Eurofound

European Foundation for the Improvement of Living and Working Conditions

The tripartite EU Agency providing knowledge to assist in the development of better social, employment and work-related policies

Monitoring Convergence in the European Union

Massimiliano Mascherini
Senior Manager, Social Policy Unit
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Monitoring Convergence in the European Union

- **Convergence trends** between Member States have been achieved over the last decades in both the economic and social dimension

- Suddenly, **since 2008**, **stalling or divergent patterns** marked the performance of the European Union Member States

- **Diverging performances** among Member States and increasing inequalities within Member States **warrant common concerns** as they can signal a general lowering of living and working conditions.

Eurofound work on convergence

- **Eurofound's** strategic objective for the programming period 2017–2020 is '*To provide scientifically sound, unbiased, timely and policy-relevant knowledge that contributes* ***to better informed policies for upward convergence of living and working conditions in Europe***''

- To achieve this strategic objective, Eurofound has designed a new strategic area of investigation entitled **Monitoring Convergence in the European Union**

- In this multiannual activity designed for the period 2017-2020, Eurofound will monitor convergence and divergence among Member States in four main research areas:
    - Employment
    - Working conditions
    - Quality of life
    - Socio-economic factors

Convergence: Outline of the presentation

1. Convergence, an unclear concept
2. How to measure convergence
3. How to define and measure upward convergence
4. Patterns of Convergence/Divergence
5. Time
6. Eurofound framework and strategy to monitor convergence in the European Union
7. Three Examples

Convergence? An unclear concept

The origin of the term ***convergence*** trace back to the Latin language and it derives from the term ***con-vergere,*** namely ***having a common direction***

Convergence is a **technical term** to indicate a ***process*** of moving towards the same point while gradually reducing differences or disparities

Several possible interpretations of the term convergence in policy analysis:

convergence *of what* and **convergence *to where***

Types of convergence

Nominal convergence

Fulfilling the requirements established by the Maastricht Treaty for accession to the European Monetary Union

Structural convergence

Changes in the structure of the economy or welfare systems of Member States towards some common standards or specific policy input

Cyclical convergence

Countries are in the same stage of the business cycle, such as an up or down swing. It is achieved when countries move in sync along the economic cycle

Real convergence

Convergence in economic and social performances in terms of real variables such as convergence in GDP per head, incomes, productivity, labour market outcomes.

Upward convergence

Convergence towards better working and living conditions and/or economic outcomes

Convergence to resilient economic and social structures

Convergence to resilience in short (good adjustment capacity) and in long (good absorption capacity) term.

Eurofound approach

Upward convergence

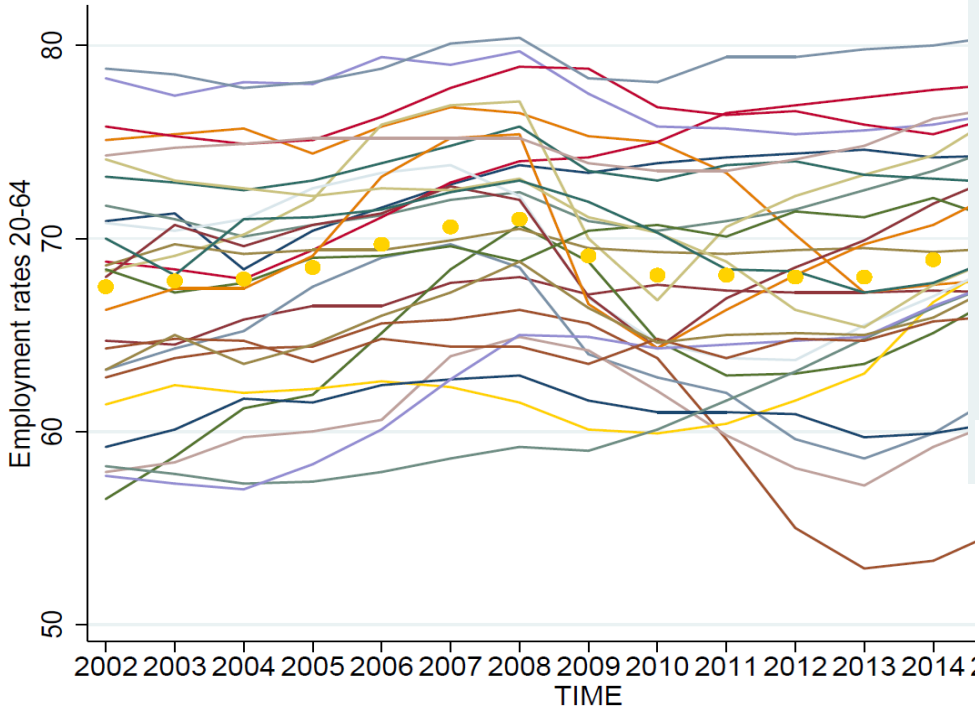
Convergence to better working and living conditions and/or economic outcomes.

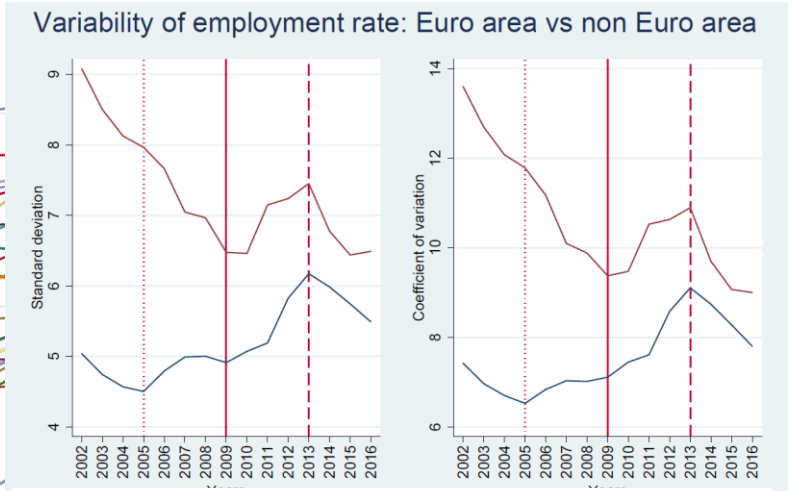
Measured through:

Convergence of Member States in outcomes and performance

How to measure convergence in outcomes and performances?

Measuring convergence is a very complex task.





Countries

	Yearly changes														Instances of convergence/divergence		
	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	Catch up - convergence (6)	Decline of EU & MS even more - divergence (7)	Decline of MS while EU grows - divergence (3)
1. AT	5	4	5		5	5	11	9	5	9	5	4	2	2	0	0	0
2. BE	3	6	6	1	6	1	12	10	3			1	3	1	3	0	3
3. BG	6	6	6	6	6	6		7	3	10	6	6	6	1	9	1	1
4. CY		5	4	5	5	4	11	11	4	8	4	1	1	1	0	0	0
5. CZ	4	4		2	2		11	11	5	9	5	5	5	5	0	0	0
6. DE	4	4	5	5	5	5	9	9	5	9	5	2	2	2	0	0	0
7. DK	4	5	4	5	4	5	8	8	4	8	5	2	2	2	0	0	0
8. EE	5	5	5	5	5	2	8	7	5	9	5	5	5	2	0	1	0
9. EL	6	6	1		1	6	12	7	3	7	3	1	6	6	5	2	2
10. ES	6	6	6	6	1	3	7	7	3	7	3	6	6	6	7	3	3
11. FI	4	4	2	2		5	8	11	5	9	4	4	4	2	0	0	0
12. FR	5	4	2	2	1	6	12	11	4	9	5	4		1	1	0	0
13. HR	6	6	1	1	6	6	12	7	3	7	3	6	6	1	6	2	2
14. HU	6	3	1	1	3	3	12	12	6	10	6	6	6	6	6	0	3
15. IE	4	5	5	2	2	4	7	7	3		6	6	6	6	4	2	1
16. IT	6	6	3	1	1	1	12	12			3	1	1		2	0	2
17. LT	5	4	5	2	5	4	7	7	6	10	5	5	5	5	1	2	0
18. LU	4	6	5	1	1	3	10	9	4	9	4	5	4	4	1	0	1
19. LV	6		5	5	5	2	8	7	6	10	5	5	5	2	2	1	0
20. MT	3	3	1	1	1	6	12	10	6	10	6	6	6	6	6	0	2
21. NL	4	4	2		5	5	11	8	4	9	4	4		2	0	0	0
22. PL	3	3	6	6	6	6	12	12	6	10	6	6	6	6	9	0	2
23. PT	4	4	4	2	4	5	8	11	4	7	3	6	6	6	3	1	1
24. RO	6	3	3		3	1	12	10	3	10	3	6	1	1	2	0	5
25. SE	4	4	2	2	5	2	8	11	5	9	5	2	2	2	0	0	0
26. SI	4	5	2	2		5	11	8	4		3	1	6	1	1	0	1
27. SK	6	3	6	6	6	6	7	7	6	10	3		6	6	8	2	2
28. UK	5	5	2	2	2	2	11	11		9	5	5	2	2	0	0	0

Measuring convergence

Convergence has been conceptualised, and measured, in policy analysis at least four ways:

1. **Beta-convergence** in which laggards catch up to leaders in regard to a specific outcome or policy objective

2. **Sigma-convergence** defined as a decrease in variation of outcomes or performances;

3. **Gamma-convergence,** which examines changes in country rankings with respect to a particular outcome or policy objective

4. **Delta-convergence,** which analyses countries' distance from an exemplary model or group of countries.

Sigma Convergence: measured through standard deviation or the coefficient of variation on unweighted averages, is adopted as measure of convergence in our study

Measuring upward convergence

- **Upward convergence** means **convergence towards better outcomes and performances** and this term is at the core of the current policy debate

- The concept of **upward convergence** is the union of two concepts: the first one is **growth**, or increase in performances and outcomes, the second one is convergence, or the **reduction of disparities**.

- Measuring **upward convergence** means to measure both concepts: increase and convergence in outcomes/performances.

