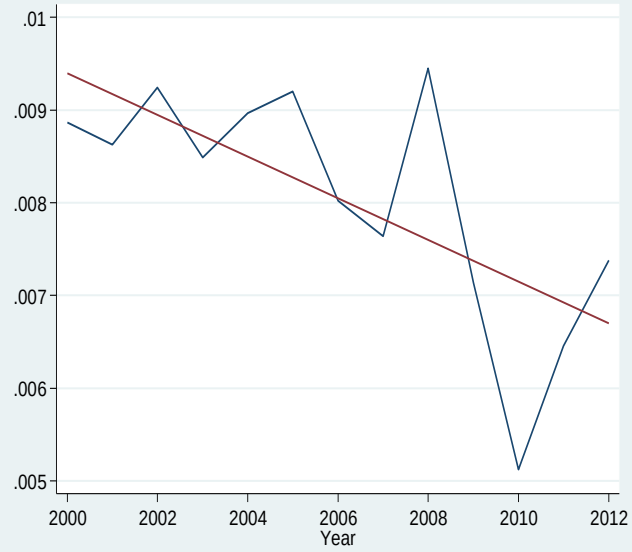

.01
.009
.008
.007
.006
.005
2000
2004
2008
2012
Actual wages

PROFILES ANALYSIS

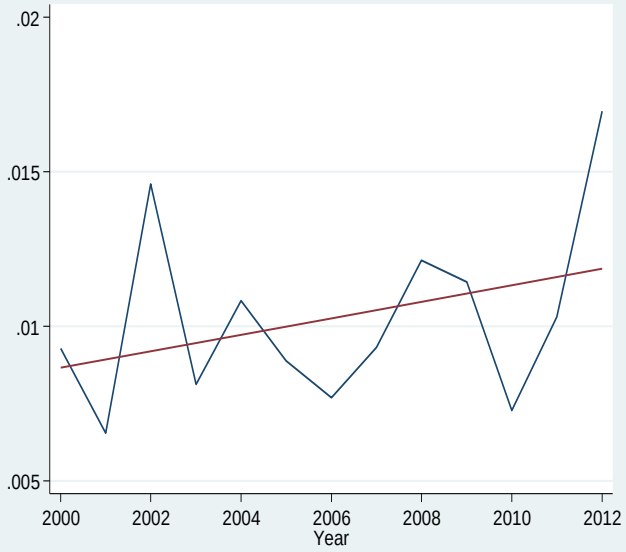
Regional disparities in predicted wages, by profile



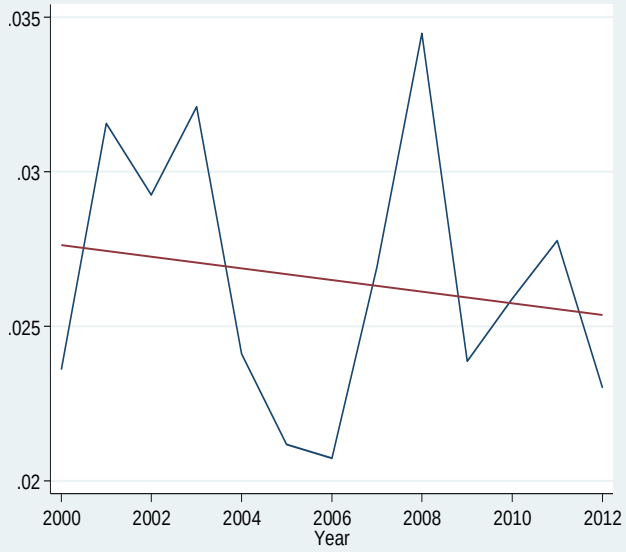
Evolution of regional wage disparities



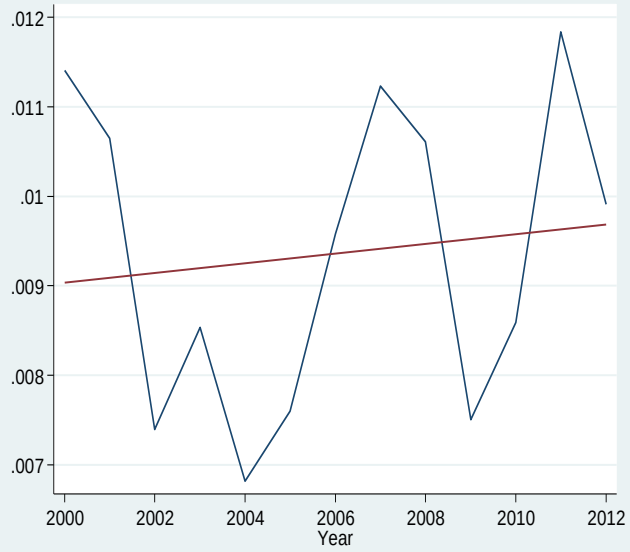
Average nominal wages



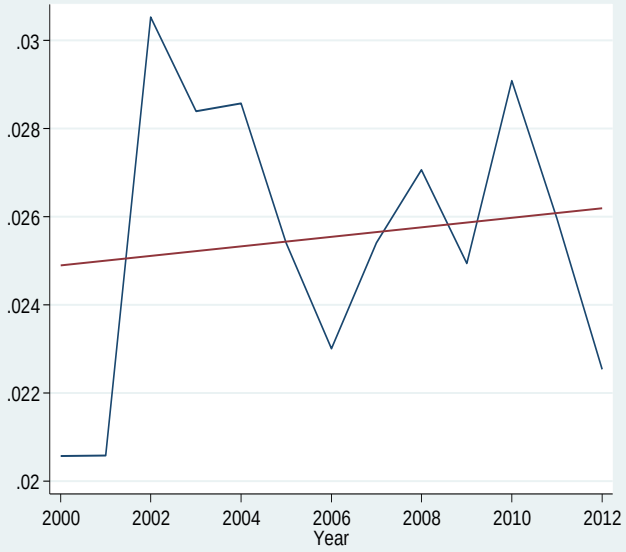
Predicted wage, ‘breadwinner’



