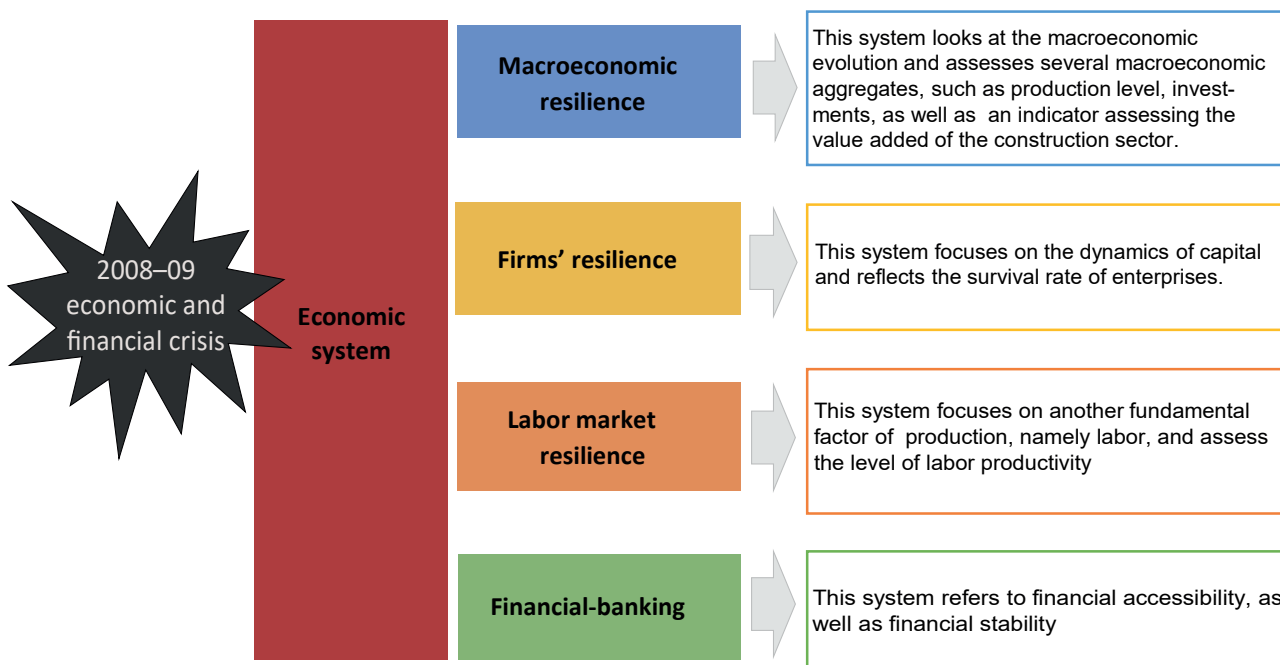


Overall economic resilience

Economic resilience is defined as *the multidimensional changing ability of an economy – its firms, workers, and financial institutions – to absorb shocks, adapt or transit to a new sustainable development path*. More subsystems were considered in this analysis as outlined in the figure below.

The indicators at the EU level or the country/regional level average were projected for delimiting the two intervals (corresponding to resistance and recovery). Three landmarks are identified for each indicator: peak year, trough/bottom year, year of full recovery/the most recent available. Resistance starts in the peak year before the shock and ends when the minimum is reached (trough year). Recovery starts in the trough year and ends when the indicator completely recovers to the pre-shock value or the most recent year available (if full recovery is not yet reached). The slopes for each of the indicators were computed over the delimited periods and aggregated into a common resilience performance index. The aggregation of components and the weights applied rely on the methodology suggested by the OECD (Nardo et al., 2008). Consequently, the top and bottom 4% of observations were winsorized.

Conceptual framework of the economic system



Assessing the resilience performance of the economic system: indicators used and periods considered