Defining Upward Convergence

- **Weak Upward Convergence:**
  - Reduction of heterogeneity + increase of EU average

$$\begin{cases} g(X_t) < g(X_{t-i}) \\ \mu(X(t)) \geq \mu(X(t-i)) \end{cases}$$

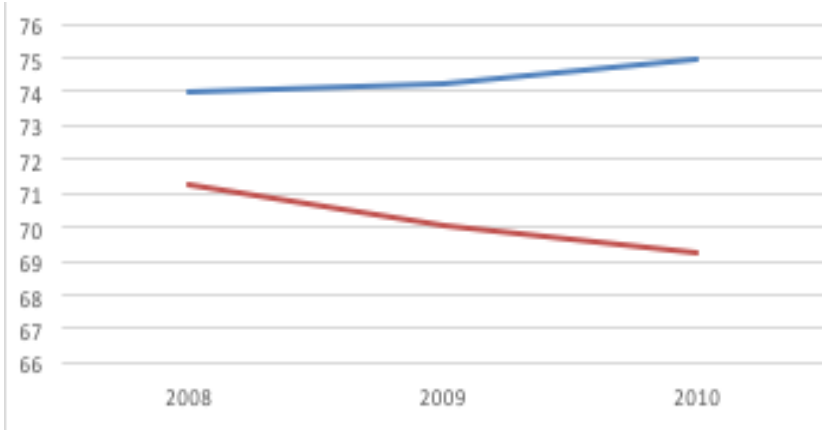
- **Strict Upward Convergence:**
  - Reduction of heterogeneity + increase of all Member States.

$$\begin{cases} g(X_t) < g(X_{t-i}) \\ X(t,j) \geq X(t-i,j) \;\; \forall j = 1..n \end{cases}$$

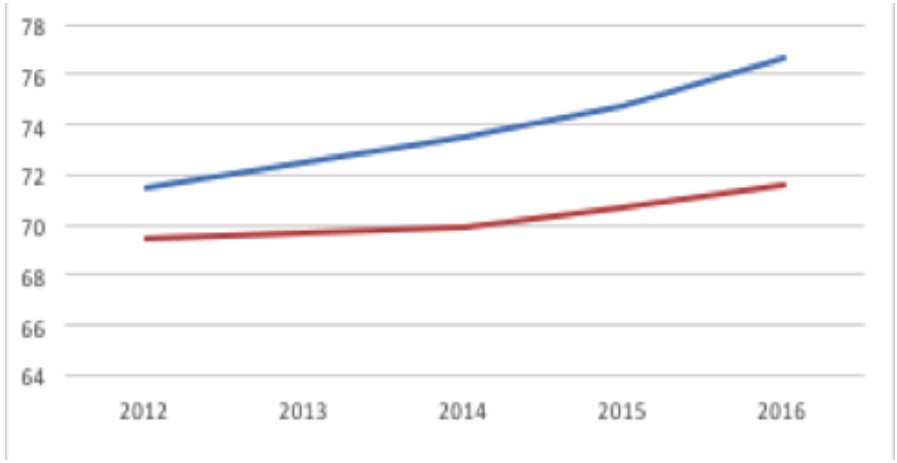
It should be noted that the term '**upward convergence**' is used **irrespectively of the direction of the indicator** considered. Technically, in some cases, i.e. unemployment, the objective of 'upward convergence' is reached through 'downward convergence'.

Patterns of Convergence/Divergence

This is how we usually think about divergence: EU goes up and MS goes down



However, we can have divergence also in other ways, for example when a MS grow less than EU



Patterns of Convergence/Divergence

- The understanding of **convergence/divergence patterns** is **important** in order to understand the **dynamics behind MSs performances** (for example: shocks vs. structural barriers)

- For each MS and two point in time, the comparison of the **gradient** of the **EU average**, of the **MS performance** and **change in squared distance** reveals that there are **12 possible convergence/divergence patterns** between a single MS and EU average.

EU better than MS	EU	MS	Direction: upward	type	Direction: downward	EU better than MS	EU	MS	nickname
yes	up*2	up	type 1	DIVERGENCE	type 11	yes	down*2	down	not at right pace!
no	up*2	up	type 2	CONVERGENCE	type 12	no	down*2	down	Flattening
yes	up	down	type 3	DIVERGENCE	type 9	yes	down	up	collapsing
no	up	down	type 4	CONVERGENCE	type 10	no	down	up	inverting the trend
no	up	up*2	type 5	DIVERGENCE	type 7	no	down	down*2	over performing
yes	up	up*2	type 6	CONVERGENCE	type 8	yes	down	down*2	catching up
yes	down	down*2	type 7	DIVERGENCE	type 5	yes	up	up*2	falling apart
no	down	down*2	type 8	CONVERGENCE	type 6	no	up	up*2	under performing
no	down	up	type 9	DIVERGENCE	type 3	no	up	down	leaving the mess
yes	down	up	type 10	CONVERGENCE	type 4	yes	up	down	recovering
no	down*2	down	type 11	DIVERGENCE	type 1	no	up*2	up	defending better
yes	down*2	down	type 12	CONVERGENCE	type 2	yes	up*2	up	better reaction

Identification of convergence/divergence patterns

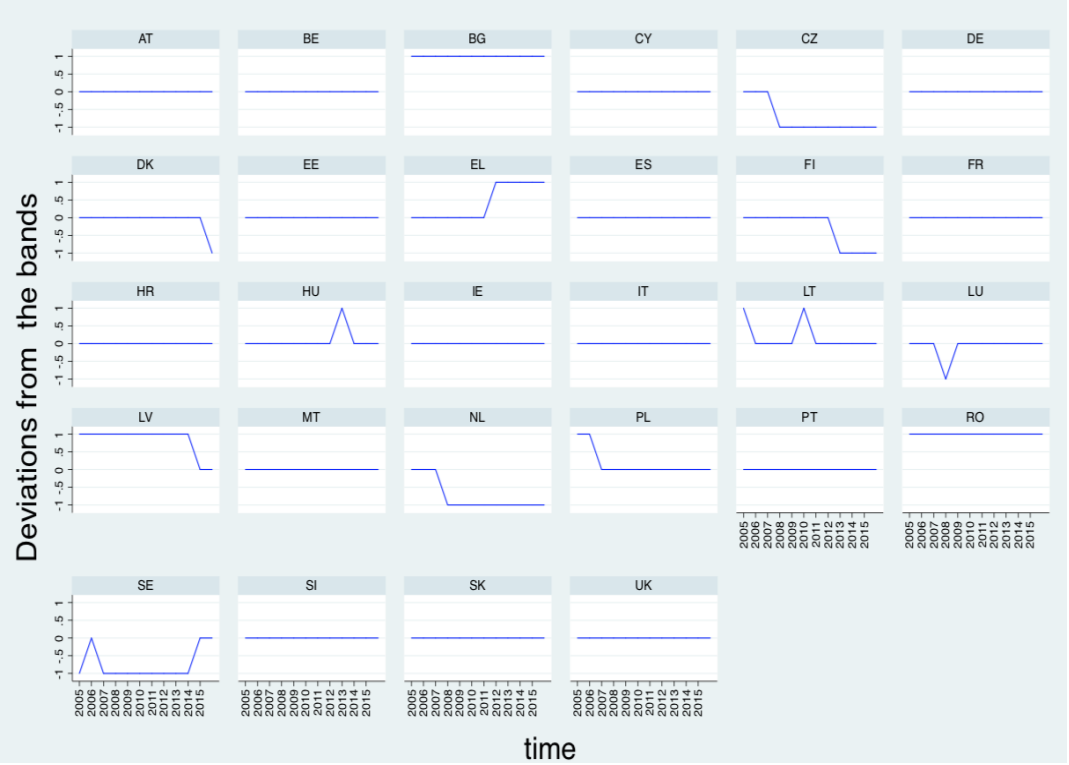
In order to investigate convergence/divergence patterns and to identify most relevant cases, **a semi-automated algorithm** has been created: ***Hitchhiker*** .

1. Identification of patterns
   $\nabla \mu_{EU}$; $\nabla f_{MS,}$; $\Delta_{t,t-1}\sigma^2 > 0$

2. Identification of the magnitude of the patterns

3. Identification of relevant changes in performances

4. Selection of case studies



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Time horizon

- What is time horizon to consider in order to have meaningful insights of convergence?

- While the investigation of **one or two years' volatility** may be **important,** more **critical** is the question on how trends **converge** or diverge **through a full business cycle** and beyond.

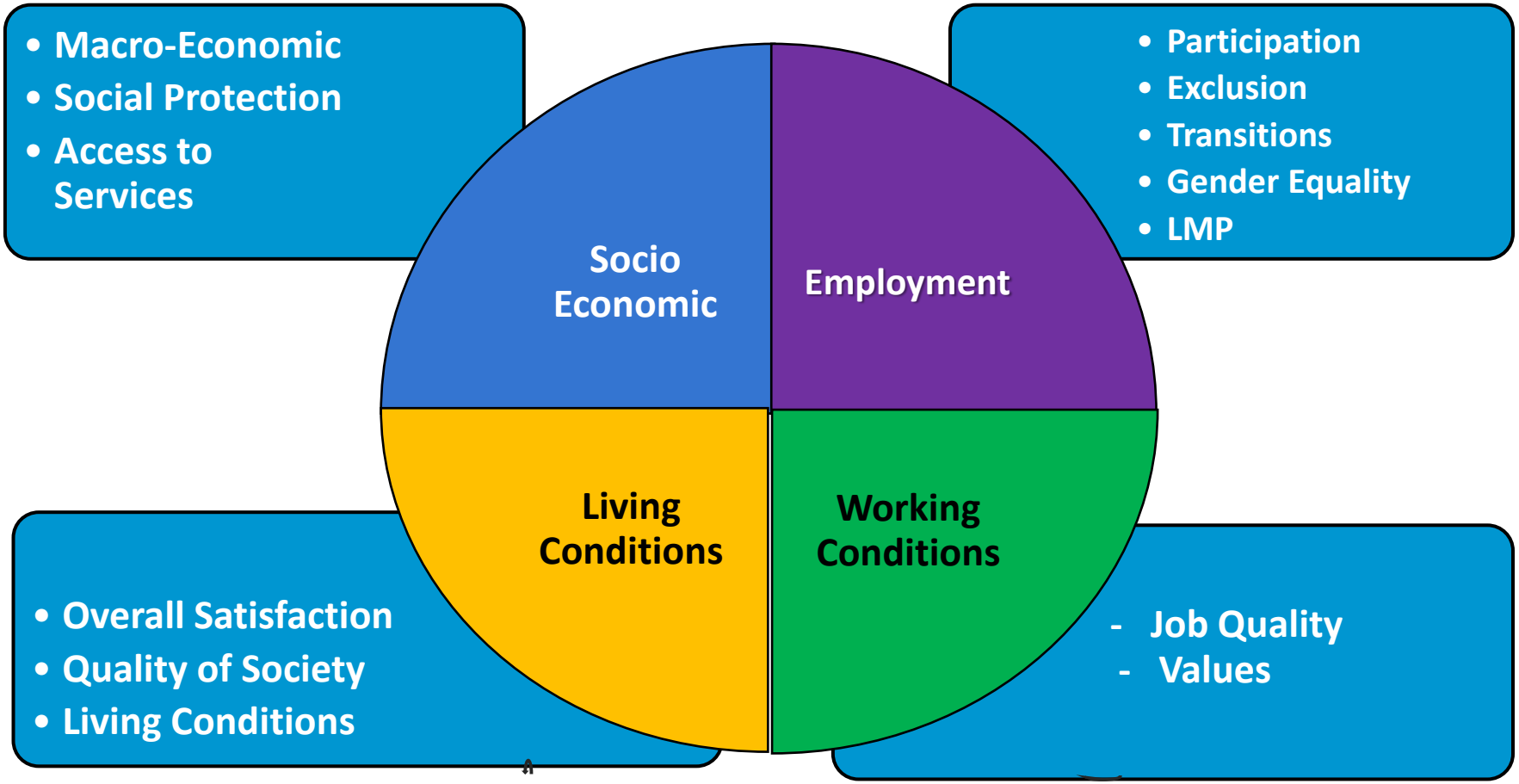
- For this reason, jointly with **short time changes**, whenever possible, the analysis of **long-term (10-15 year) trends** should be performed in order to establish what is temporary and what is lasting.

