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Measuring European Regional Economic Resilience: operationalising a complex concept

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ESPON project pages

ESPON funded research ECR2: Economic Crisis The Resilience of Regions.

The main results can be found at:

http://www.espon.eu/main/Menu_Projects/Menu_AppliedResearch/ECR2.html

The final report is available to download at the Cardiff University web-site:
http://cplan.subsite.cf.ac.uk/cplan/research/economic-crisis

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Outline

- We quantify resilience of European regions after dating business cycle turning points. Our approach allows us to analyse the recent crisis impact across European NUTS 2 level employment and GDP.
- We set out our methodology with reference to the classical business cycle.
- We present maps showing resilience categories across Europe and within country comparisons.

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Preview of Results

- We find that national employment in Germany, Poland, Luxembourg and Switzerland were resistant to the most recent crisis. Only Polish GDP was resistant.
- By 2011, 5 countries had recovered their pre-crisis peak employment level (Austria, Belgium, Malta, Norway and Sweden). 8 had recovered peak GDP levels (Austria, France, Denmark, Malta, Norway, Slovakia, Sweden and Switzerland).
- From the 280 NUTS 2 regions analysed, 12% of regions employment resisted the crisis, 23% had recovered by 2011, while 65% were yet to fully recover to their pre-recession peak levels.

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Regional Resilience Defined

Regional economic resilience may be defined as the capacity of a local economy to withstand, recover from and reorganize in the face of shocks to its growth path (Martin and Sunley, 2014; Bristow and Healy, 2014).

We have identified 4 categories of resilience for regions:

1. Those that have resisted shocks (RS).
2. Those that have recovered to pre-recession levels (RC).
3. Those that have not recovered but have reached the trough turning point (NR1).
4. Those yet to have recovered and are still falling (NR2).

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What is an economic shock?

- This could be a **global** phenomenon, Dow's (1998) book "Major Recessions: Britain and the World, 1920-1995" attributes the UK recessions of 1973-5 and 1979-82 to the OPEC oil price increases. More recently the financial crisis of 2008 spread rapidly throughout the world following the collapse of US banks with toxic debts.
- It could be **national** events. The UK 1989-93 recession is called the "debt recession" in Dow (1998). The surge of demand during 1985-1988, with favourable terms of trade and growing confidence in a de-regulated financial system caused rapid growth. The rise in interest rates could have triggered the recession and exacerbated large levels of debt, consumer spending and confidence fell and house building and business investment contracted.
- **Regional**, local events like a factory closure may shock the local labour market.

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The Classical Business Cycle

- Change in the level of economic activity, not the growth rate.
- Maximums are peaks and minimums are troughs.
- Peak will be followed by recession.
- Trough will be followed by expansion.
- If two cycles occur in close proximity the maximum point is dated as the peak, the minimum point is dated as the trough. If the first of the maximum points is the peak and the second minimum is the trough we have a double dip recession.
- The minimum phase duration is 1 year from peak to trough (annual data) and a minimum length of the entire business cycle (from peak to peak) to be 2 years. We do not set a maximum.

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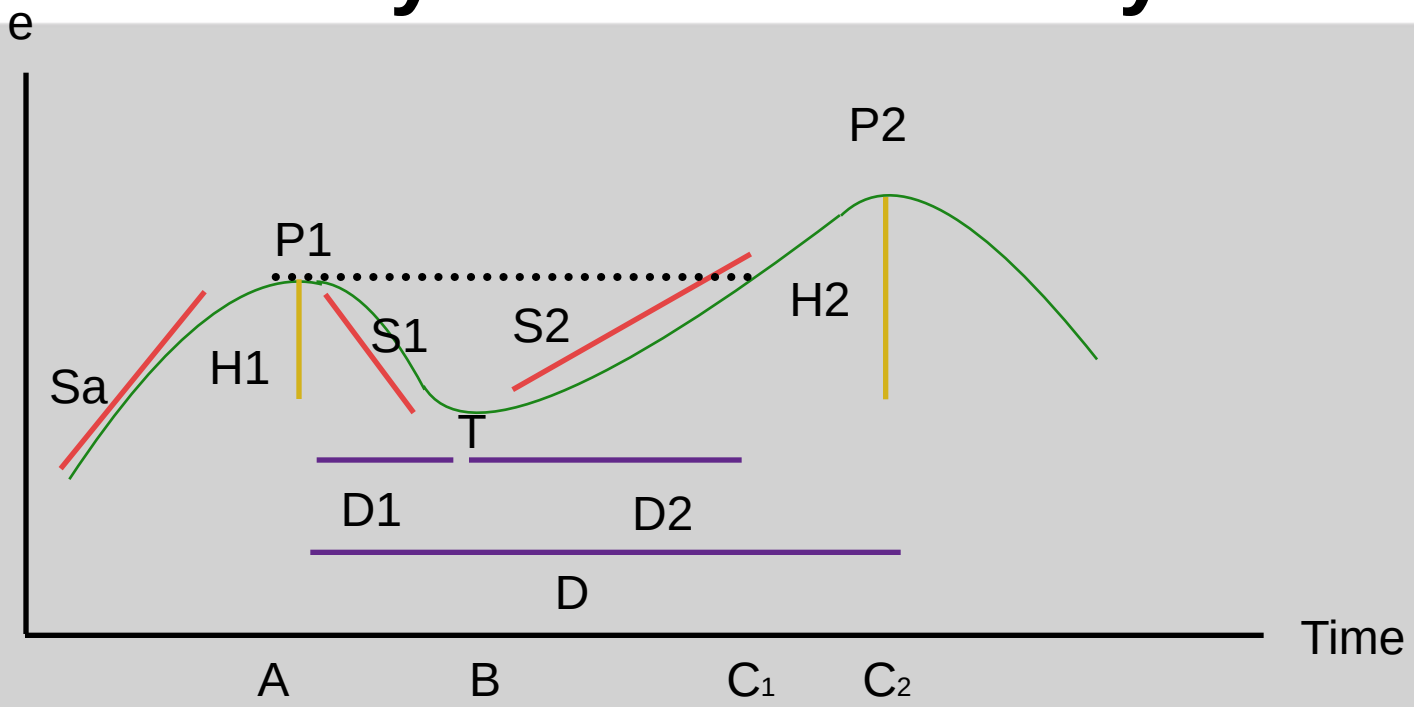
The Stylised Business Cycle



P = Peak
T = Trough
H = height of economic peak/Trough
S = slope of growth path (decline or recovery)
D = duration of downturn/recovery

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Method: Turning Points

We calculate the first difference of the natural log of GDP and employment.

When the series is negative we code this as a “1” for recession, when positive is “0” for expansion.

We date the peak turning point as the observation before the recession and the trough turning point as the observation before the expansion.

We use both Stata and Gauss programs to check results.

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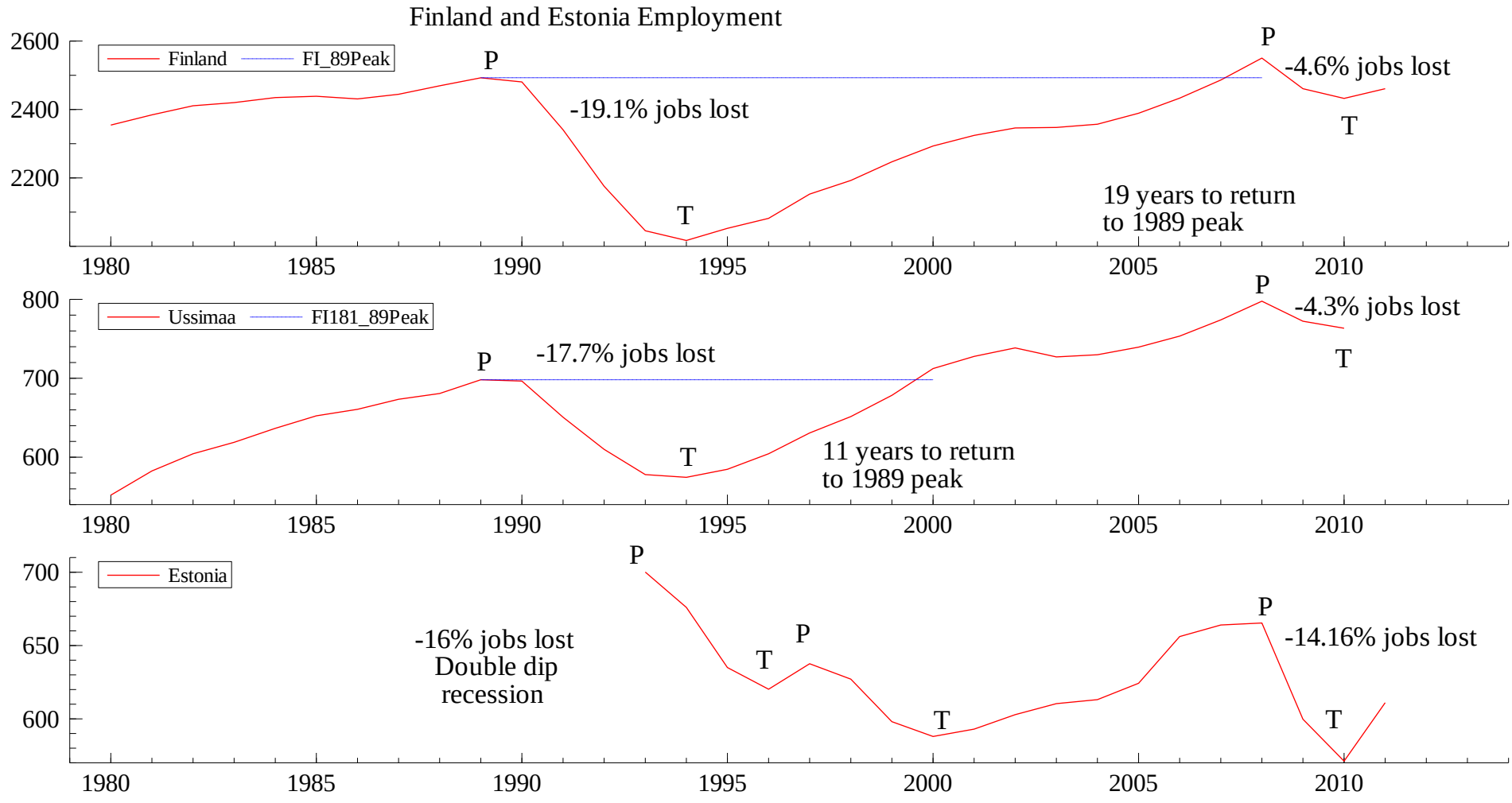
Employment in Finland and Estonia



Method: Loss Calculations

To measure the employment loss we calculate:

- Loss=100x(T-P)/P.
- P= employment at Peak
- T= employment at Trough
- We then observe if the region has recovered to its pre-recession peak level and note the date, recording the length of time to recovery.
- If the trough turning point has been reached but the region has not returned to its pre-recession peak this is classed as the “not recovered 1” category.

