# Overall resilience performance

The aggregate resilience index measures the performance of all subsystems included in each thematic group. The steps followed in designing the aggregate resilience index are similar to those described in the methodology corresponding to the thematic indices. Nevertheless, the aggregate index only includes a selection of the indicators used in the computation of thematic resilience indices.

As already described in the previous sections, the projection of average for each of the indicators in part helped us to delimitate the periods corresponding to both resistance and recovery (see the table below).

**Assessing the overall resilience performance: indicators used and periods considered**

| System/ subsystem | Indicator name | Source | Shock considered | Resistance interval | Recovery interval |
|---|---|---|---|---|---|
| Macroeconomics | GDP per capita | ARDECO | Economic crisis | 2008–2009 | 2009–2011 |
| Macroeconomics | Investments | ARDECO | Economic crisis | 2008–2009 | 2009–2015 |
| Macroeconomics | GVA construction | ARDECO | Economic crisis | 2008–2013 | 2013–2017 |
| Business | Firm survival | Eurostat | Economic crisis | 2008–2011 | 2011–2017 |
| Labor market | Productivity | OECD | Economic crisis | 2008–2009 | 2009–2010 |
| Financial-banking | Banking system default probability | World Bank | Financial crisis | 2008–2017 | – |
| Financial-banking | Credit to government and SOE | World Bank | Financial crisis | 2007–2012 | 2012–2017 |
| Institutions | Voice and accountability | WGI | Economic crisis/ European integration | 2007–2017 | 2017–2018 |
| Institutions | Trust in the political system | Eurostat | Economic crisis/ European integration | 2008–2012 | 2012–2016 |
| Governance system | Government investment | Fraser Institute | Economic crisis / European integration | 2006–2010 | 2010–2017 |
| Society | Risk of poverty | Eurostat | Economic crisis / European integration | 2007–2013 | 2013–2018 |
| Society | Count on to help | Gallup | Economic crisis | 2010–2013 | 2013–2016 |
| Individual | Life satisfaction | EC Europa | Economic crisis | 2007–2013 | 2013–2014 |
| Democracy / Social | Organized crime | WEF | Ukraine crisis / refugees crisis | 2010–2018 | – |
| Democracy / Social | Political stability | WGI | EU Enlargement | 2006–2009 | 2009–2013 |
| Democracy / Social | Press freedom | Freedom House | EU enlargement / Financial crisis | 2007–2018 | – |
| Democracy / Economic | Property rights | PRA | Ukraine crisis / refugees crisis | 2010–2015 | 2015–2018 |