- This in order to indicate the opportunity of systemic corrections in case long-term divergence is statistically proven.

Eurofound strategy

- **Sigma Convergence**: standard deviation and CV
- **Upward convergence**: weak and strict upward convergence.
- **Patterns of convergence/divergence**: *Hitchhiker* algorithm - our alert indicator system.
- **Time horizon**: year by year and 10-15 years.
- **Framework:**

Eurofound Framework



An example of the application of Eurofound's approach

- In this presentation, the analysis on **3 indicators** are presented as example of the application of the methodological approach developed by Eurofound for monitoring convergence
    1. **AROPE**
    2. **Unemployment**
    3. **Income Inequality**

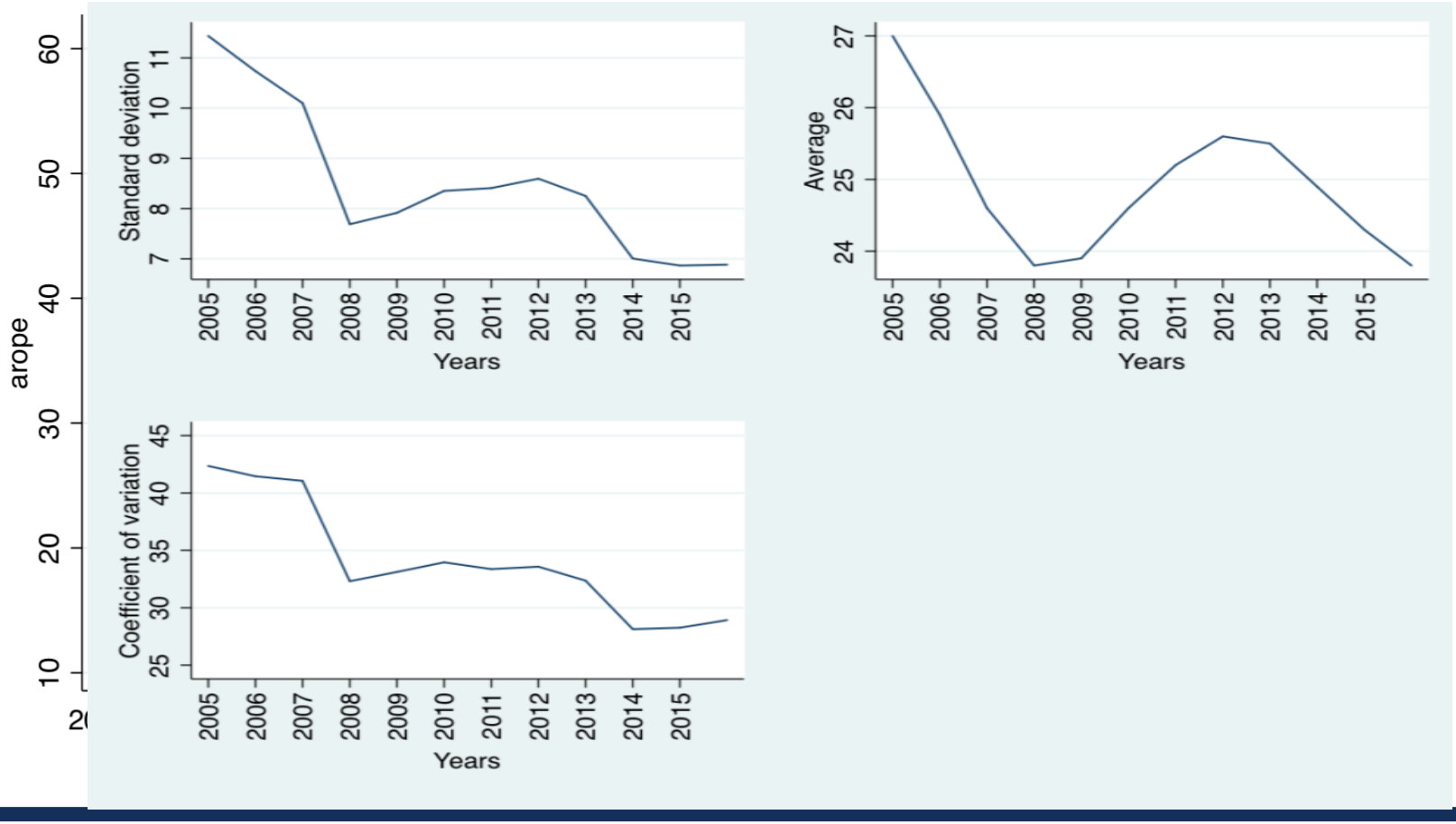
- The **statistical consistency** of the scoreboard was crosschecked through:
    - Correlation analysis
    - Cronbach Alpha
    - Principal Component Analysis

The Social Scoreboard

- On the basis of the analysis performed, **the social scoreboard** appear to be **statistically consistent** and **robust**
  - Very few are the indicators very highly correlated: They are mainly those breakdown by gender
  - Almost all indicators record their highest correlation with other indicators of the same dimension and sub-dimension
  - The analysis of internal consistency shows a very high Cronbach alpha coefficient (>.7) for all the dimensions and sub-dimensions considered
  - PCA results are less clear