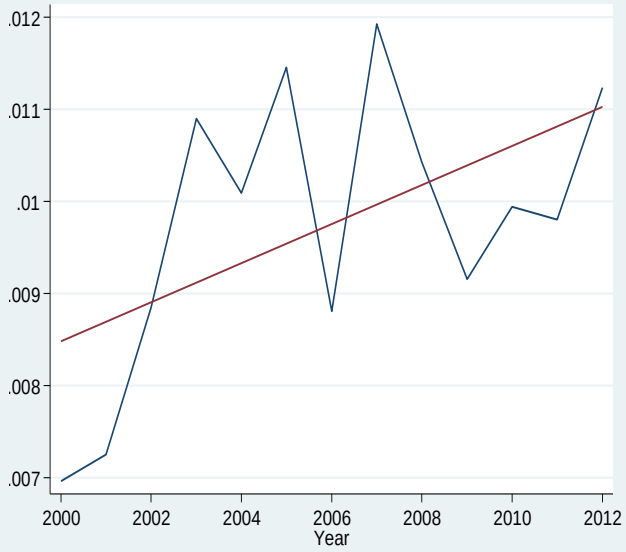
Predicted wage, ‘precarious’



Predicted wage, ‘old worker’



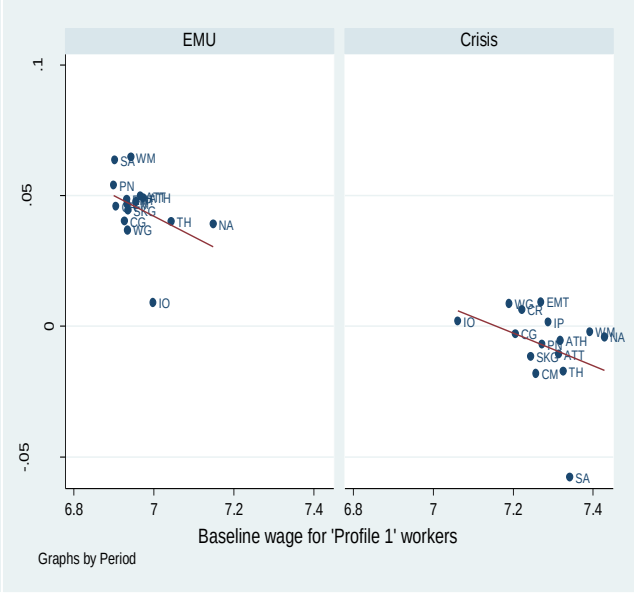
Predicted wage, ‘migrant’



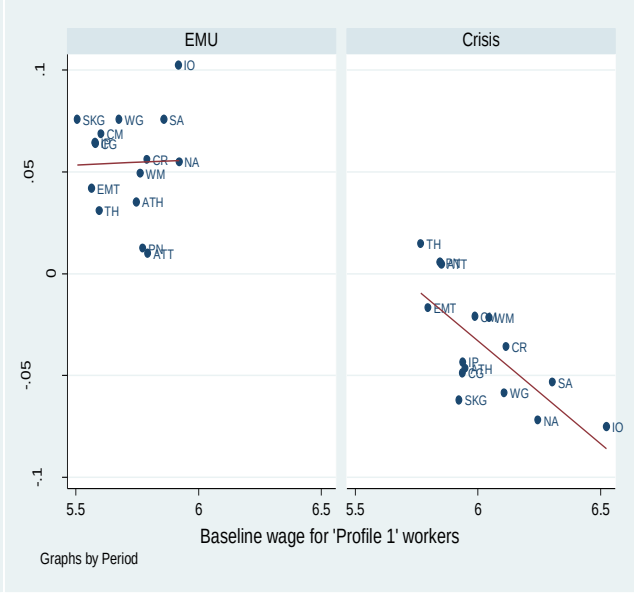
Predicted wage, ‘fem prof/nal’

Convergence-divergence of regional wages by period

Average nominal wages

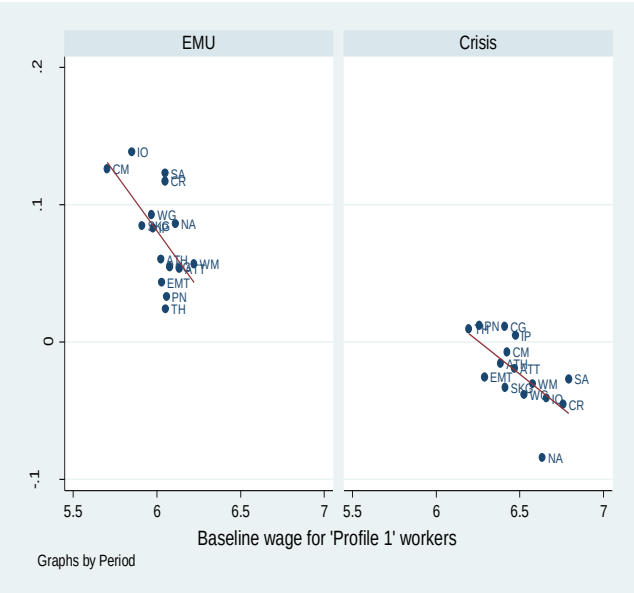


Predicted wage, ‘breadwinner’



Predicted wage, ‘precarious’

Predicted wage, ‘old worker’



Predicted wage, ‘migrant’

Predicted wage, ‘fem prof/nal’