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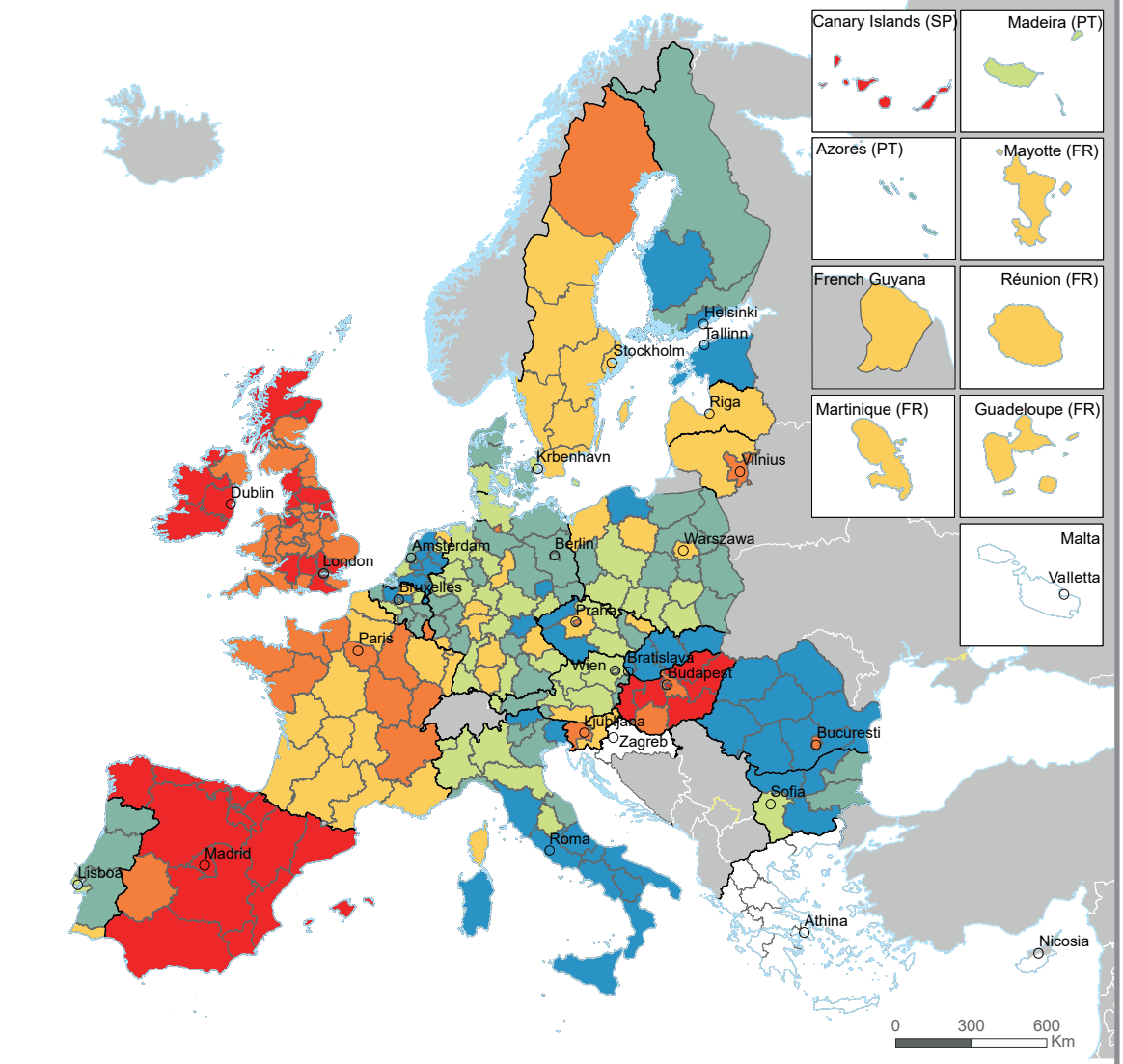
After setting the time intervals, the slopes were estimated for each of the indicators over the periods considered in the previous step. The normalization and aggregation of the components of the index rely on the principal component methodology described by Nardo et al. (2008). The table below shows more details about weights used in index construction.