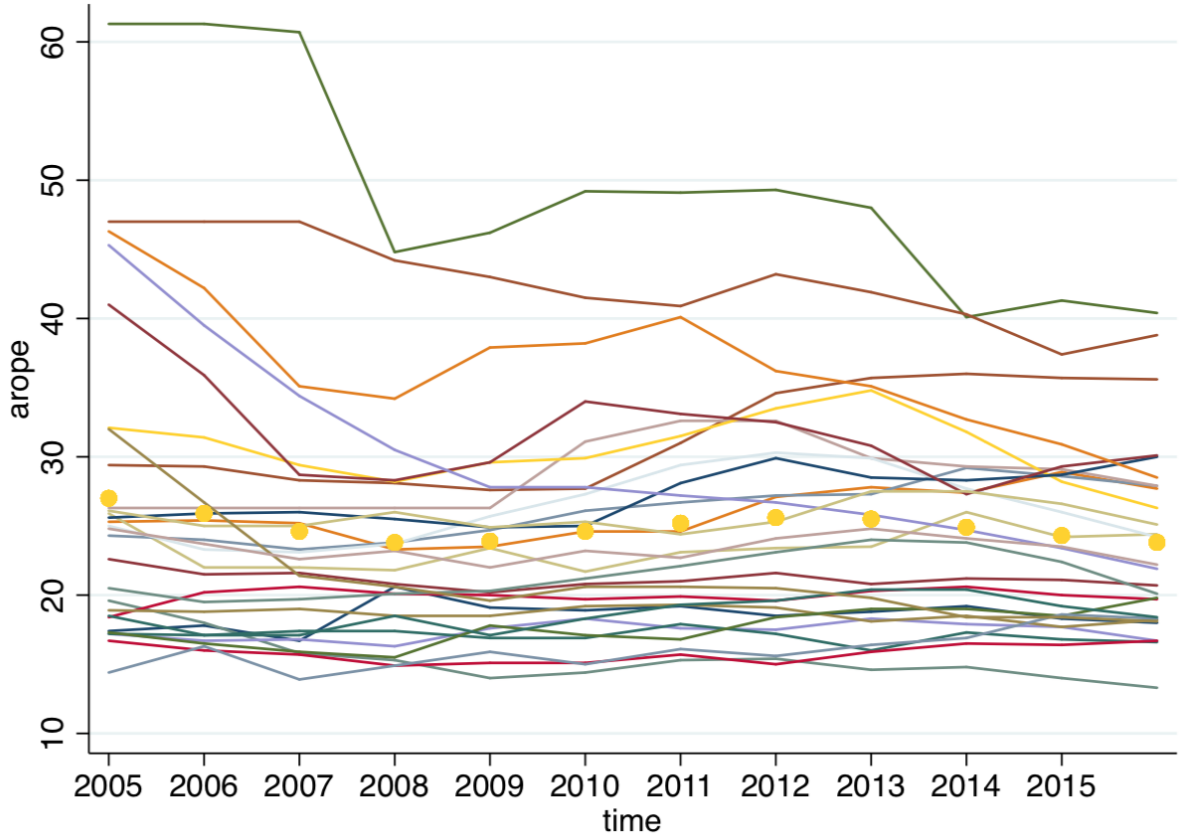
AROPE

Weak Upward Convergence



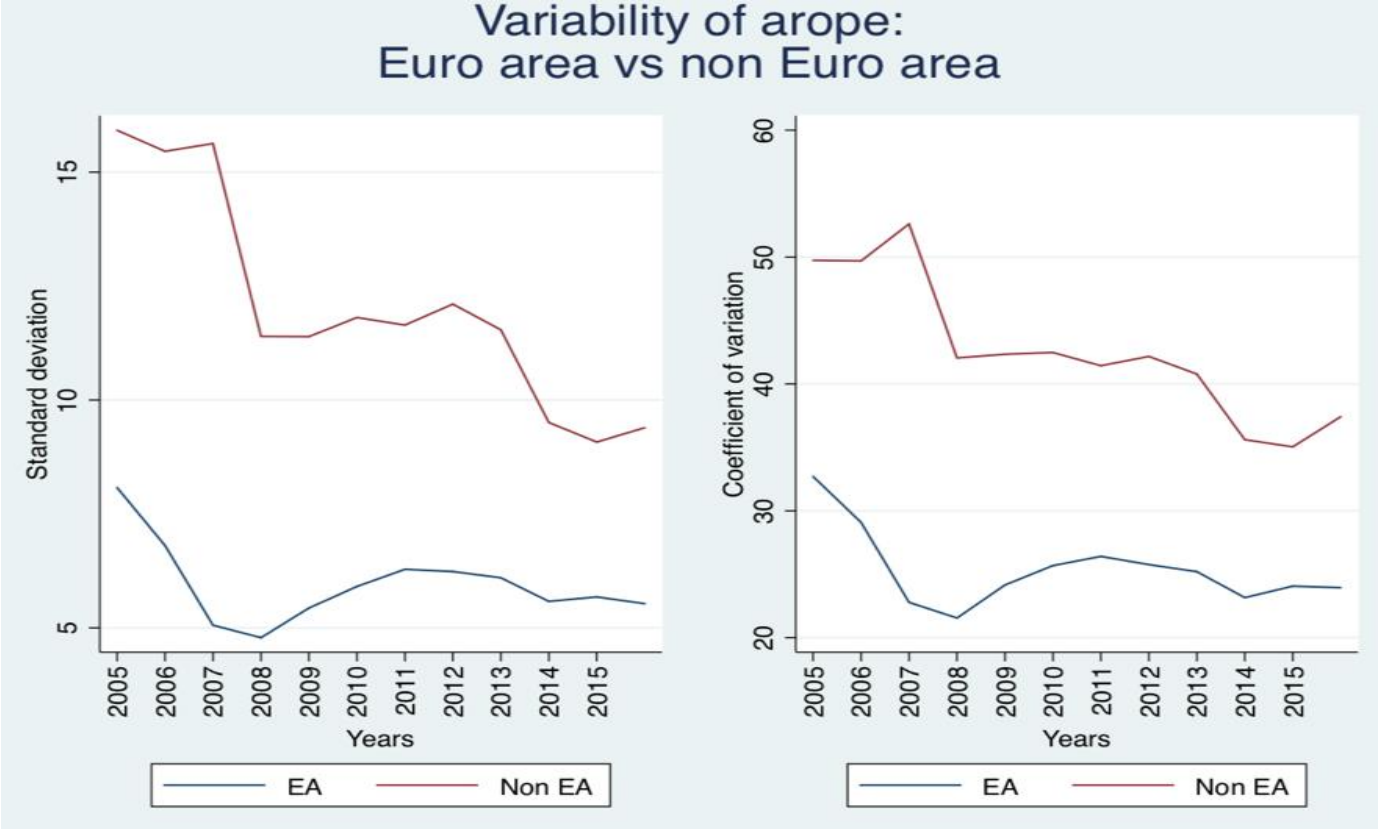
AROPE

Weak Upward Convergence



AROPE

Weak Upward Convergence



AROPE

Weak Upward Convergence

	changes 2005-2016	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2015	2016
AT	0	0	1	0	1	1	0	1	0	0	1	1	0
BE	1	1	0	1	1	0	0	0	1	0	1	1	1
BG	1	0	1	1	0	0	1	0	1	1	0	0	1
CY	0	0	1	1	0	0	0	0	0	1	0	0	1
CZ	1	1	1	1	1	0	0	0	1	0	1	1	1
DE	0	0	0	1	1	1	0	1	0	0	1	1	1
DK	1	1	0	1	0	0	1	1	0	1	1	1	1
EE	1	1	0	1	0	1	0	0	0	0	1	1	1
EL	0	1	1	1	1	0	0	0	0	0	1	1	0
ES	0	1	1	0	0	0	0	0	0	0	1	1	1
FI	1	1	0	0	1	0	0	1	1	0	1	1	1
FR	1	1	0	1	0	0	0	1	1	0	1	1	1
HR	0	0	0	0	0	0	0	0	1	1	1	1	0
HU	1	1	1	1	0	0	0	0	0	1	1	1	1
IE	1	1	1	0	0	0	0	0	1	1	1	1	1
IT	0	0	0	1	1	0	0	0	1	1	0	0	1
LT	1	1	1	1	0	0	1	1	1	1	0	0	0
LU	0	1	1	1	0	1	1	0	0	0	1	1	0
LV	1	1	1	1	0	0	0	1	1	1	1	1	0
MT	1	1	0	0	0	0	0	0	0	1	1	1	1
NL	0	1	1	1	0	0	0	1	0	0	1	1	1
PL	1	1	1	1	1	0	1	1	1	1	1	1	0
PT	1	1	0	0	1	0	1	0	0	0	1	1	1
RO	1	0	0	1	1	1	1	0	1	1	1	1	1
SE	0	0	1	0	0	1	0	1	0	0	0	0	0
SI	1	1	0	0	1	0	0	0	0	0	1	1	1
SK	1	1	1	1	1	0	0	1	1	1	0	0	1
UK	1	1	1	0	1	0	1	0	0	1	1	1	1

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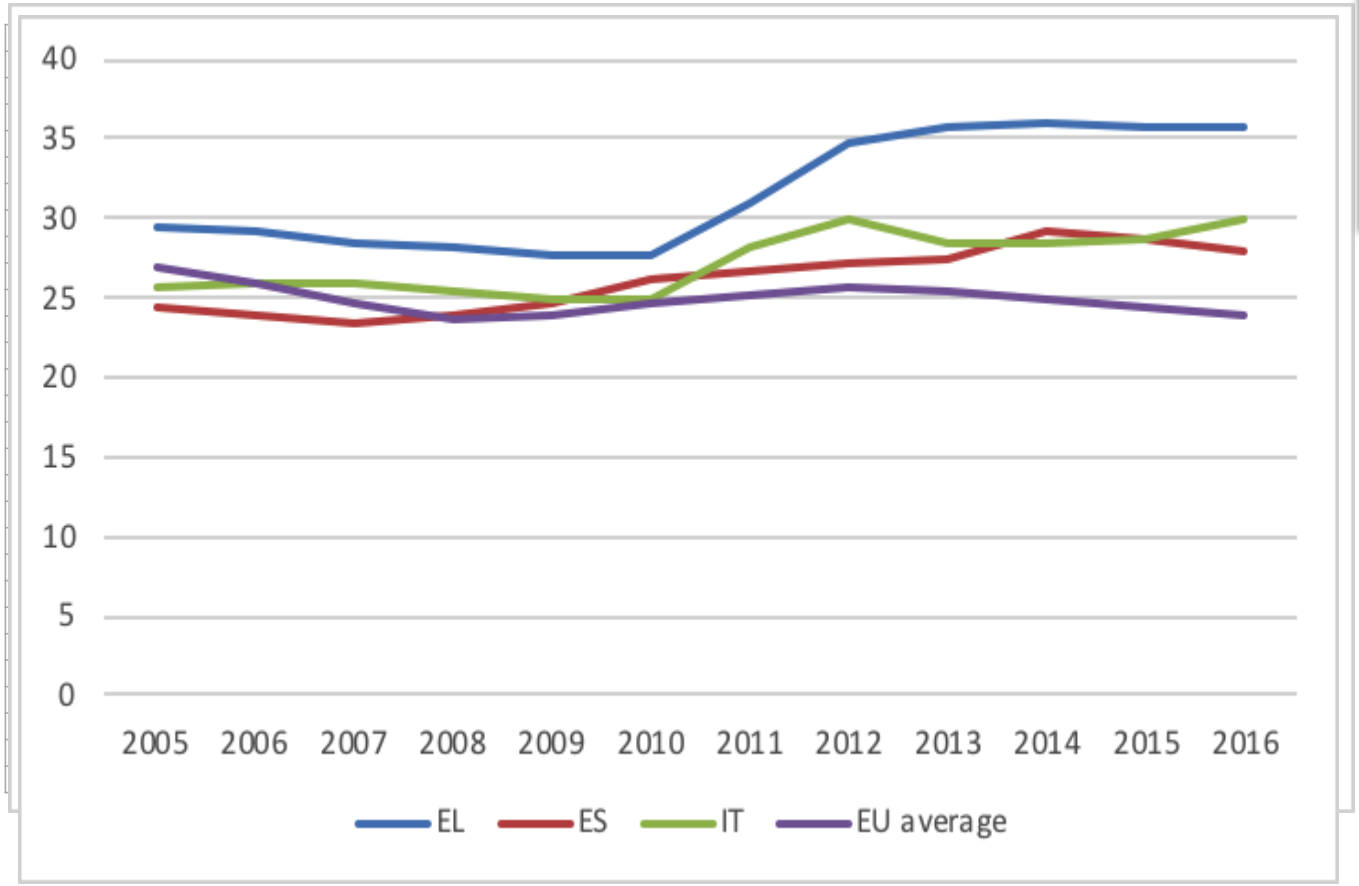
AROPE

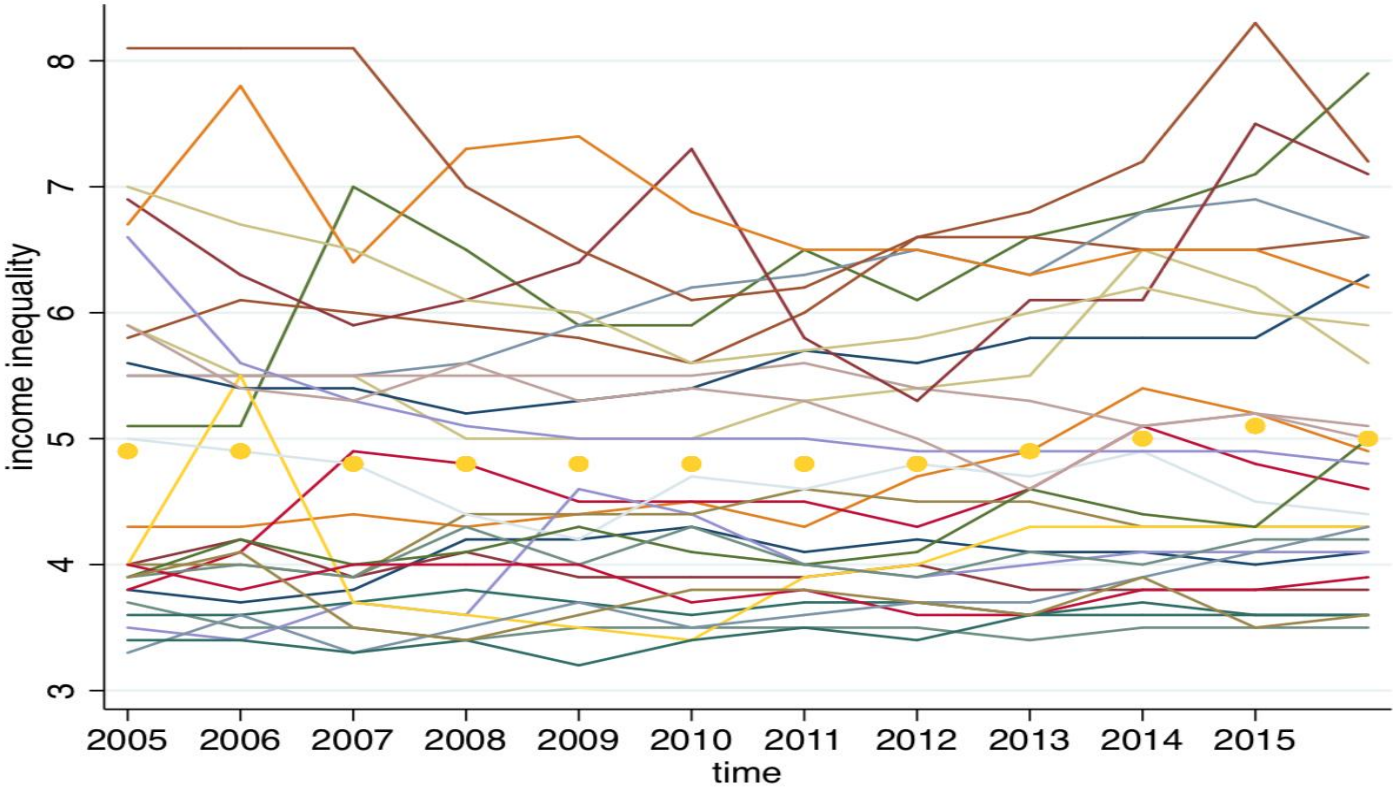
Patterns of Convergence/Divergence



Divergence:
EL,ES,IT

Income inequality

Weak downward convergence (marginal reduction heterogeneity and increase of average)