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Data: Countries

We study European NUTS 2 level data of GDP and employment from Cambridge Econometrics for EU 28 countries and other countries from Experian.

- EU15=AT+BE+DE+FR+FI+GR+IT+IE+LU+NL+ES +PT+UK+DK+SE.
- EU12=EE+LT+LV+CZ+PL+BG+SI+SV+CY+MT +HU+RO.
- EU27=EU15+EU12
- CE data also for Norway. Experian data for Croatia, Switzerland and Iceland for ESPON 31.

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Data: Frequency

The annual time series data are from Cambridge Econometrics covering 1980-2011 for EU15 and Norway (then updated to 2012).

- EU15=AT+BE+DE+FR+FI+GR+IT+IE+LU+NL+ES +PT+UK+DK+SE.
- EU12=EE+LT+LV+CZ+PL+BG+SI+SV+CY+MT +HU+RO. Shorter sample of 1990-2011 for EU12.
- Former East German regions, data sample 1991-2011.
- We loose first observation when first differencing.

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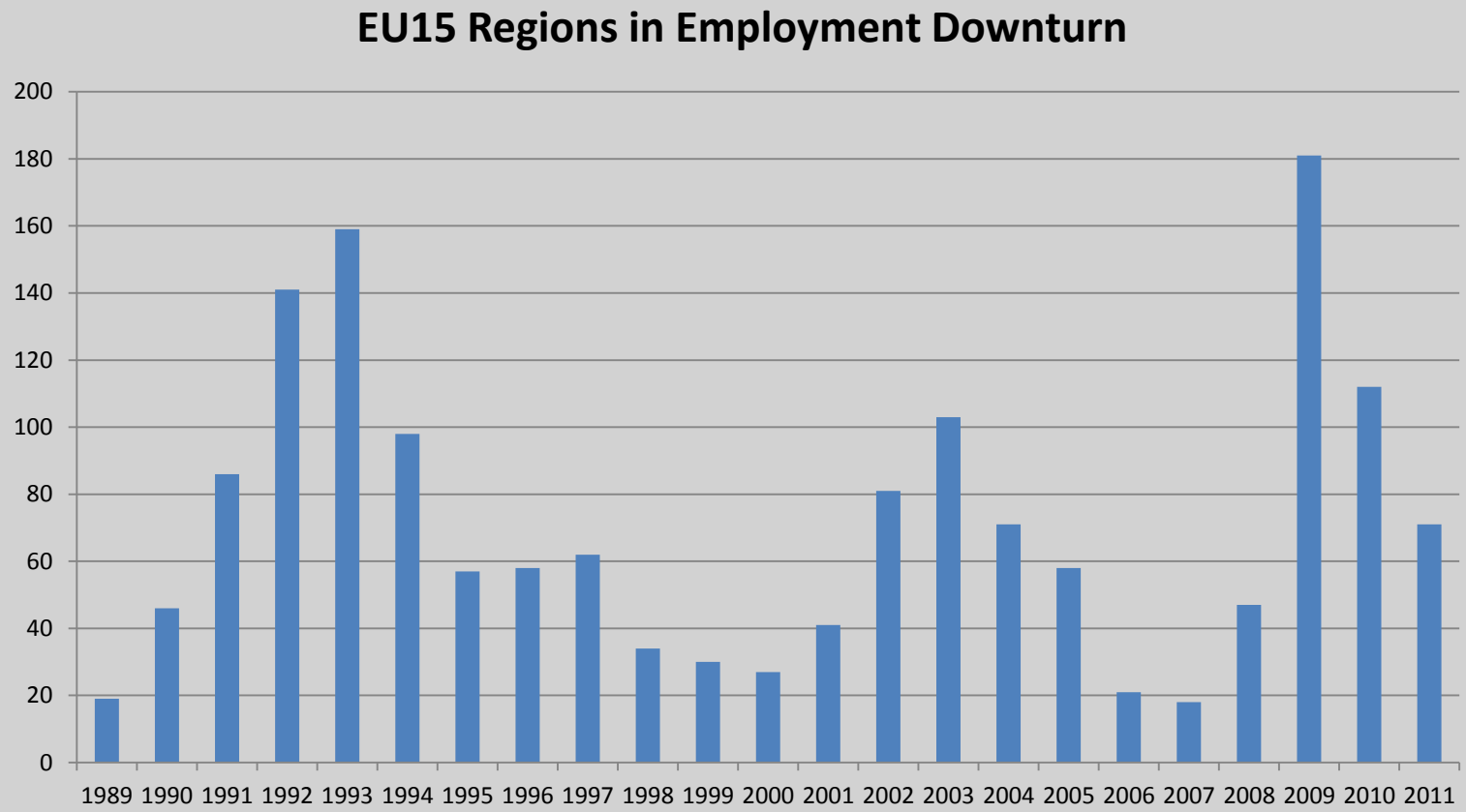
EU15 Regions (215 regions)



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Frequency of Recession

- Luxembourg has had continued employment and GDP growth since 1980s recession.
- The Netherlands also did not experience the 1990s recession in aggregate employment, though 6/12 regions did contract.
- Austria, Ireland and the Netherlands aggregate GDP did not contract in 1990s.
- 2002/3 recession felt in national employment of Germany, Austria, Belgium, Denmark, Portugal, Sweden and the Netherlands .

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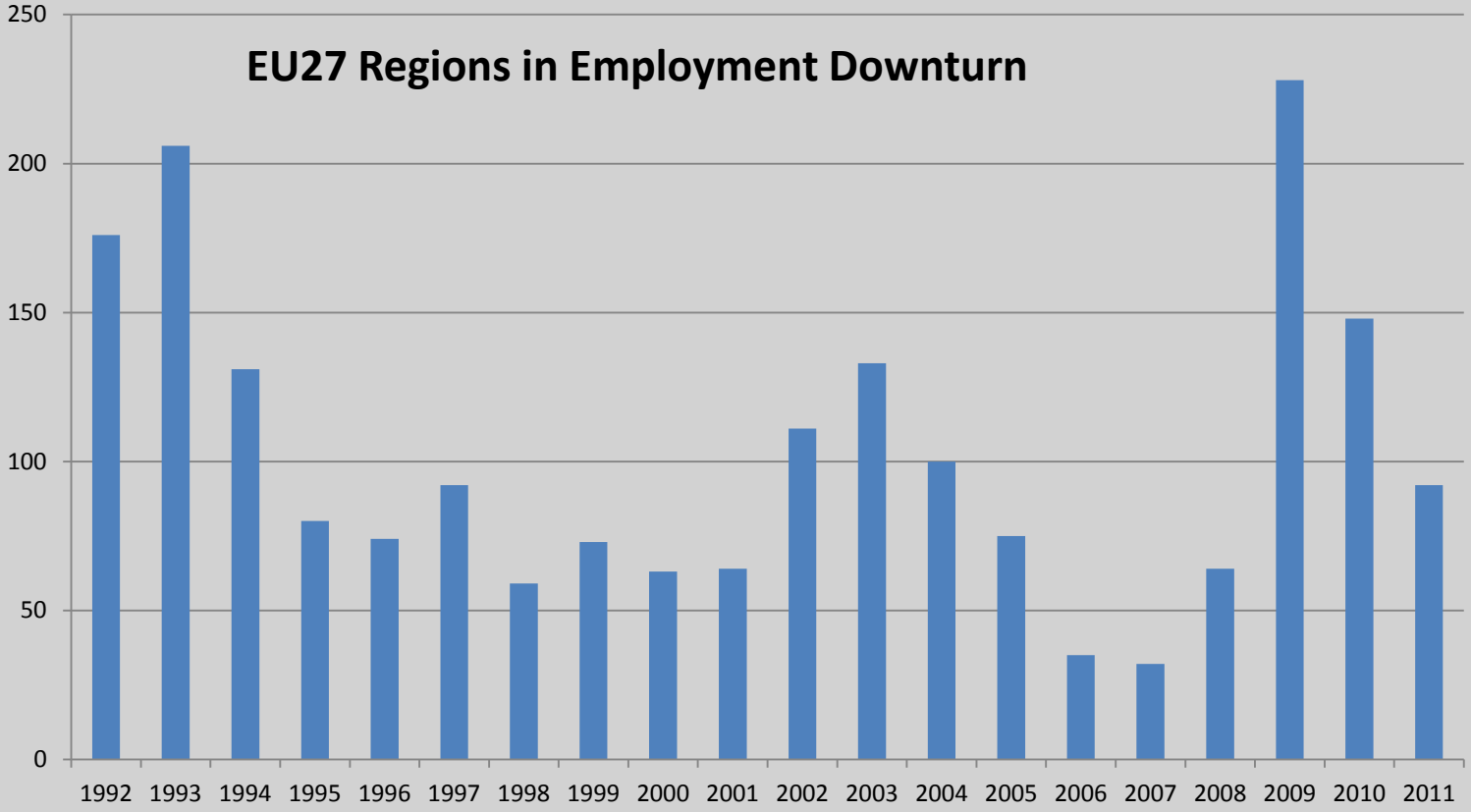
EU27 Regions (271 regions)



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1990s Recession

In the UK it took regions just over 8 years on average to recover their pre-recession peak levels of employment and 3 regions had not recovered to these by 2011 (Cumbria, East Yorkshire & Northern Lincolnshire and West Midlands).

Employment in regions of Europe seem to be more resilient after the recent crisis with 23% of regions having recovered within 3 years (22% had recovered after 4 years following the 1990s crisis).

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Map Categories

The following map presents colour coded resilience categories for European NUTS 2 regions.

- For continued regional employment growth the region is resistant to downturn and coloured blue.
- For a region that has experienced downturn but has recovered to its pre-recession peak it is green.
- For a region not yet recovered by 2011 but having reached its trough turning point it is yellow and with employment still falling it is red.