**Assessing the overall resilience performance: indicators used and weights**

| Resistance performance index | Component | Resistance | Recovery | Resilience |
|---|---|---|---|---|
| GDP per capita | Resistance | 0.057 | | 0.041 |
| Investments | Resistance | 0.047 | | 0.024 |
| GVA construction | Resistance | 0.067 | | 0.037 |
| Firm survival | Resistance | 0.058 | | 0.045 |
| Productivity | Resistance | 0.070 | | 0.025 |
| Banking system default probability | Resistance | 0.059 | | 0.016 |
| Credit to gov. and state-owned enterprises | Resistance | 0.057 | | 0.035 |
| Voice and accountability | Resistance | 0.087 | | 0.042 |
| Trust in the political system | Resistance | 0.069 | | 0.047 |
| Government investment | Resistance | 0.063 | | 0.028 |
| Risk of poverty | Resistance | 0.058 | | 0.033 |
| Count on to help | Resistance | 0.078 | | 0.047 |
| Life satisfaction | Resistance | 0.024 | | 0.031 |
| Organized crime | Resistance | 0.046 | | 0.016 |
| Political stability | Resistance | 0.069 | | 0.025 |
| Press freedom | Resistance | 0.037 | | 0.028 |
| Property rights | Resistance | 0.056 | | 0.023 |
| GDP per capita | Recovery | | 0.103 | 0.022 |
| Investments | Recovery | | 0.084 | 0.037 |
| GVA construction | Recovery | | 0.069 | 0.035 |
| Firm survival | Recovery | | 0.074 | 0.028 |
| Productivity | Recovery | | 0.079 | 0.037 |
| Credit to gov. and state-owned enterprises | Recovery | | 0.079 | 0.034 |
| Voice and accountability | Recovery | | 0.067 | 0.022 |
| Trust in the political system | Recovery | | 0.079 | 0.035 |
| Government investment | Recovery | | 0.024 | 0.037 |
| Risk of poverty | Recovery | | 0.048 | 0.021 |
| Count on to help | Recovery | | 0.030 | 0.026 |
| Life satisfaction | Recovery | | 0.078 | 0.050 |
| Political stability | Recovery | | 0.095 | 0.037 |
| Property rights | Recovery | | 0.092 | 0.038 |
| **Sum** | | **1.000** | **1.000** | **1.000** |

*Note: For the indicators which did not display a tendency to recover in the aftermath of shocks, we considered that the recovery period covers the entire post-shock period.*

## Overall resistance




## Multishock resistance – a random spatial pattern

The overall resistance (including multiple shocks) displays a non-homogenous spatial pattern, with important differences among regions belonging to the same country. At the same time, one cannot notice a general pattern at EU level. The least resistant regions are concentrated in most of Spain, Hungary and Ireland, with several spots in the Great Britain. The most resistant regions are also randomly located, with a concentration tendency in the Eastern Europe, where the explanation may reside in a lower exposure to shocks.