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Income inequality

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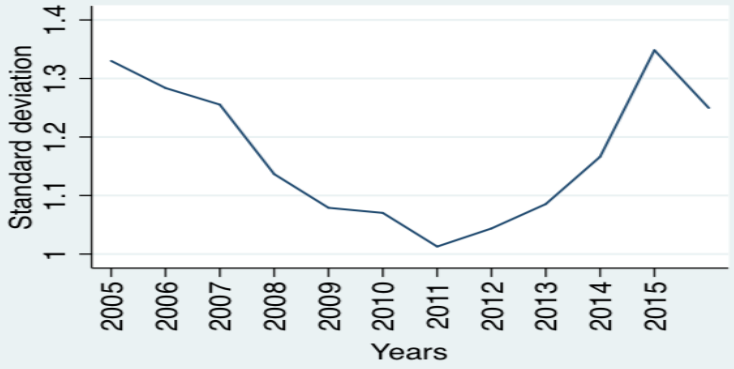

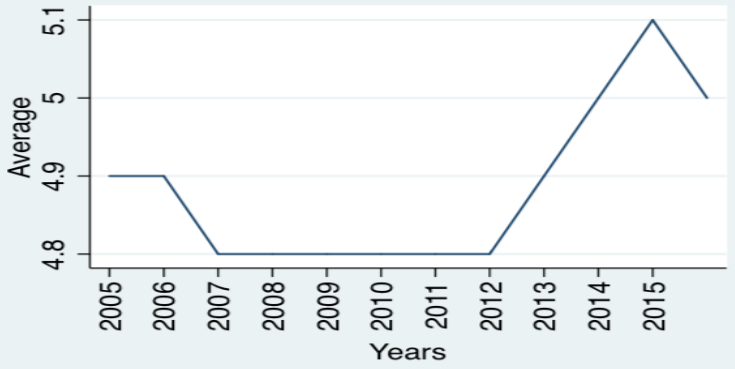

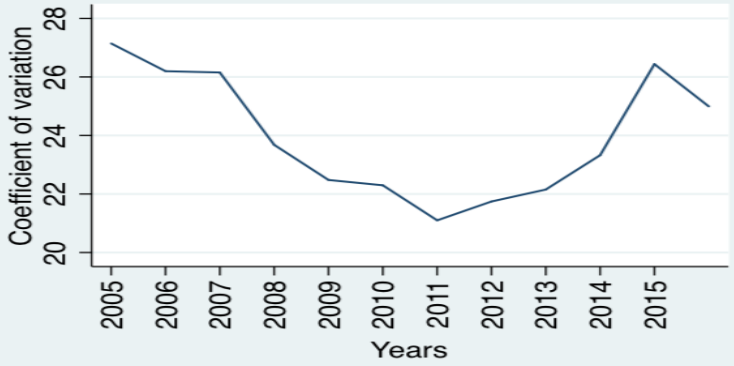

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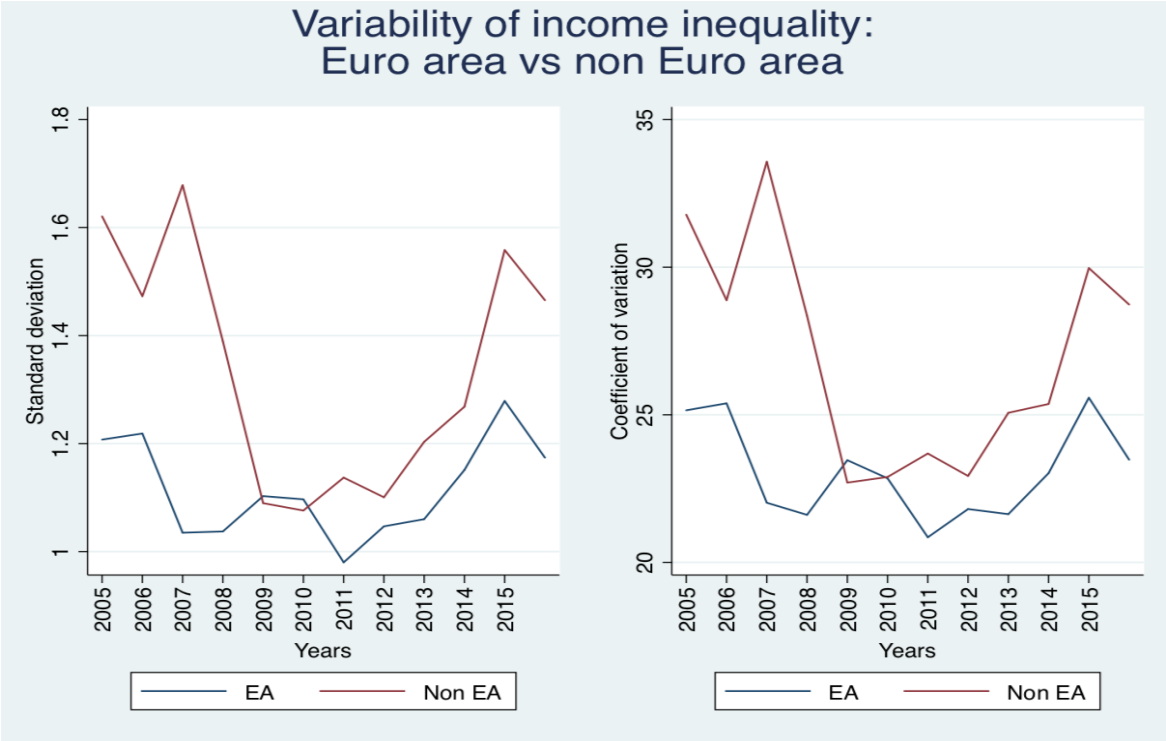
Income inequality

Weak downward convergence (marginal reduction heterogeneity and increase of average)



Eurofound

Income inequality

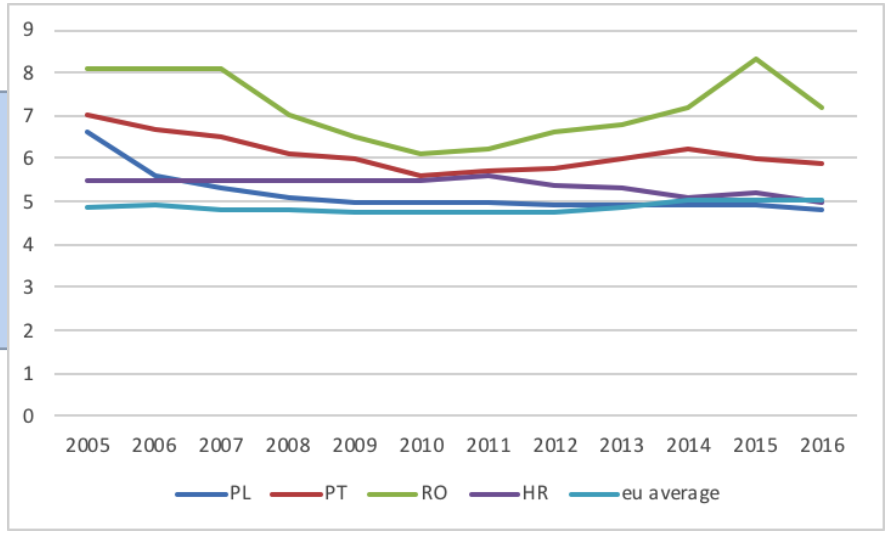
Weak downward convergence (marginal reduction heterogeneity and increase of average)

	change 2005-2015	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
AT	1	0	1	1	0	1	0	1	0	0	0	1
BE	0	1	0	1	0	0	0	1	0	0	0	0
BG	1	0	1	0	0	0	1	0	1	1	1	1
CY	1	0	1	0	1	1	0	1	1	1	0	0
CZ	0	0	0	0	1	0	0	0	0	1	0	0
DE	1	1	1	0	0	0	0	0	1	1	0	0
DK	1	0	1	0	1	0	0	0	1	1	0	0
EE	0	0	0	0	0	0	1	1	1	1	0	0
EL	1	1	0	0	0	0	1	1	0	0	0	1
ES	1	0	0	1	1	1	1	1	0	1	1	0
FI	0	0	1	1	0	0	1	0	0	0	0	0
FR	1	0	0	1	0	0	1	0	0	0	0	0
HR	0	0	0	0	0	0	1	0	0	0	1	0
HU	1	1	0	0	0	0	1	1	1	0	0	0
IE	0	0	0	0	0	1	0	1	0	1	0	0
IT	1	0	0	0	1	1	1	0	1	0	0	1
LT	1	0	0	1	1	1	0	0	1	0	1	0
LU	1	1	0	1	1	0	0	1	1	0	0	1
LV	0	1	0	1	1	0	0	0	0	1	0	0
MT	1	1	0	1	0	1	0	0	1	0	1	0
NL	0	0	1	0	0	0	1	0	0	1	0	1
PL	0	0	0	0	0	0	0	0	0	0	0	0
PT	0	0	0	0	0	0	1	1	1	1	0	0
RO	0	0	0	0	0	0	1	1	1	1	1	0
SE	1	1	0	1	1	0	1	1	0	1	1	1
SI	1	0	0	1	0	1	1	0	1	1	0	0
SK	0	1	0	0	1	1	0	0	0	1	0	1
UK	0	0	0	1	0	1	0	0	0	1	1	0