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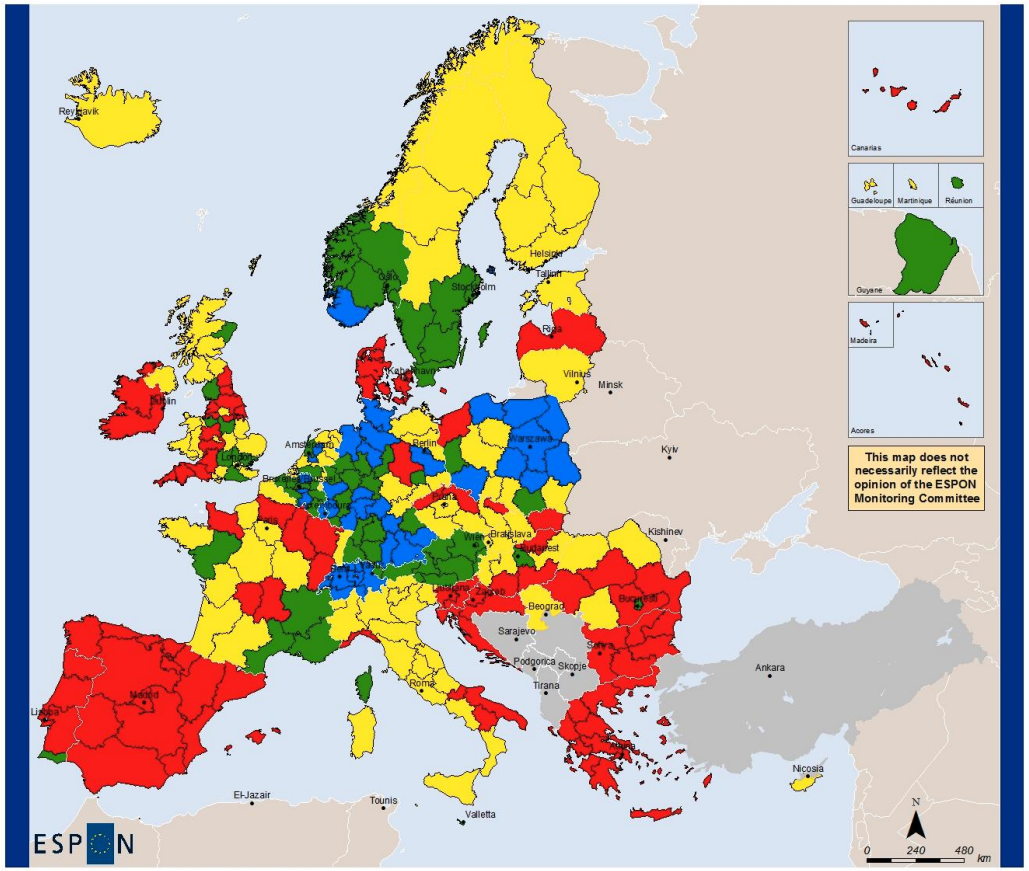
Employment Resilience



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Regional level: NUTS2
Source: ESPON Database, ESPON ECR2 Project, Cardiff University, UK
Origin of data: Experian, Cambridge Econometrics, Eurostat
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Legend

Resistant	Not Recovered: Upturn	No Data
Recovered	Not Recovered: No Upturn	

Progress Map Categories

The following maps presents colour coded resilience categories for European NUTS 2 regions with progress over time from 2005-2012.

- For continued regional employment growth the region is resistant to downturn and coloured blue.
- For a region in recession it is coloured red.
- For a recovered region having reached its trough it is coloured green.

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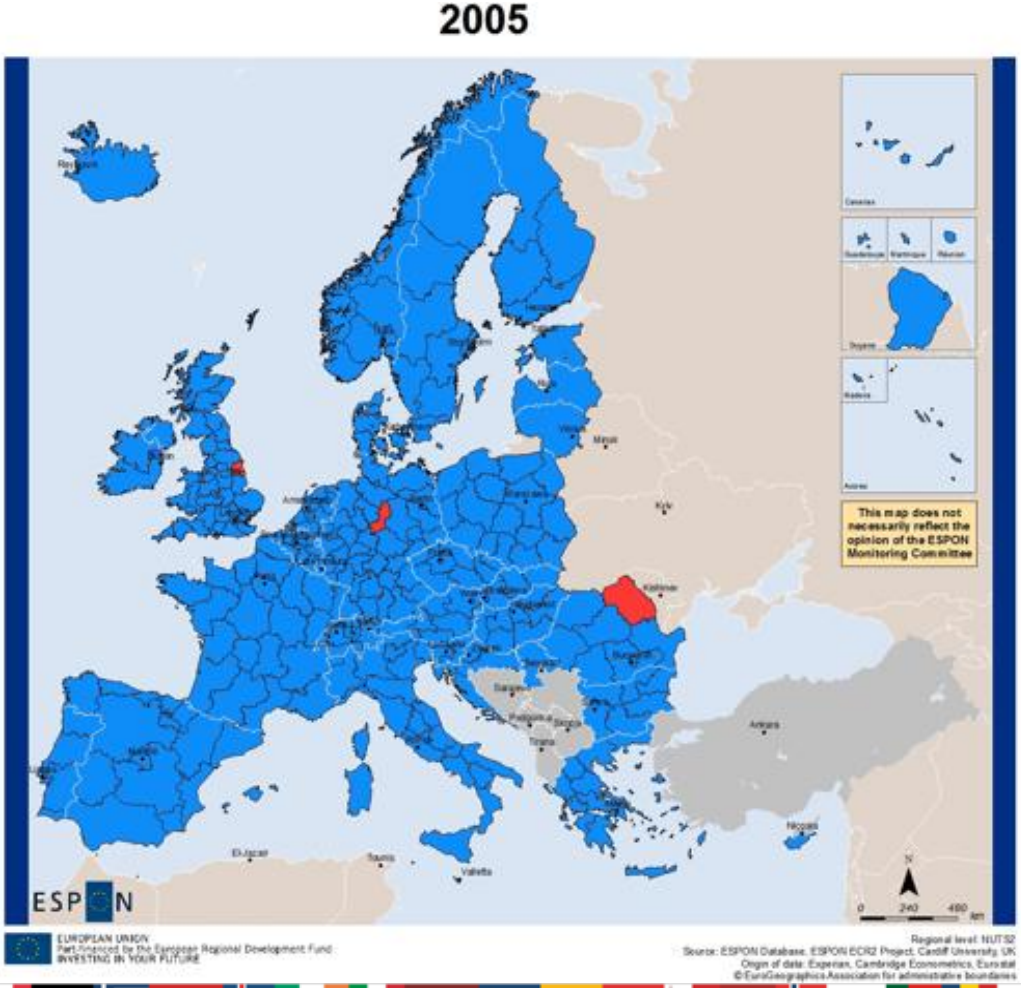
Progress of Crisis: 2005