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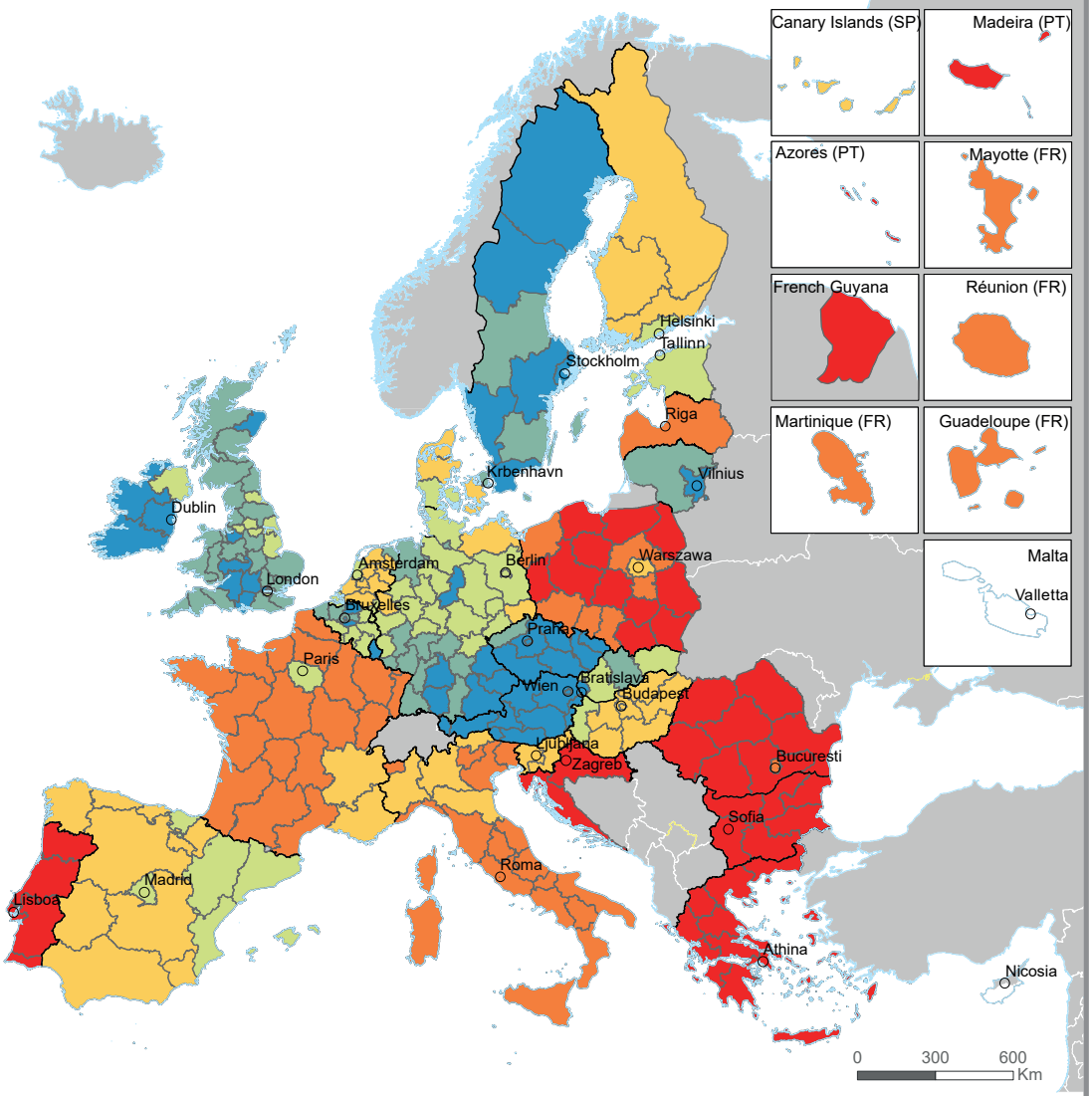