Income inequality

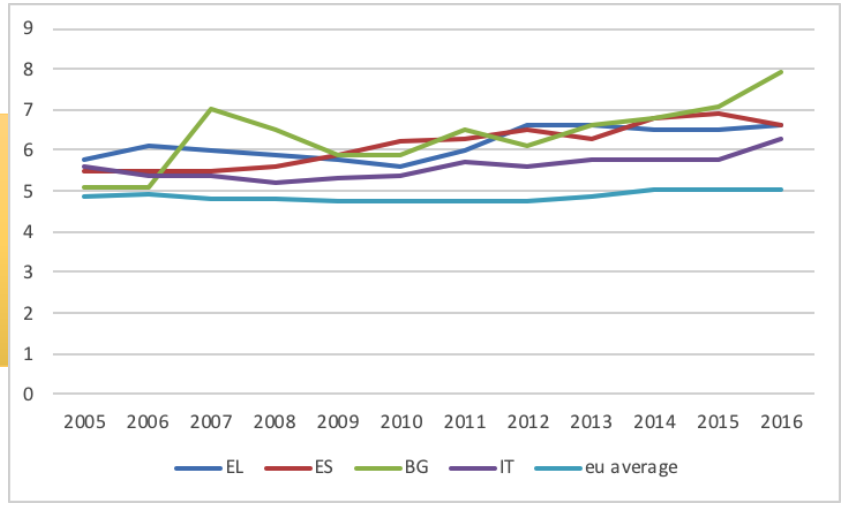
Catch-up:

PL, PT, RO, HR



Divergence:

EL,ES,BG,IT



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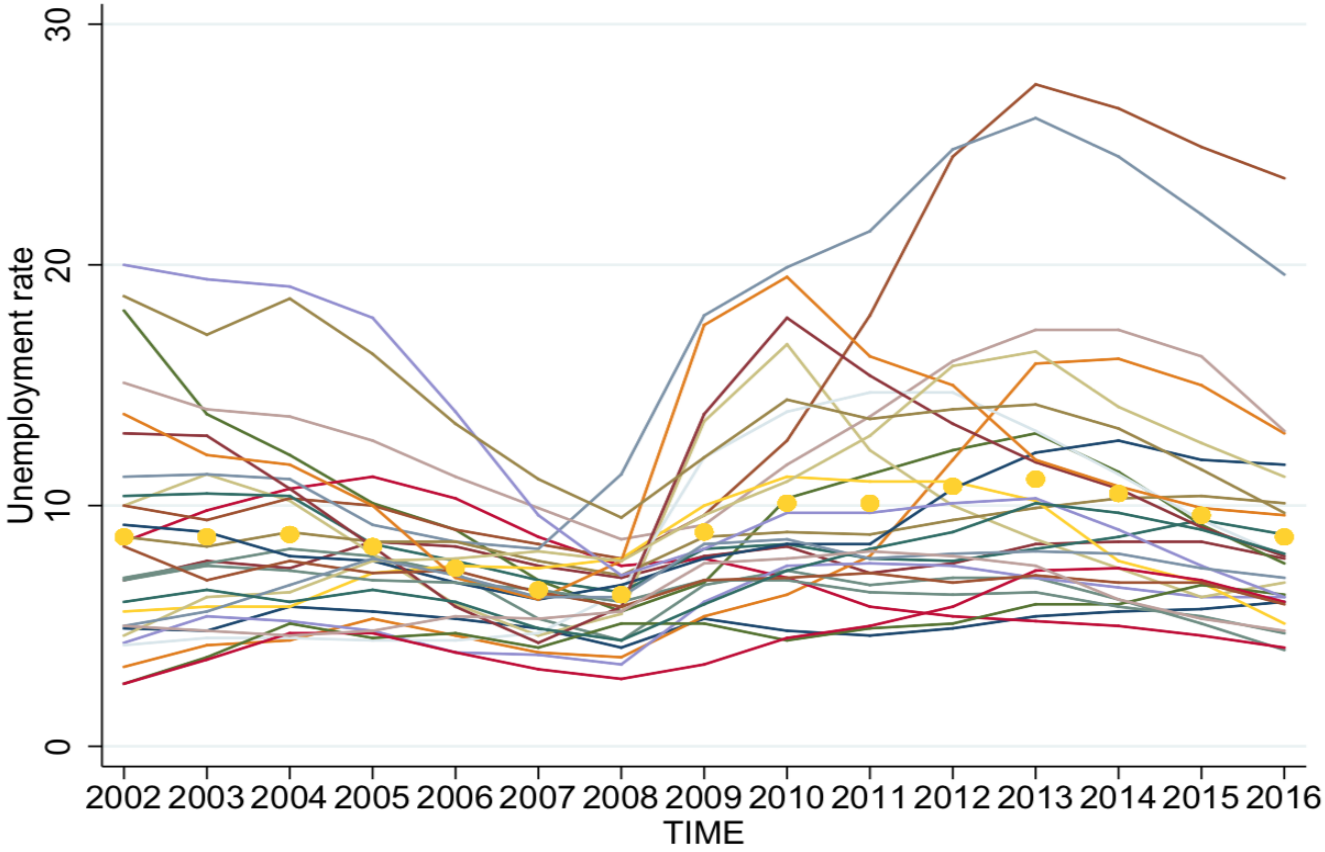
Labour market: Unemployment

Weak Upward Convergence



Labour market: Unemployment

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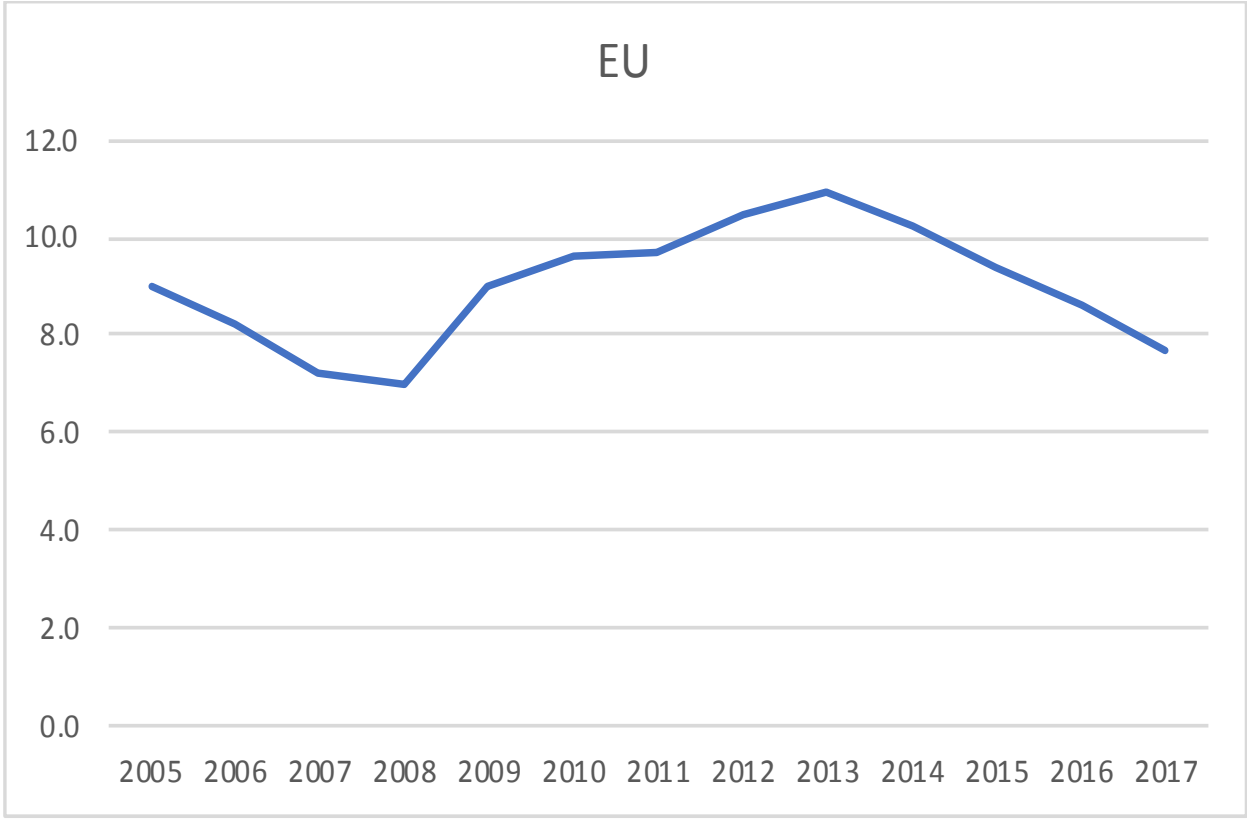
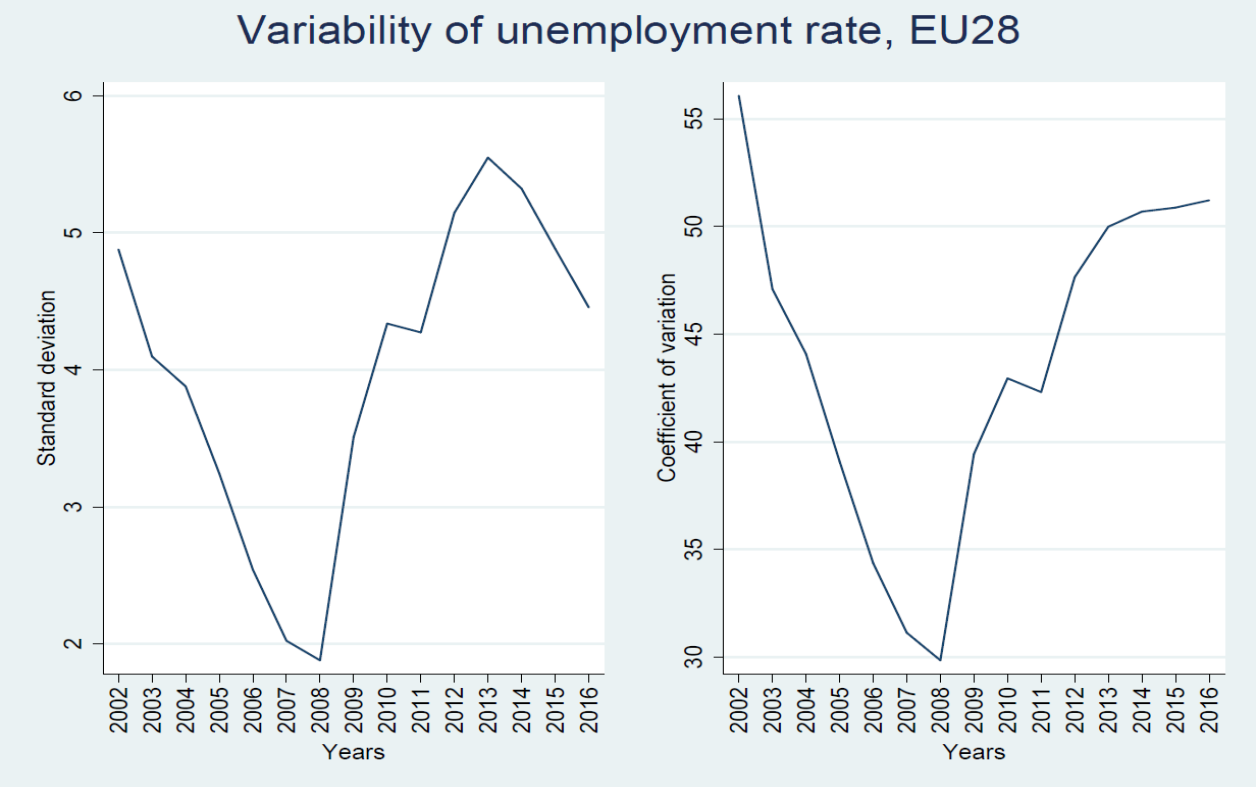