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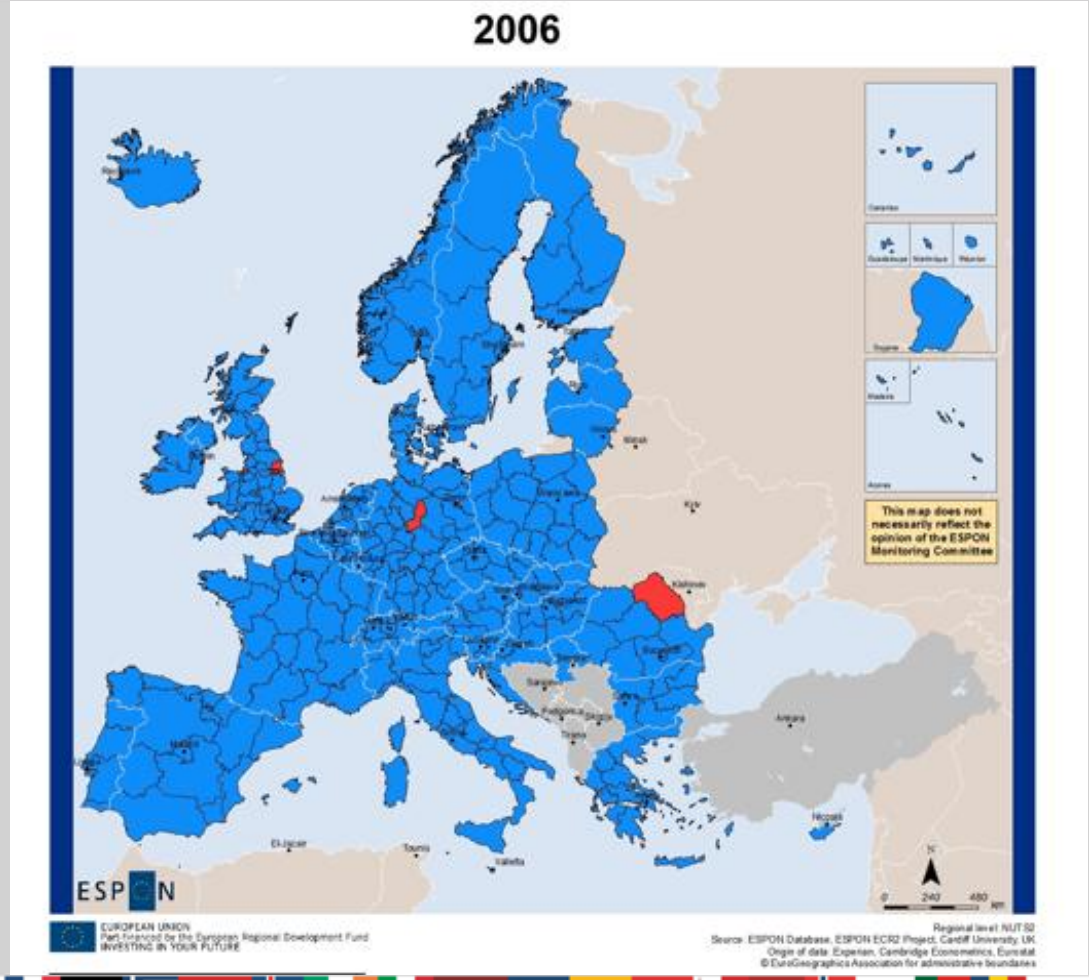
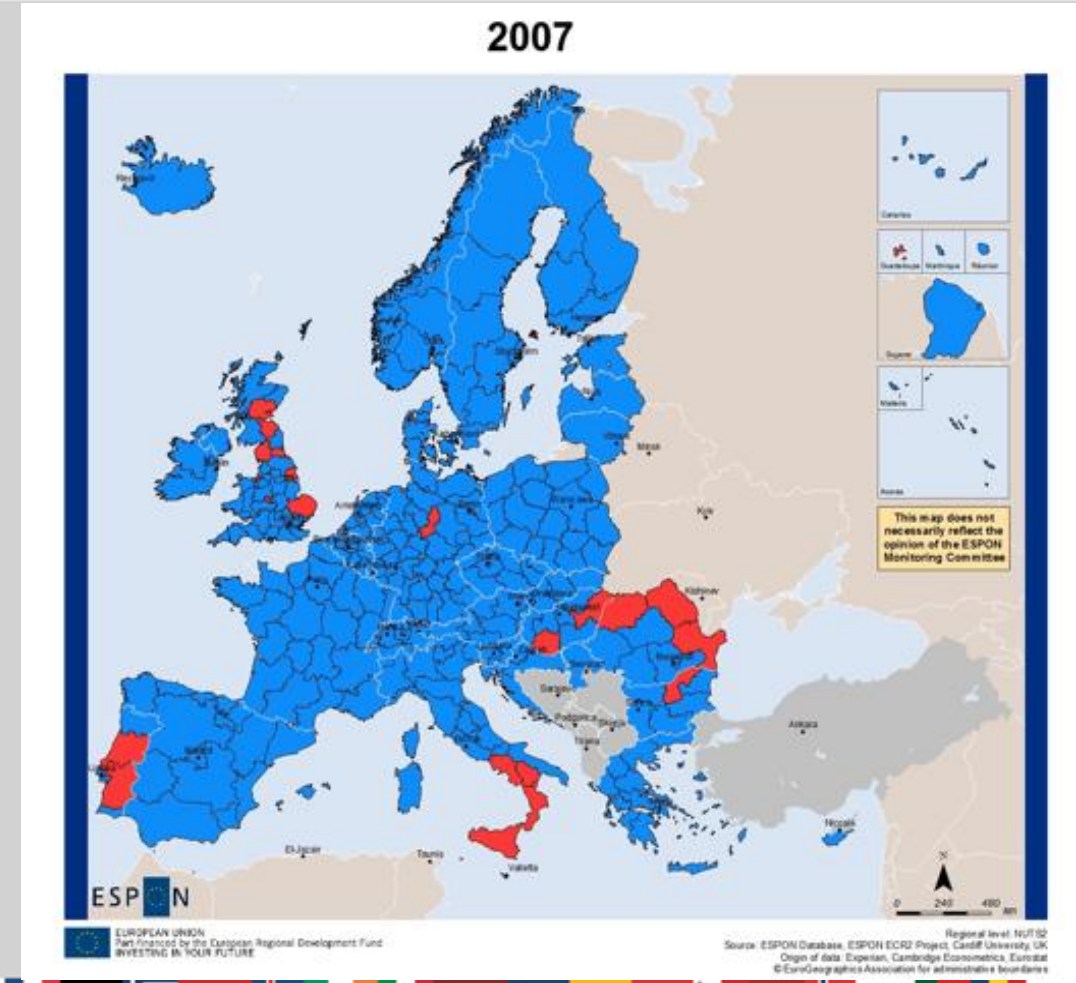
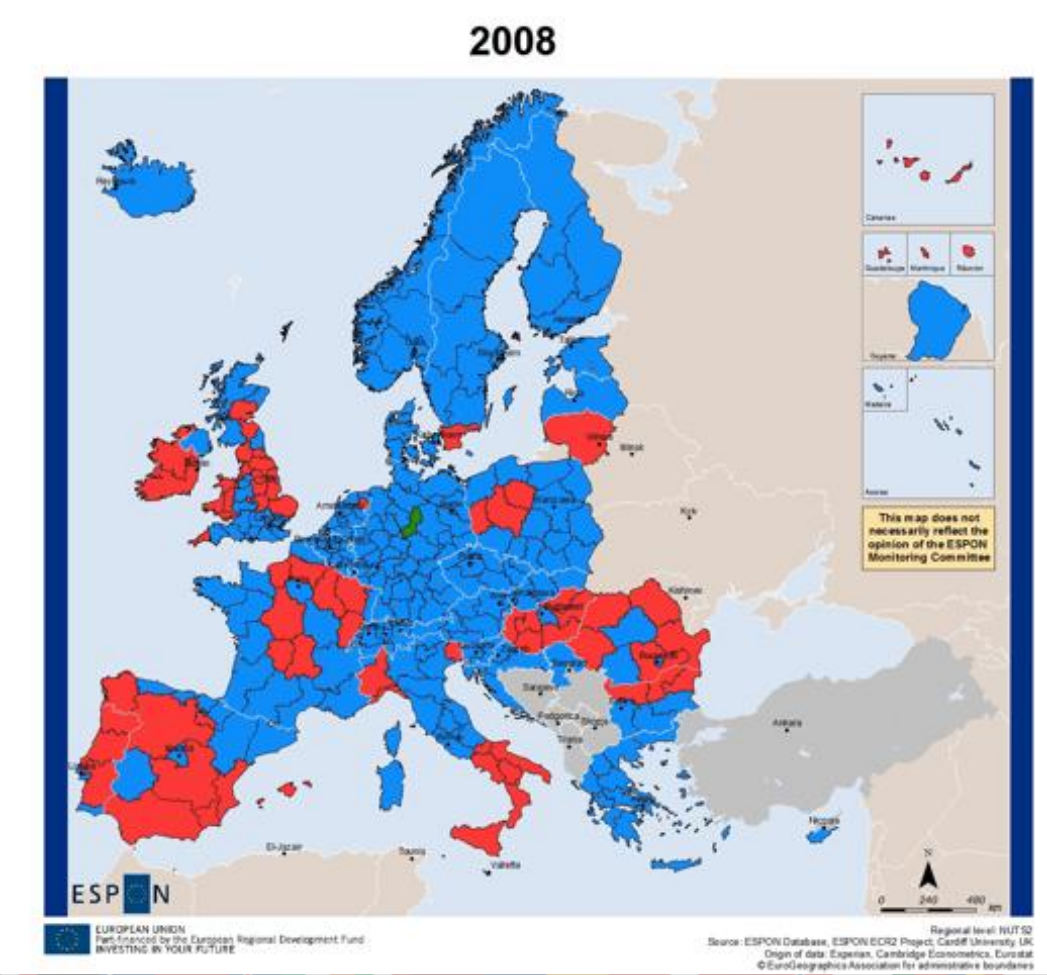
Progress of Crisis: 2006