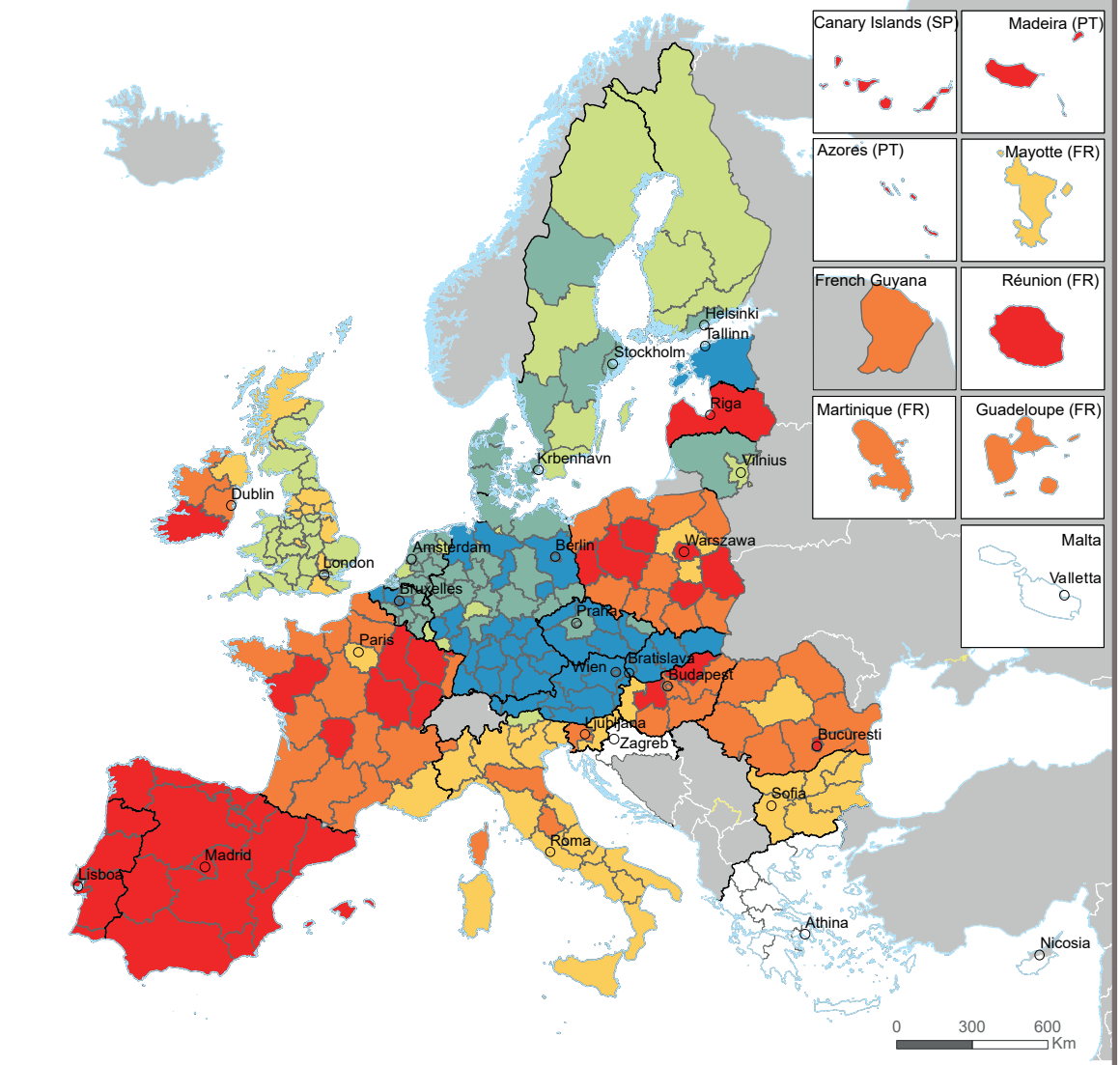
## Overall recovery