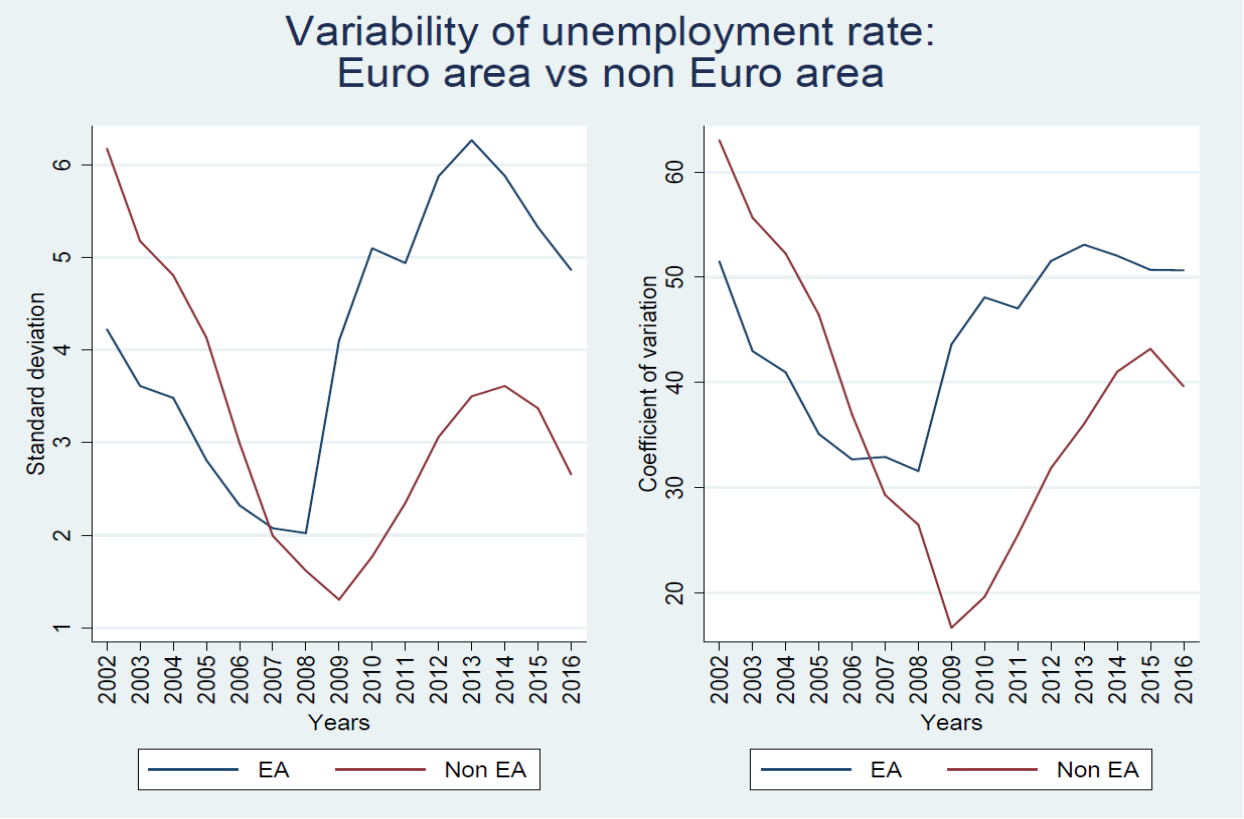
Labour market: Unemployment

Weak Upward Convergence



Labour market: Unemployment

Weak Upward Convergence



Unemployment

Patterns of Convergence/Divergence

		Yearly changes														Instances of convergence/divergence		
		2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	Catch up - convergence (8)	Decline of EU & MS even more - divergence (5)	Decline of MS while EU grows - divergence (9)
Countries	1. AT	3	6	12	12	12	7	1	3	3	1	6	10	10	10	0	0	0
	2. BE	6	3	10	11	11	8	1	1	3	1	6	10	10	12	1	0	0
	3. BG	4	4	8	8	8	7	1	6	5	5	5	8	8	7	5	3	0
	4. CY	6	6	10	12	12		1	1	6	6	5	9	8	8	2	1	1
	5. CZ	6	6	12	12	7	7	1	1	3	1	1	7	7	7	0	0	0
	6. DE	5	5	9		8	8	2	3	3	3	3	12	12	12	2	2	1
	7. DK	6	3	12		12	7		6	6	3	3	12	12	10	0	0	0
	8. EE	5	4	8	7	7	10	5	5	4	4	3	7	7	10	1	3	0
	9. EL	4	5	11	8	11	8	2	5	5	5	5	8	8	8	5	5	0
	10. ES	5	4	8	11	11	9	5	5	5	5	5	8	8	8	4	6	1
	11. FI	5	4	8	11	11	8	1	1	3	3	6	10	10		2	1	0
	12. FR	3	6		9	11	8	2	1	3	1	6	10	9	11	1	0	2
	13. HR	4	4	8	8	8	8	2	5	5	5	5	9	8	8	6	4	1
	14. HU	6	1	10	10	11	9	2		4	2	3	7		7	0	0	1
	15. IE	6	1	12	10	10	10	5	5	5	2	4	8	8	7	2	3	0
	16. IT	4	3	12		12		1	1		6	5	9	11	11	0	1	1
	17. LT	4	4	8	7	7	10	5	5	4	4	4	8	7	7	2	2	0
	18. LU	6	6	7	10	12	10	1	3	6	1	6	10	10	12	0	0	0
	19. LV	4	4	8	8		9	5	5	4	4	4	8		11	3	2	1
	20. MT	6	3	12	12	12	7	1	1	3	3	1		12	12	0	0	0
	21. NL	6	6	10	12	12	7	1	1	6	6	6	10	12		0	0	0
	22. PL	4	4	8	8	8	8	2	6		1	1	7	7	7	4	0	0
	23. PT	6	6	10	10	9	8	2	5	5	5	5	8	8	8	4	4	1
	24. RO	3	6		10		7	1	1	6	3		12	10		0	0	0
	25. SE	6	6	10	12		10	1	1	3	1	1	12	12	12	0	0	0
	26. SI	6	3	10	12	7	7	1	6	6		6	12	12	7	0	0	0
	27. SK	4	5	8	8	8	8	2	5	4	2	2	8	8	8	7	2	0
	28. UK	3	3	10	10	12	10	1	1	6	3	3	7	12	12	0	0	0