Progress of Crisis: 2007



Progress of Crisis: 2008



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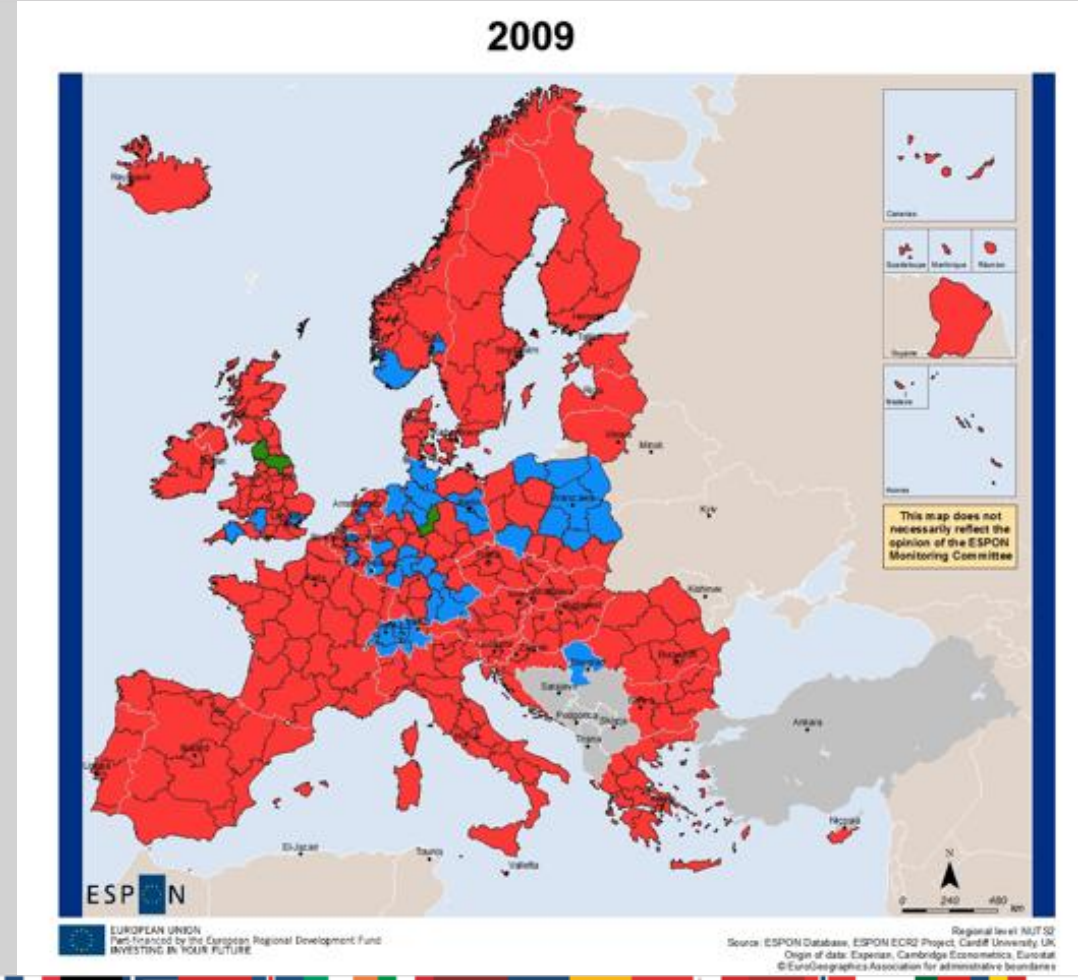
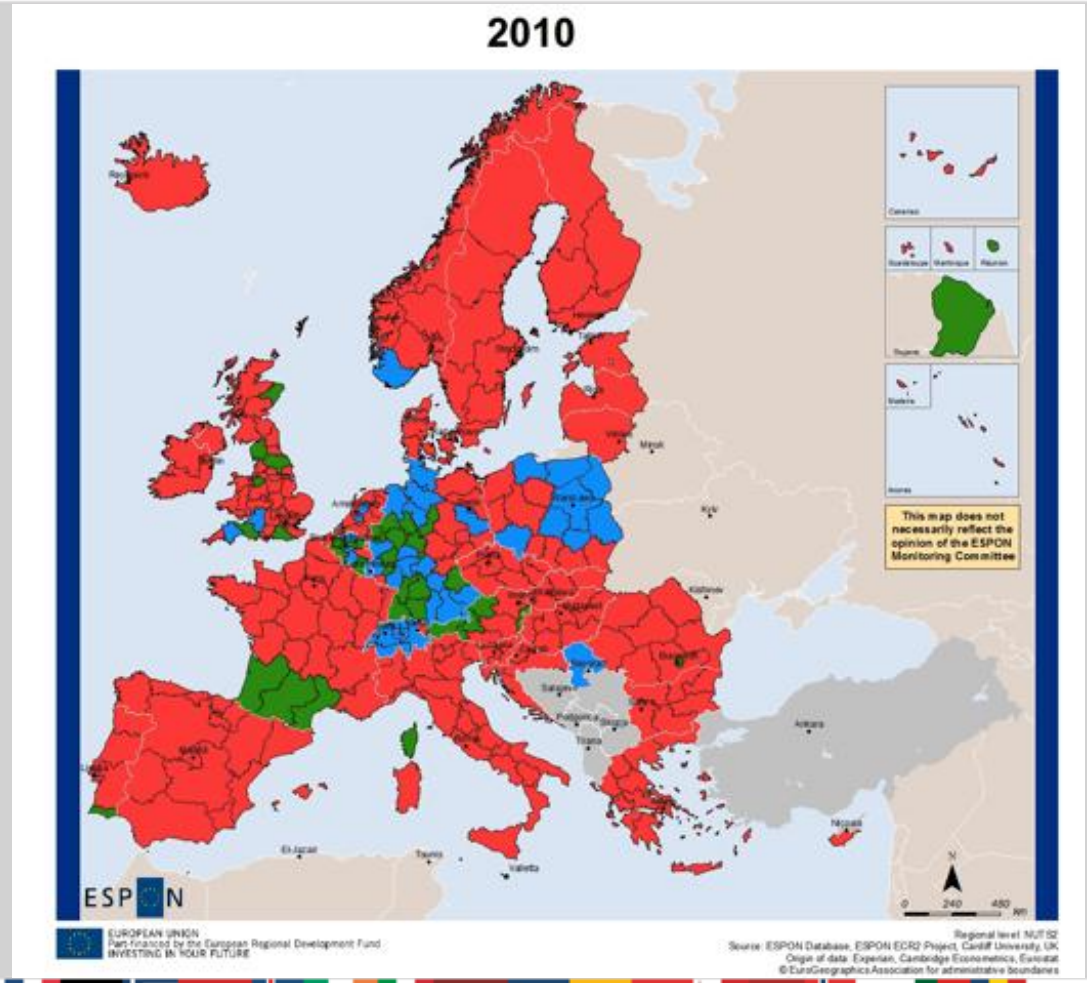
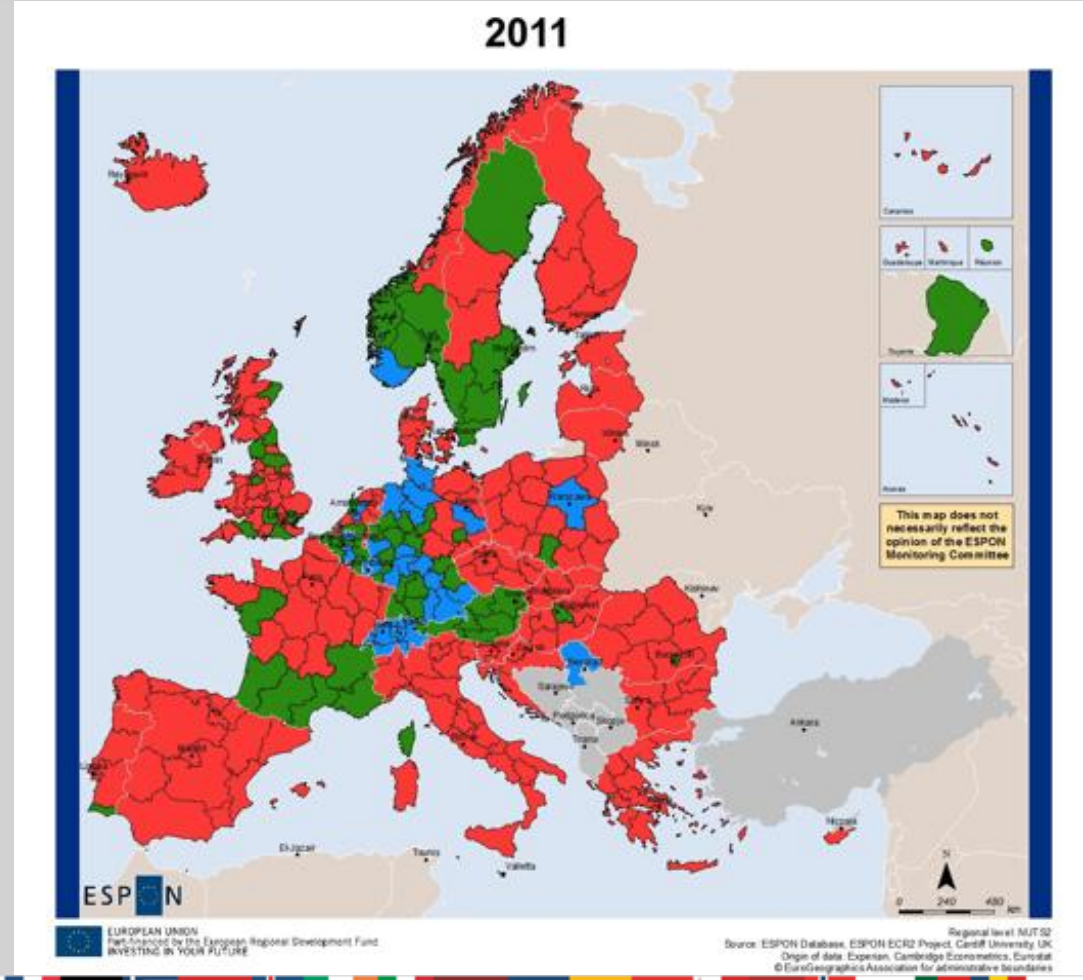
Progress of Crisis: 2009