## North-South and East-West divide

Compared to the resistance index, the recovery index create a more concentrated spatial pattern: North-South and East-West divides are noticeable. Differences in performance are more present between countries than between regions, as the recovery is highly related to the quality of the response, which is mainly shaped by the national policies. While France displays a rather unexpected low recovery, the higher values are concentrated in the Central, Northern and Western parts of the Europe. At the same time, Eastern and Southern Europe recorded low or medium values of resistance index.

## Overall resilience performance




## Multishock resilience – a clustered spatial pattern

The resilience index, which integrates both resistance and recovery, creates some interesting spatial clusters at the level of Europe. Overall, the least resilient regions are concentrated in Spain, Portugal, in the eastern part of France, as well as in Poland, Hungary and Ireland. At the same time, the most resilient regions are concentrated in the Central Europe, including Slovakia, Czech Republic, Austria and most of Germany (especially the southern part) as well as in Belgium and Estonia.



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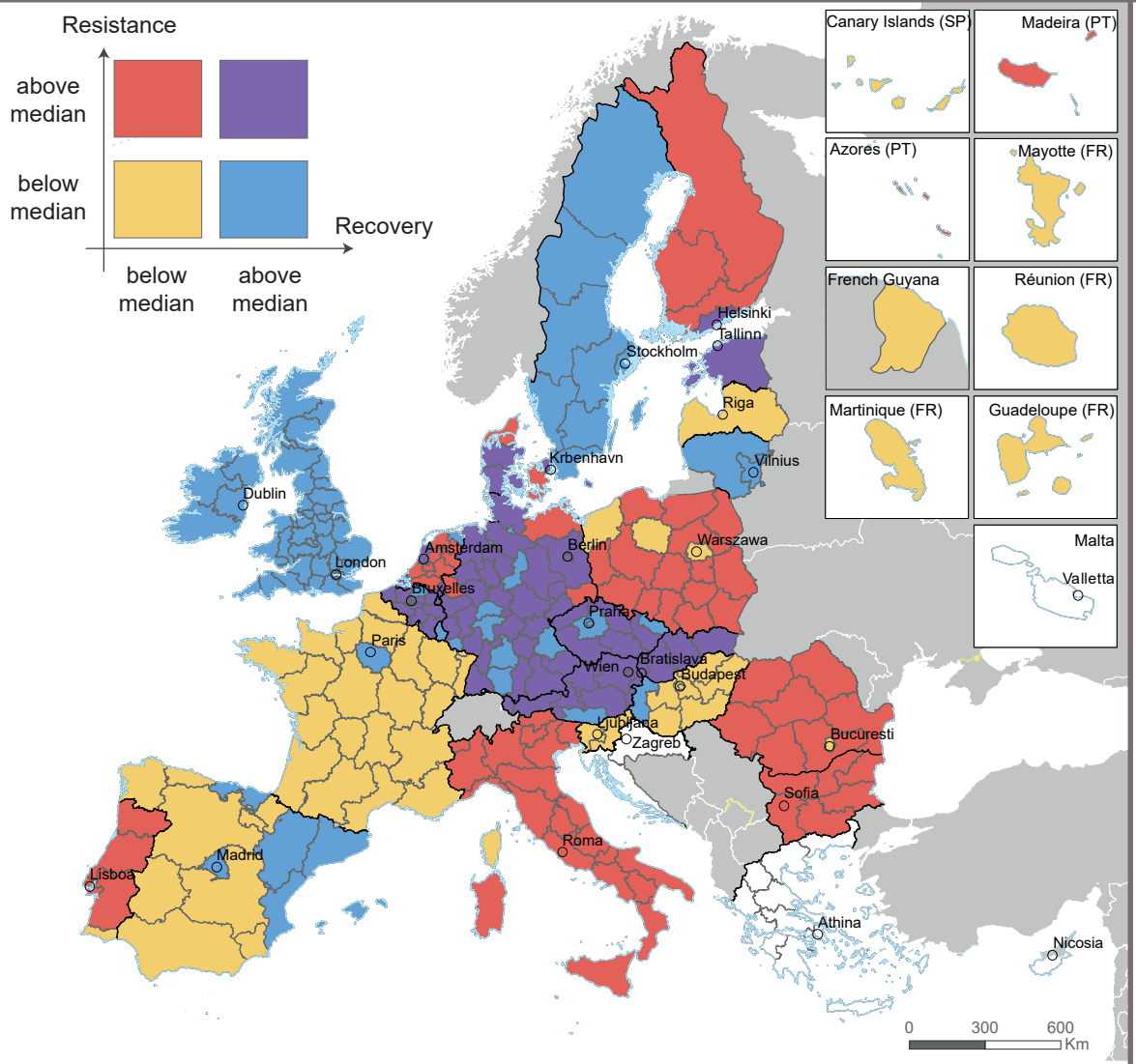
# Typology of overall resilience




## Many high resistance-low recovery regions – a need for timely responses

The final resilience typology based on multiple shocks displays a quite similar spatial pattern to that illustrated by the map on the left. Nevertheless, some different nuances can be spotted. One interesting difference compared to the previous map is recorded by the regions with low resistance, followed by high recovery: eastern part of Spain and Madrid region, Paris Region, Great Britain, Ireland, Sweden, Lithuania as well as many regions in central Europe.

While the most resilient regions according to the previous map record both high resistance and high recovery, the last intermediate category (high resistance – low recovery) displays an interesting pattern. This situation is specific to a wide range of regions and countries: eastern countries (Poland, Romania, Bulgaria); southern countries (Portugal, Italy); several regions in Germany, Denmark and the Netherlands as well as the entire Finland. For this category of regions, the quality and the timing of the national or regional response is crucial for the resilience performance to future shocks.