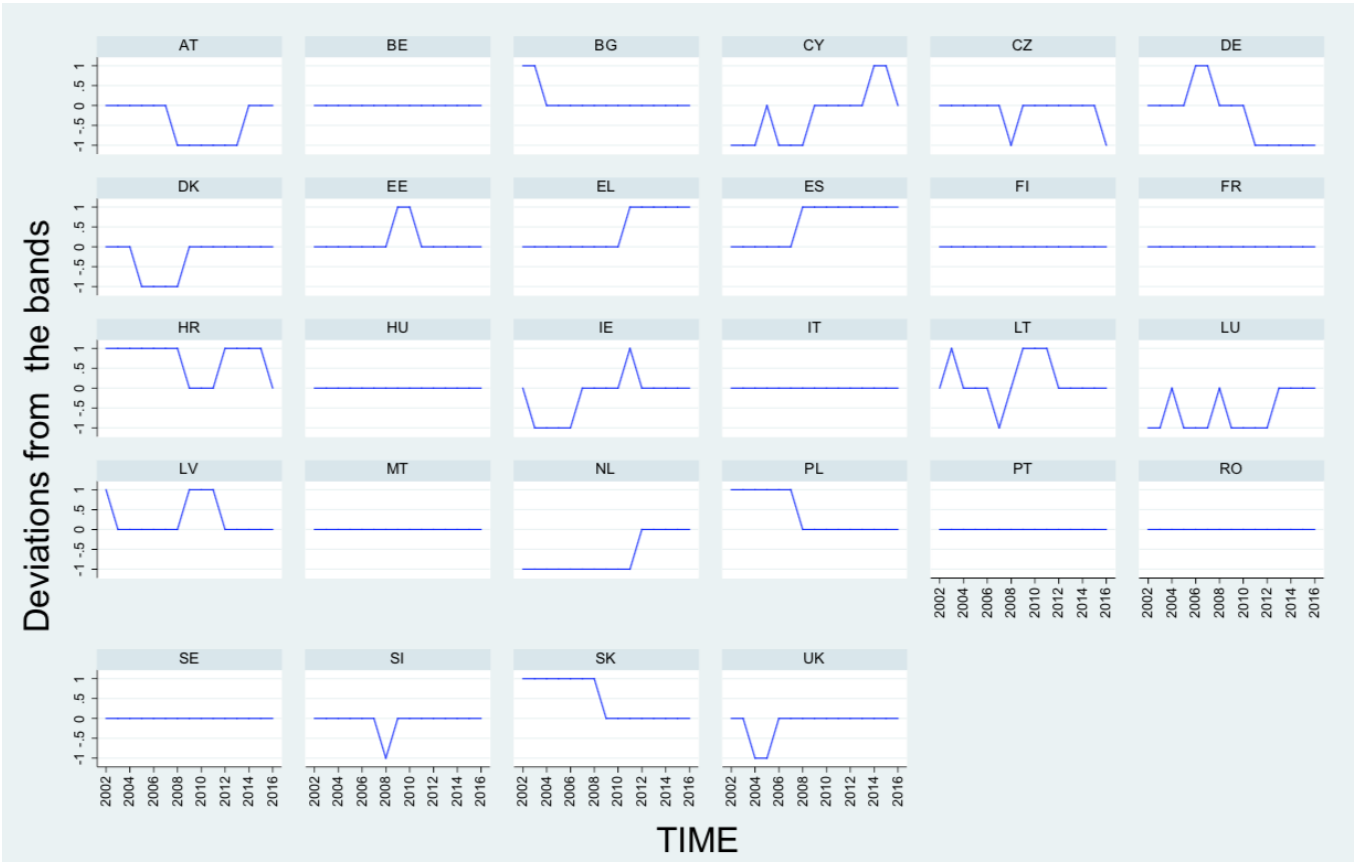
Positive catch up: HR,LT,LV,PL,SK

Divergence: BG,EL,ES,HR

Eurofound

Unemployment

Patterns of Convergence/Divergence



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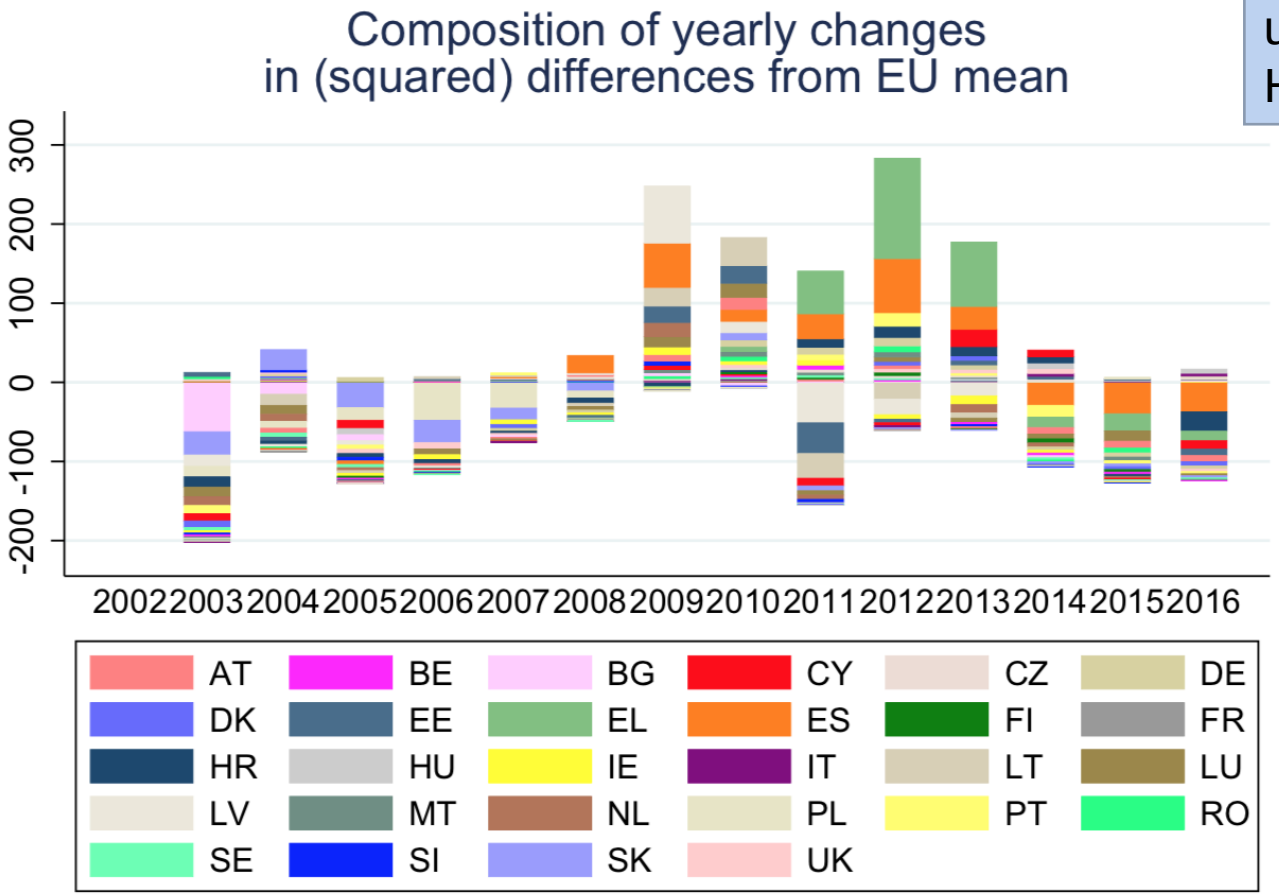
Eurofound

Unemployment

- Patterns of Convergence/Divergence



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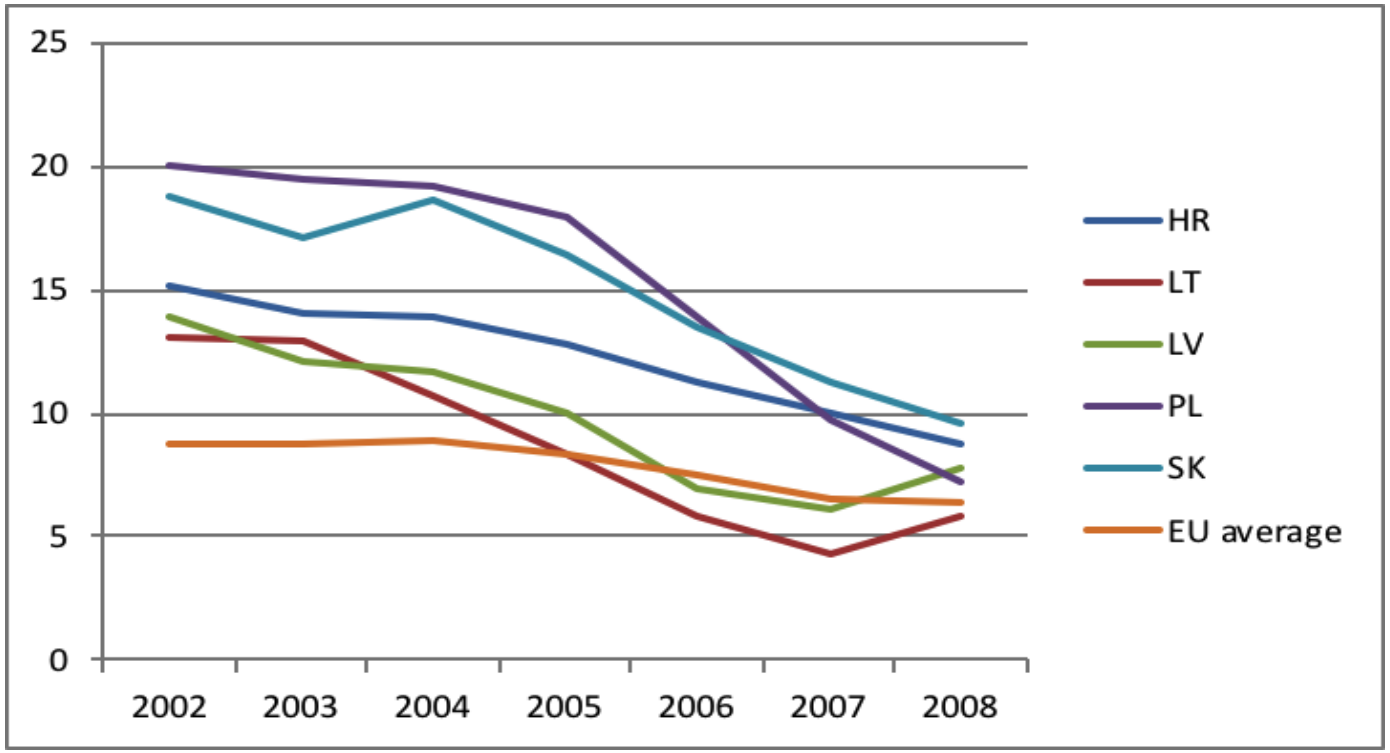
Eurofound

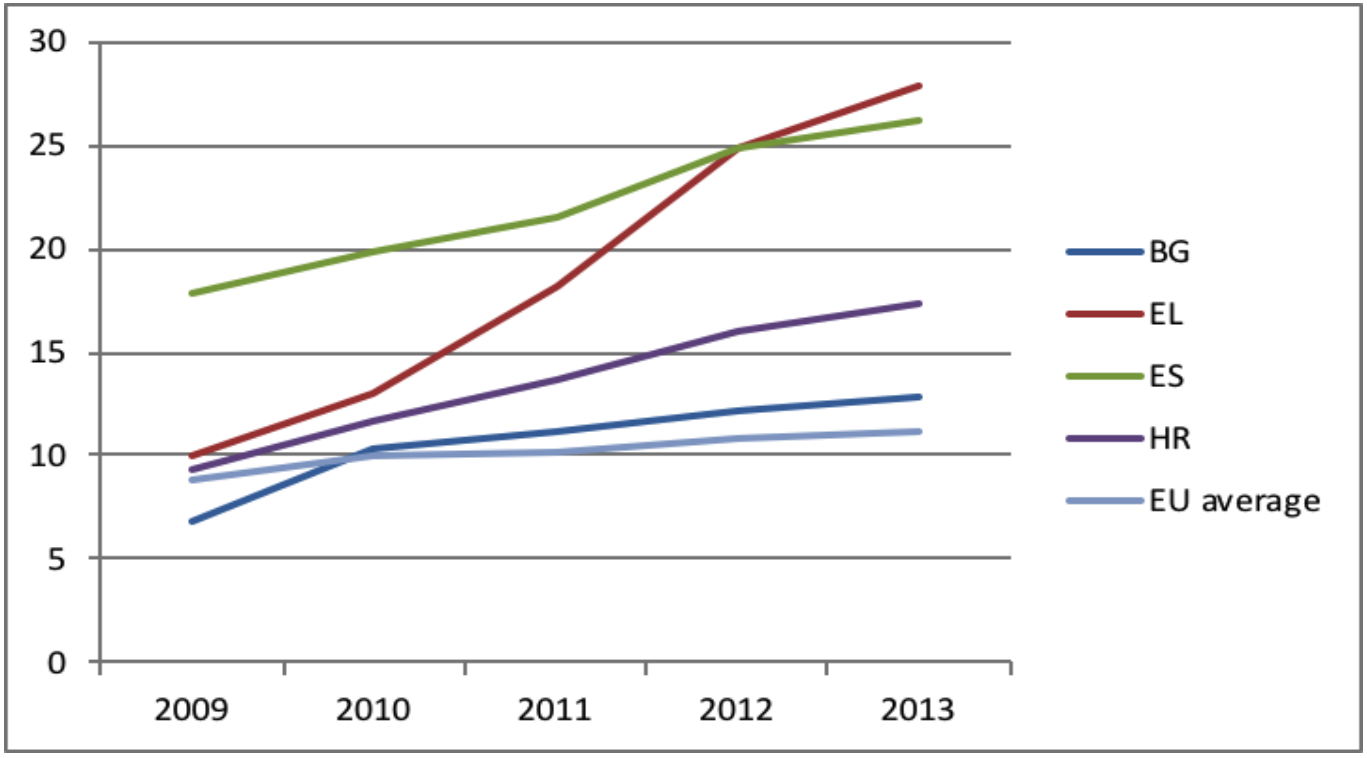
Unemployment

Patterns of Convergence/Divergence



Unemployment

Patterns of Convergence/Divergence



Conclusions

- Measuring convergence is a complex exercise

- Eurofound methodological approach on Monitoring Convergence in the European Union
  - Sigma Convergence
  - Patterns of Convergence/Divergence of MSs

- **Next Steps:**
  - Eurofound Report on Monitoring Convergence in the EU – 2018Q3
  - One report for each Dimension in 2019/20 + web repository
  - Flagship Report in 2021