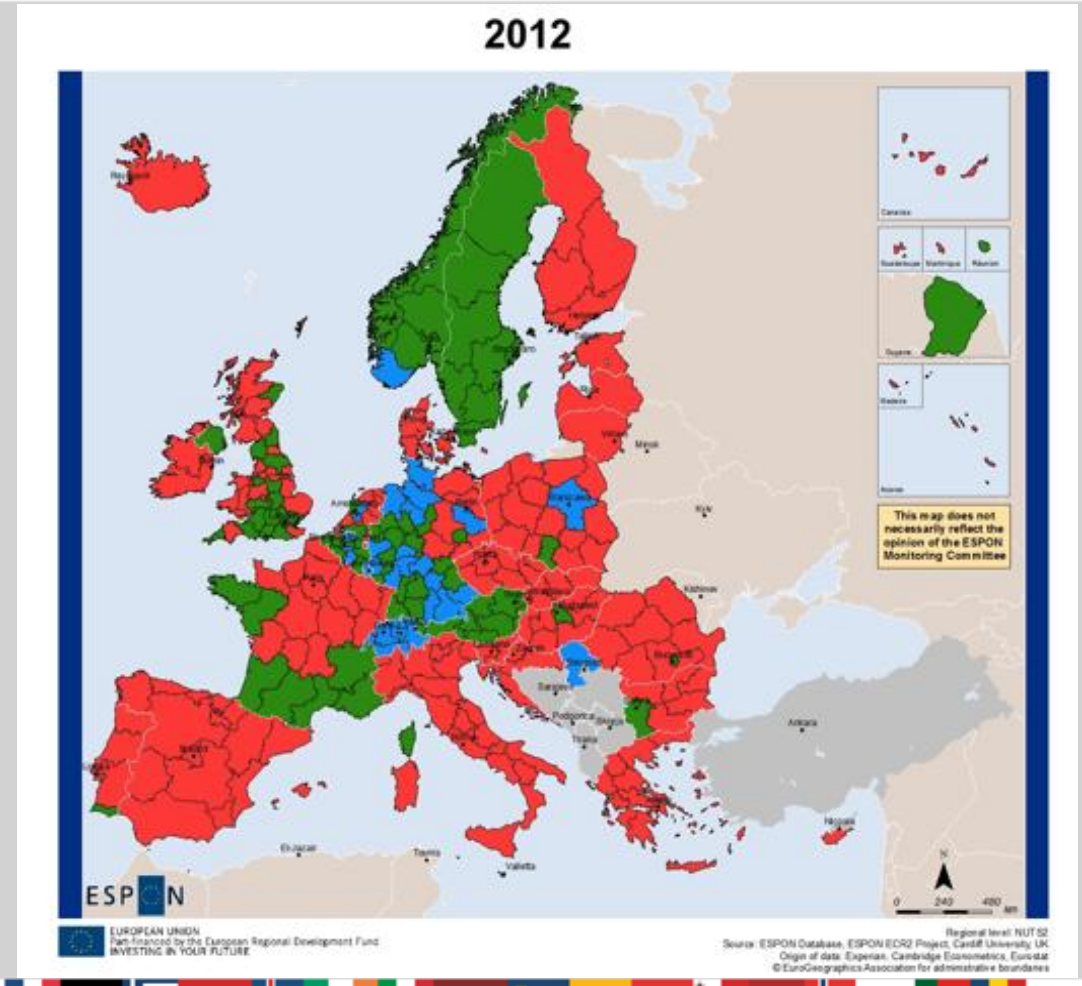
Progress of Crisis: 2010



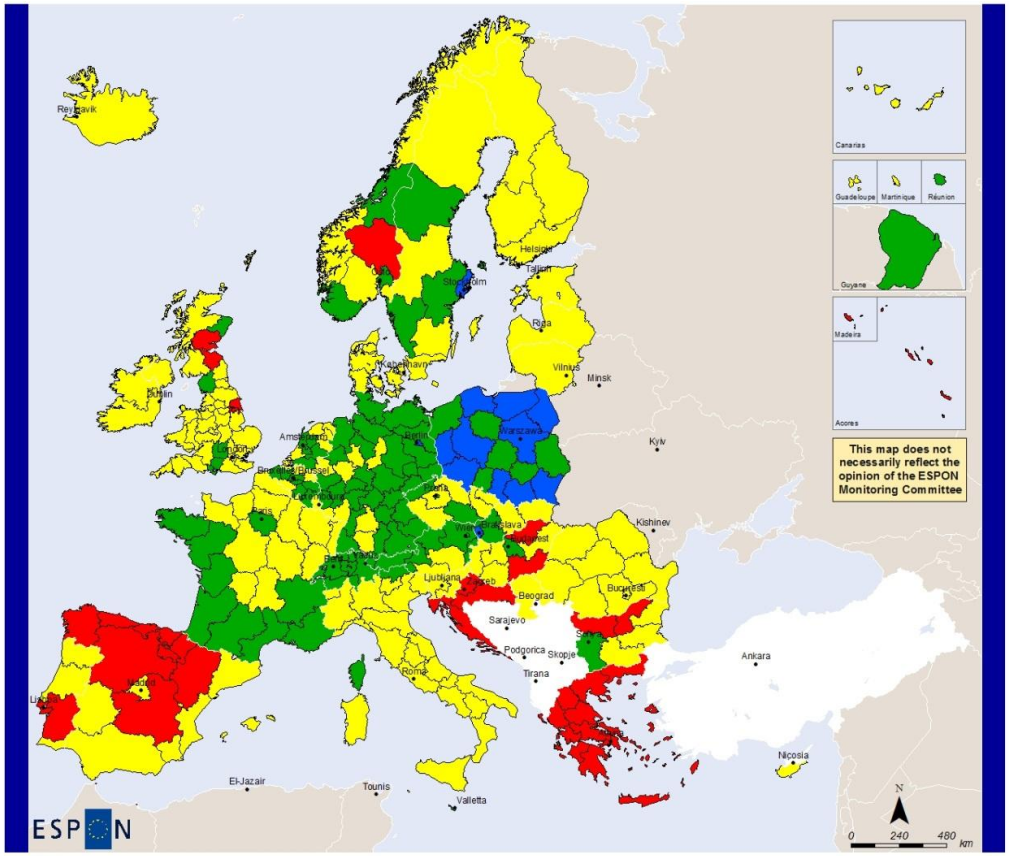
Progress of Crisis: 2011



Progress of Crisis: 2012



GDP Resilience



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Regional level: NUTS2
Source: ESPON Database, ESPON ECR2 Project, Cardiff University, UK
Origin of data: Experian, Cambridge Econometrics, Eurostat
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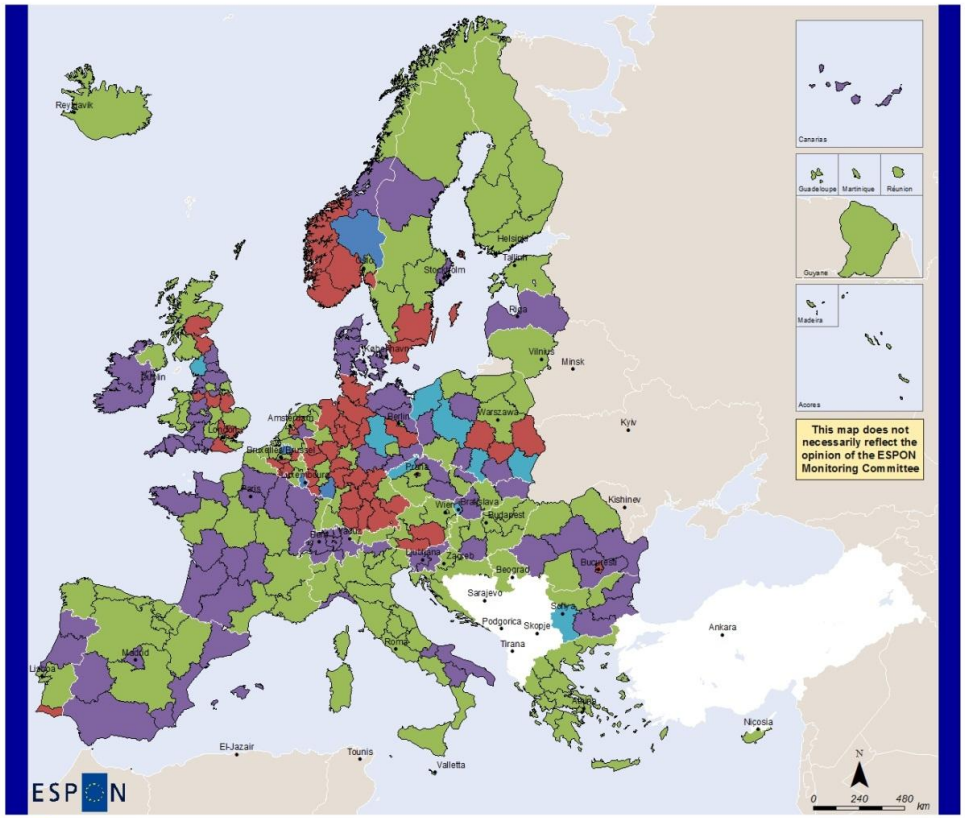
Legend

Resistant	Not Recovered: Upturn	No Data
Recovered	Not Recovered: No Upturn	Non-ESPON Space

Comparative Resilience



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Regional level: NUTS2
Source: ESPON Database, ESPON ECR2 Project, Cardiff University, UK
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Legend

- Much Stronger GDP Resilience
- Stronger GDP Resilience
- Similar Resilience
- Stronger Employment Resilience
- Much Stronger Employment Resilience
- No Data
- Non-ESPON Space

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Martin's Sensitivity Index

Martin's (2012) sensitivity index compares the percentage change in regional employment (E_R) to national employment (E_N) in a downturn:

$$\beta_R = \left(\Delta E_R / E_R\right) / \left(\Delta E_N / E_N\right)$$

A Beta less than one signifies that a region is more resistant than the nation and Beta greater than one means a region is less resistant.

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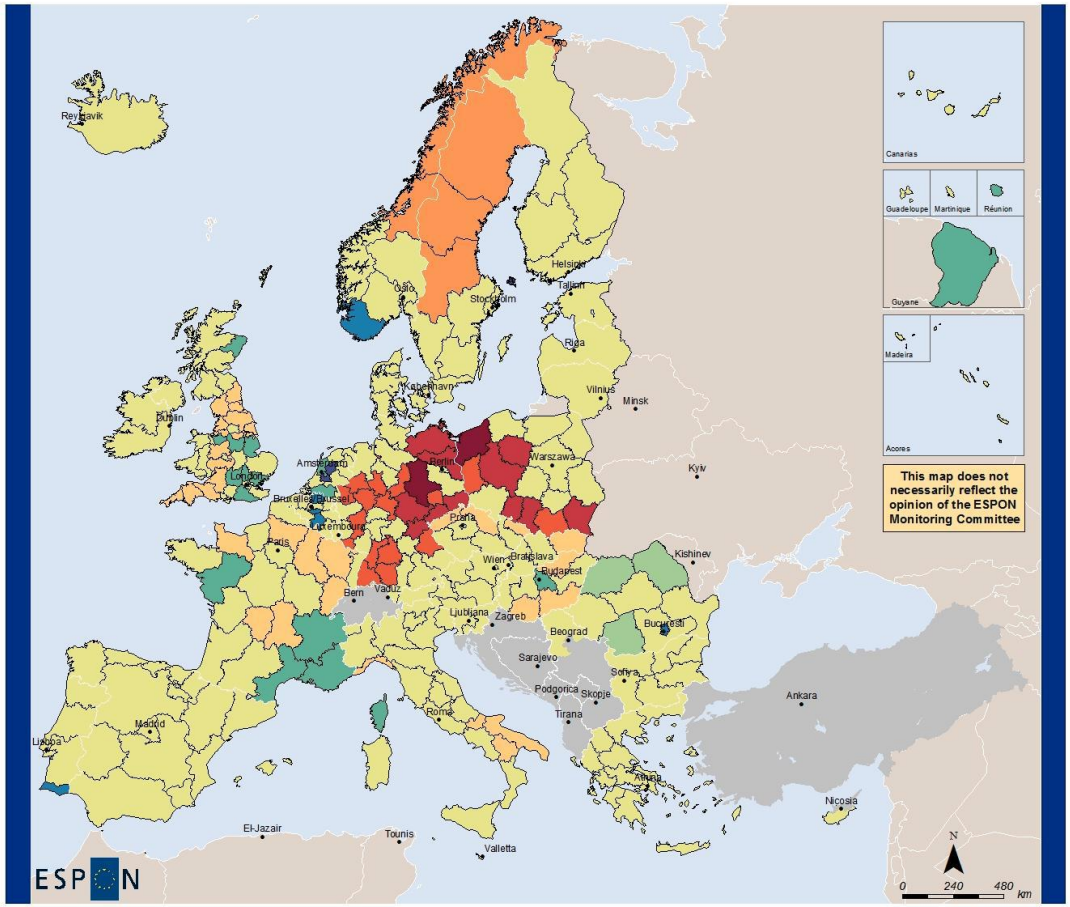
Countries Relative Regional Resilience



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Regional level: NUTS2
Source: ESPON Database, ESPON ECR2 Project, Cardiff University, UK
Origin of data: Experian, Cambridge Econometrics, Eurostat
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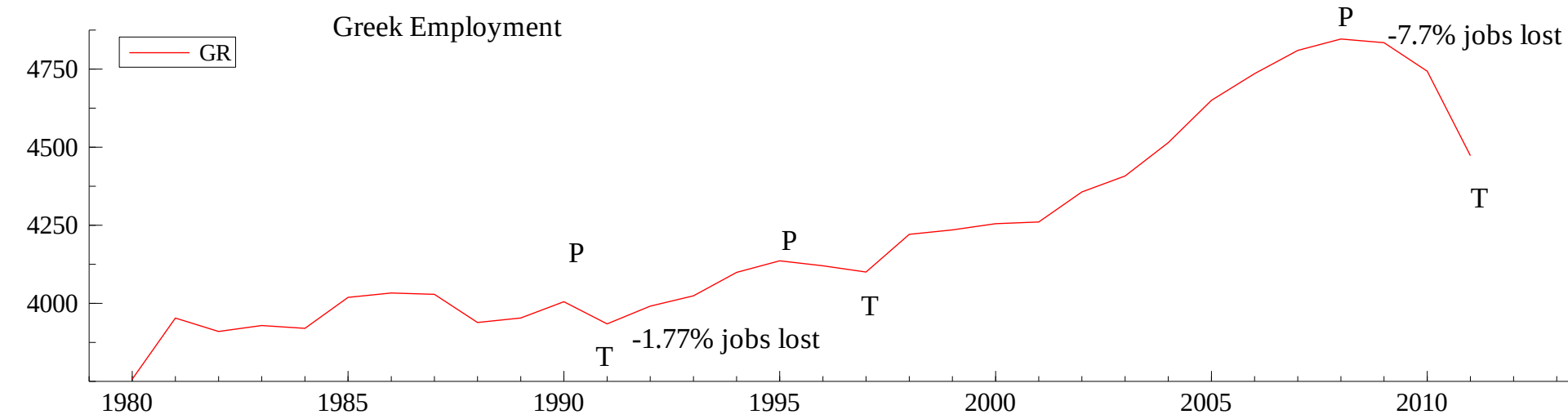
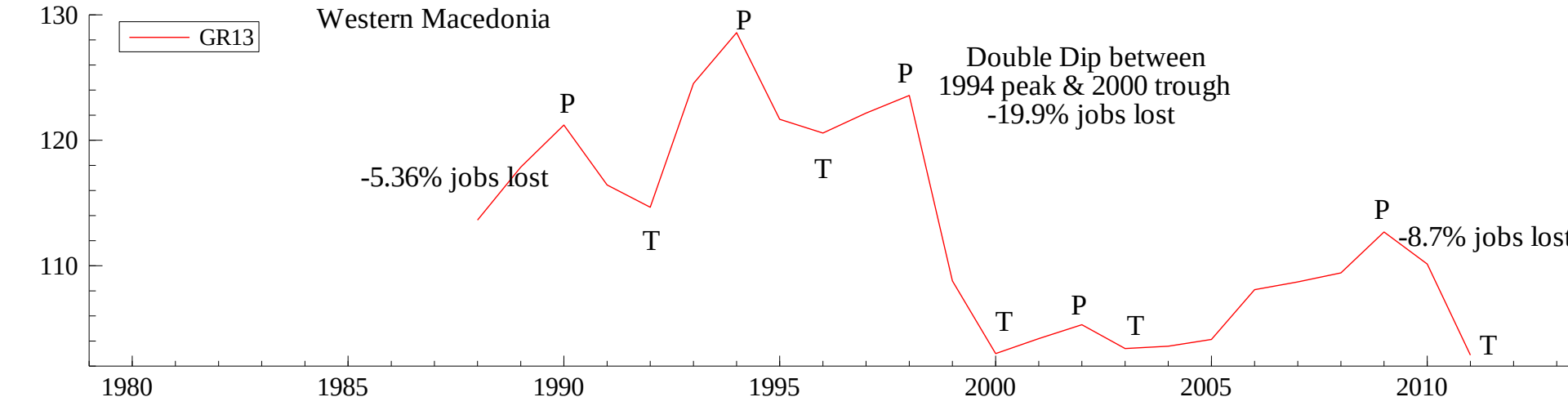
Legend

Weaker — Equivalent — Stronger

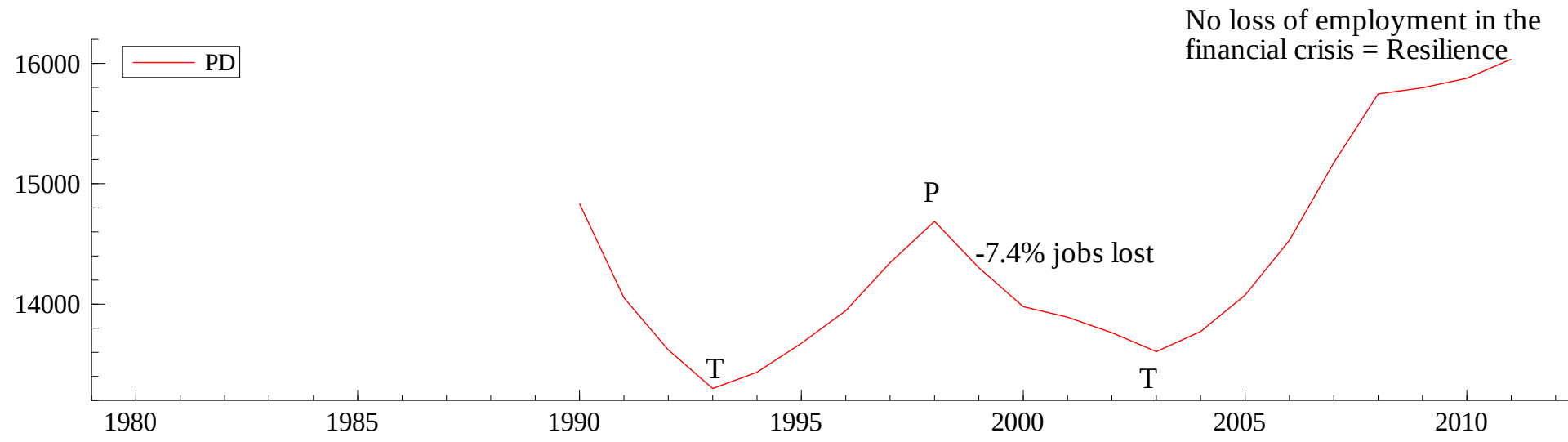
No Data

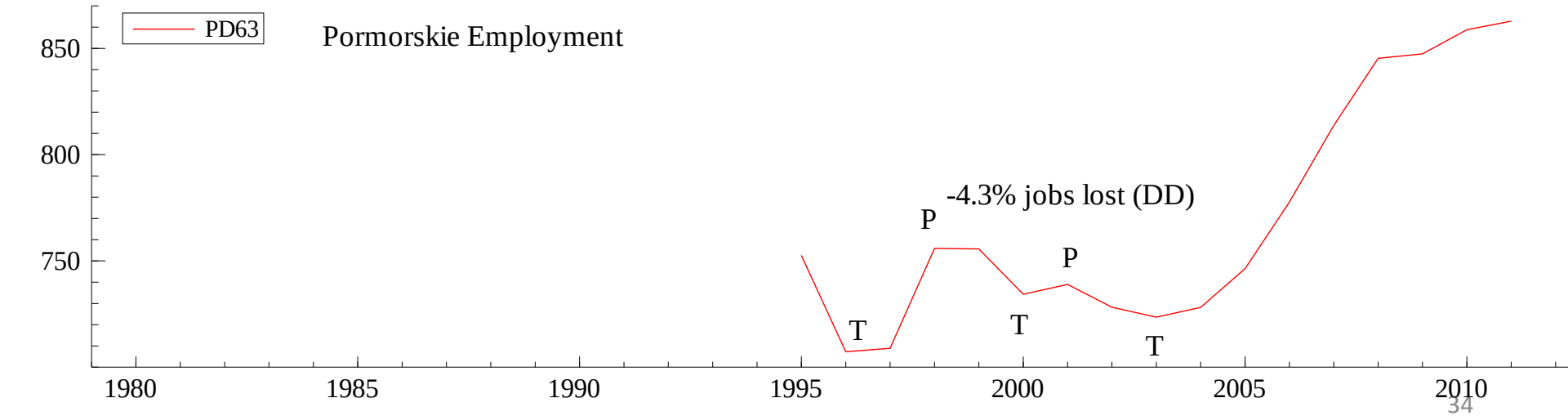
Employment in Greece



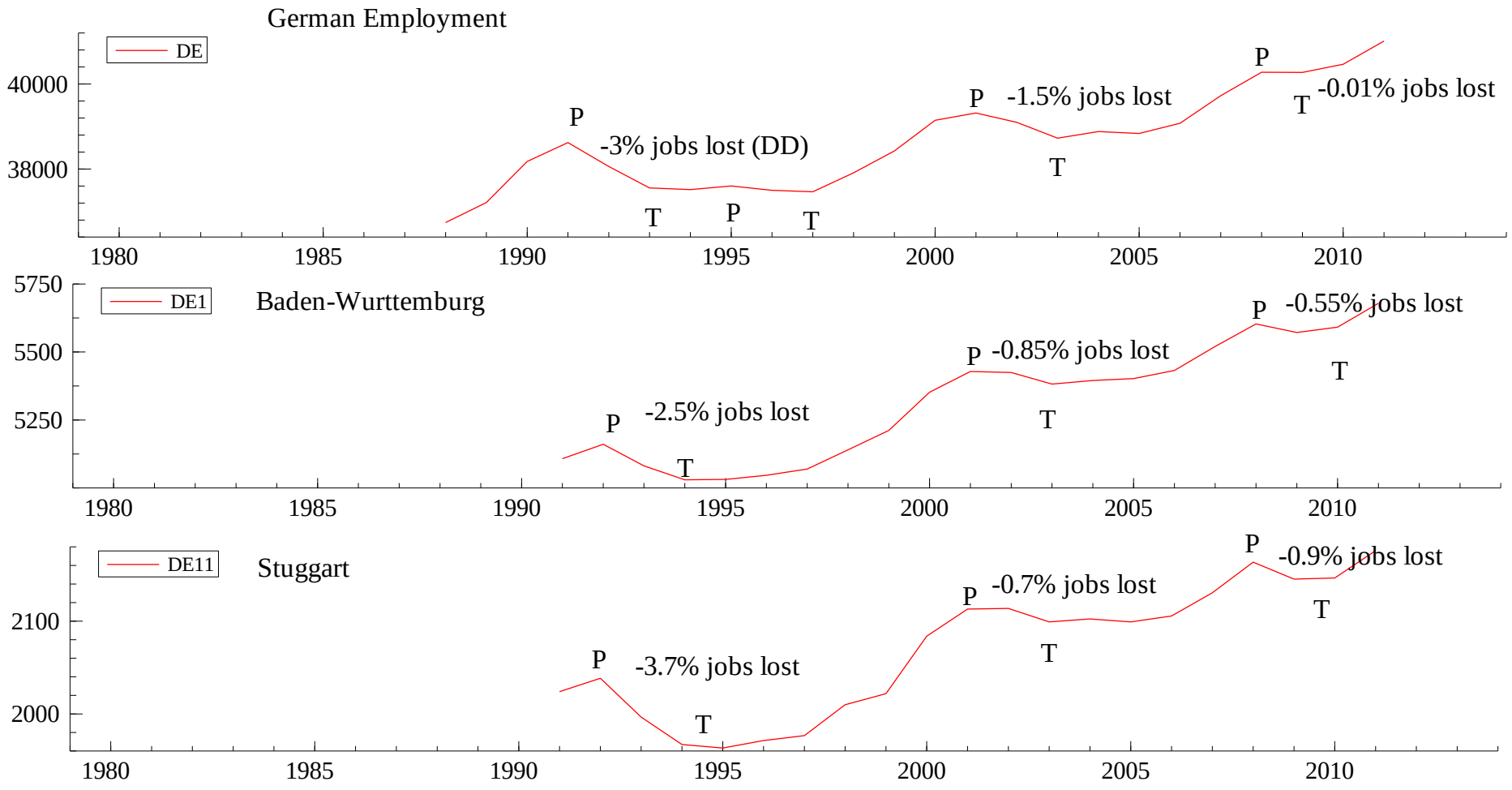


Employment in Poland

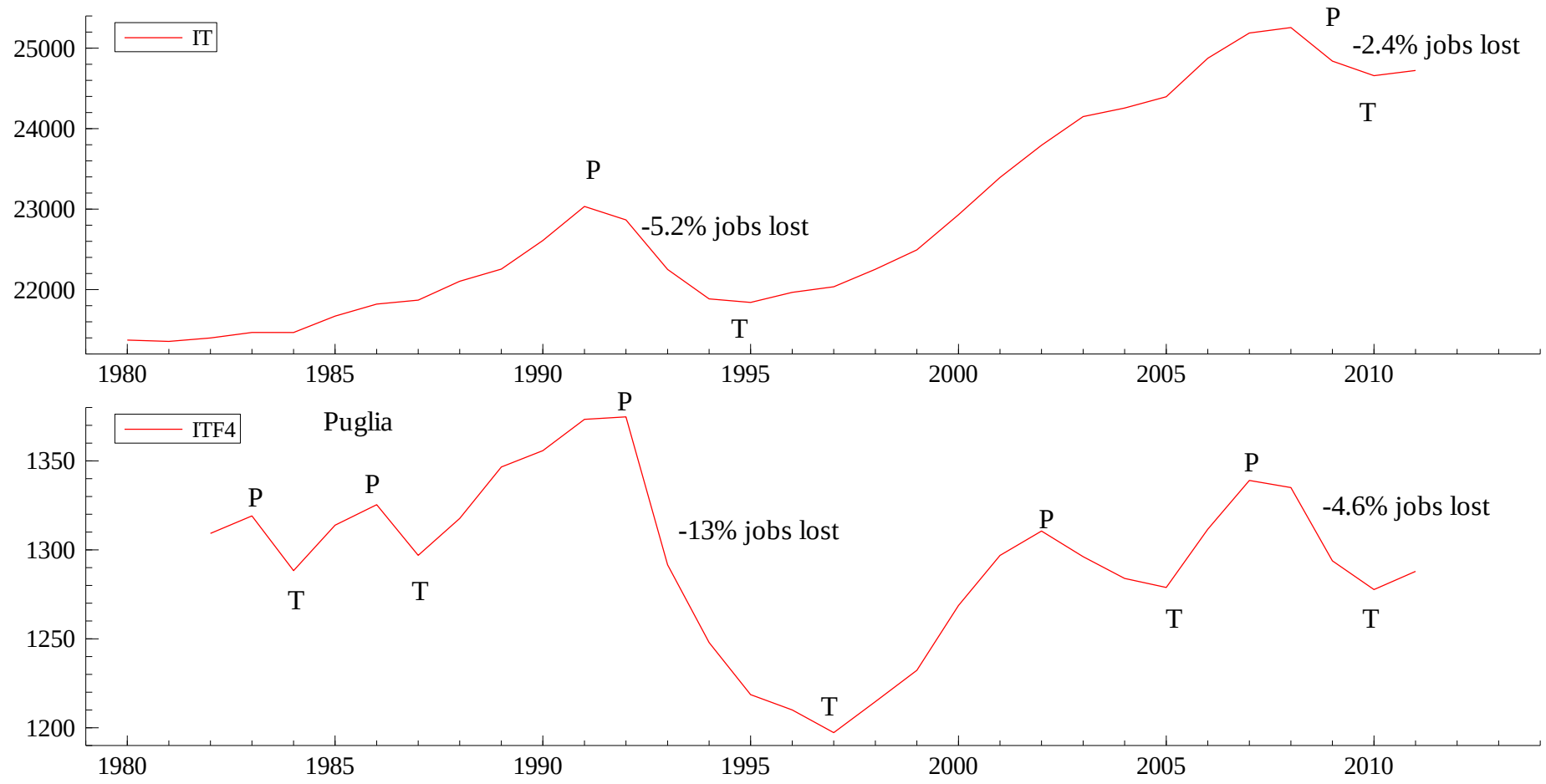




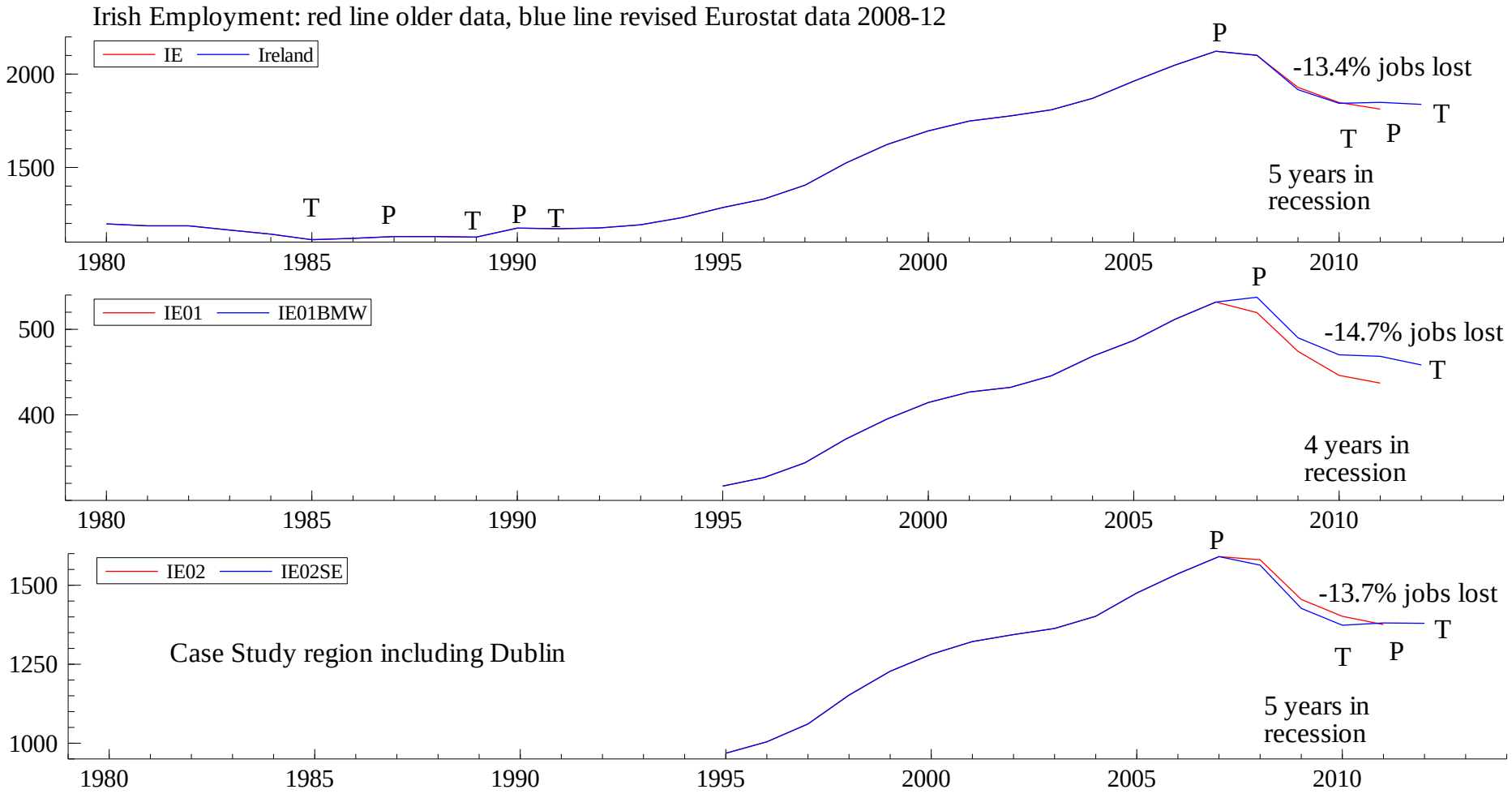
Employment in Germany



Employment in Italy



Employment in Ireland



Conclusions

- Our approach adds value in that it allows more flexibility in dating business cycle turning points, rather than assuming fixed turning points for each region.
- We are able to see the variable impact of the most recent crisis across NUTS 2 regions of Europe and not tie this in the national growth rate with the sensitivity index.
- Comparing regions of Europe we see that some regions were resistant to the most recent crisis, some have recovered while others are yet to fully recover to their pre-recession peak levels.

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4 Key Features of Resilient Regions

1. **Diversity** – More diverse economies tend to be more resilient over time as they prove more able to adapt to changing circumstances.
2. **Skills** – Policies promoting higher-qualified and higher-skilled labour help to build economies with greater resilience capabilities.
3. **Innovation** – Regions with higher levels of innovation activity tend to be able to respond to economic shocks more positively than those where innovation capabilities are lower.
4. **Good governance** – There is a strong correlation between the quality of government present in a region and its observed capacity for resilience to economic shocks.

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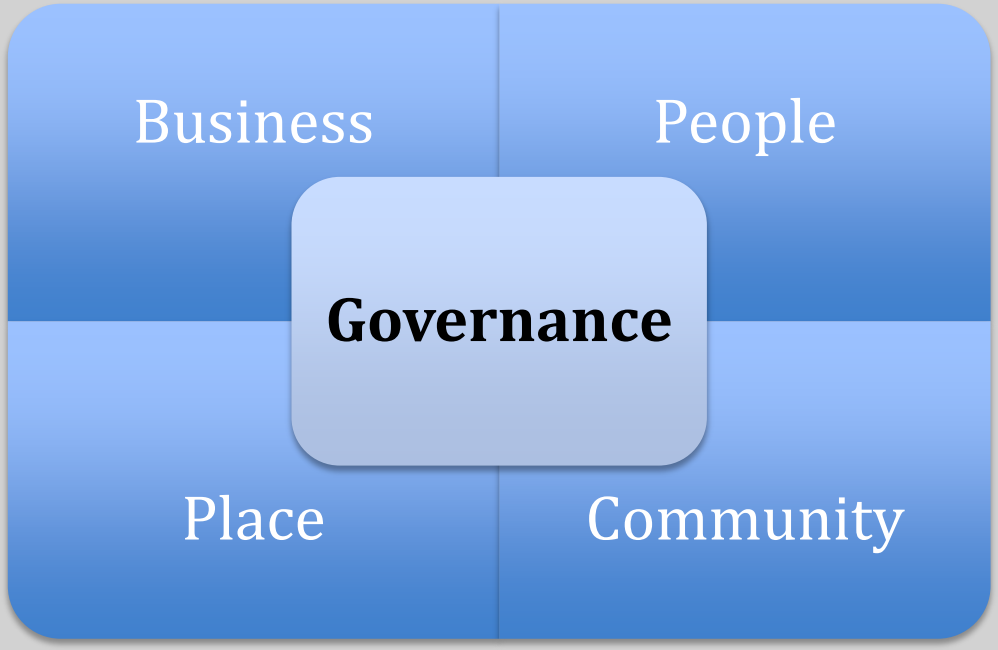
Key components



Innate characteristics

Choices, behaviour and agency

A shared responsibility

- Multilevel
- Multiagency
- Multiactor

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