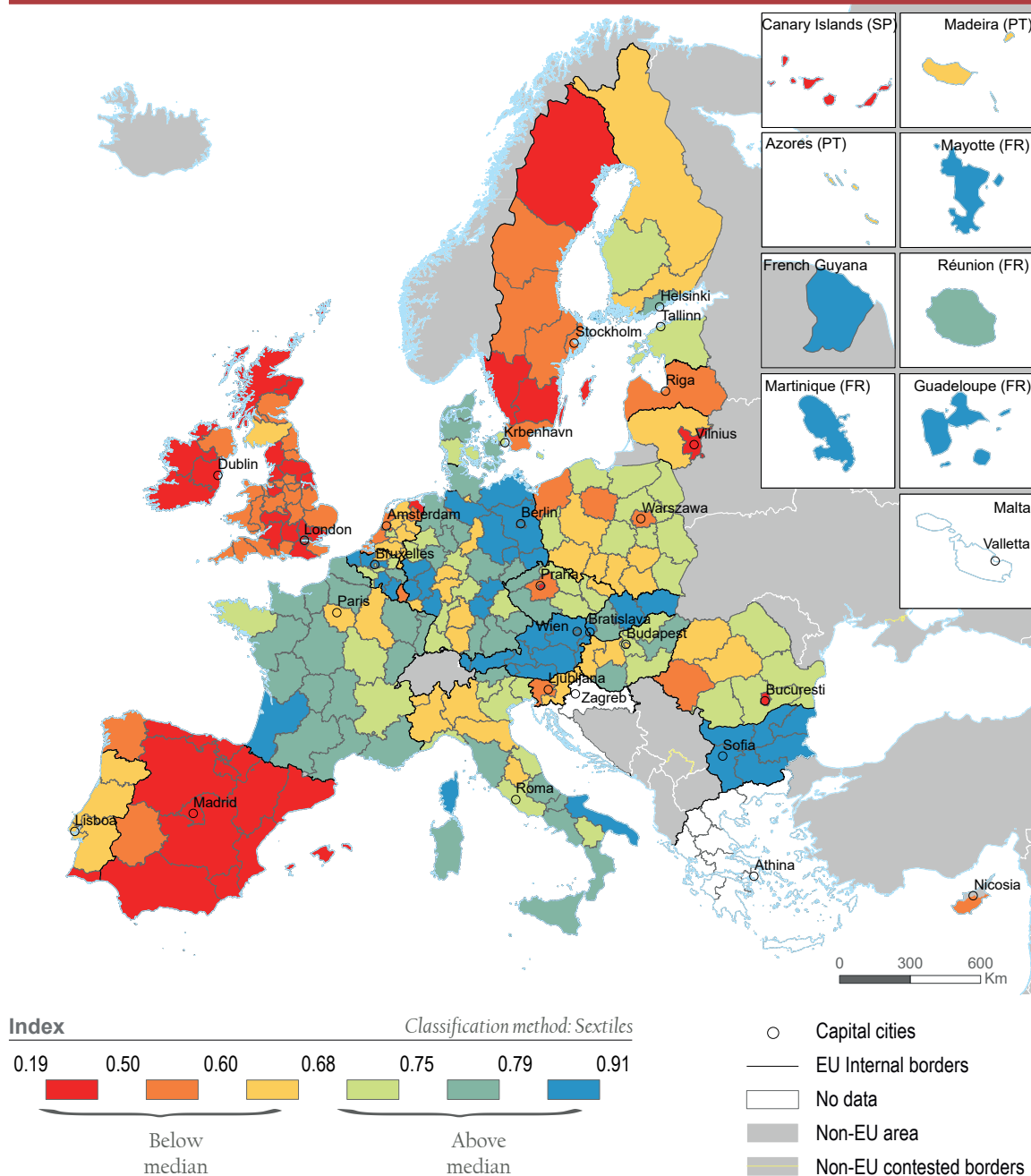
Subsystem	Indicator description	Territorial level	Source	Resistance interval	Recovery interval
Macroeconomics-production	Real GDP per capita (2015 prices, PPP)	NUTS2	ARDECO	2008–2009	2009–2011
	Real GFCF per capita (2015 prices, PPP)	NUTS2	ARDECO	2008–2009	2009–2015
	Real GVA construction per capita (2015 prices, PPP)	NUTS2	ARDECO	2008–2013	2013–2017
Firms (Constructions)	Survival rate of firms: number of enterprises created in year (t-2) that survived to (t) divided by the number of “births” of enterprises in t-2 (percentage), 2008-2017	NUTS0	Eurostat	2008–2011	2011–2017
Labor market	GDP divided by the number of working hours	NUTS2	OECD	2008–2009	2009–2010
Financial-banking	Bank z-score: The probability of default of a country's commercial banking system. The indicator was rescaled after normalization.	NUTS0	World Bank	2008–2017	
	Credit to government and state-owned enterprises (%GDP): ratio between credit by domestic money banks to the government and state-owned enterprise and GDP. The indicator was rescaled after normalization.	NUTS0	World Bank	2007–2012	2012–2017

Note: Both NUTS0 and NUTS2 indices include all the indicators. For the NUTS2 level index, the country level values were used for every region.

Assessing the resilience performance of the economic system: indicators used and weights

Indicator		Resistance	Recovery	Resistance and recovery
Real GDP per capita	Resistance	0.217		0.112
Real GFCF per capita	Resistance	0.086		0.045
Real GVA construction per capita	Resistance	0.192		0.102
Survival rate of firms	Resistance	0.030		0.081
Labor market productivity	Resistance	0.203		0.082
Bank z-score	Resistance	0.090		0.039
Credit to government and state-owned enterprises (%GDP)	Resistance	0.182		0.102
Real GDP per capita	Recovery		0.213	0.066
Real GFCF per capita	Recovery		0.193	0.074
Real GVA construction per capita	Recovery		0.189	0.084
Survival rate of firms	Recovery		0.059	0.078
Labor market productivity	Recovery		0.200	0.063
Credit to government and state-owned enterprises (%GDP)	Recovery		0.145	0.071
Sum		1.000	1.000	1.000

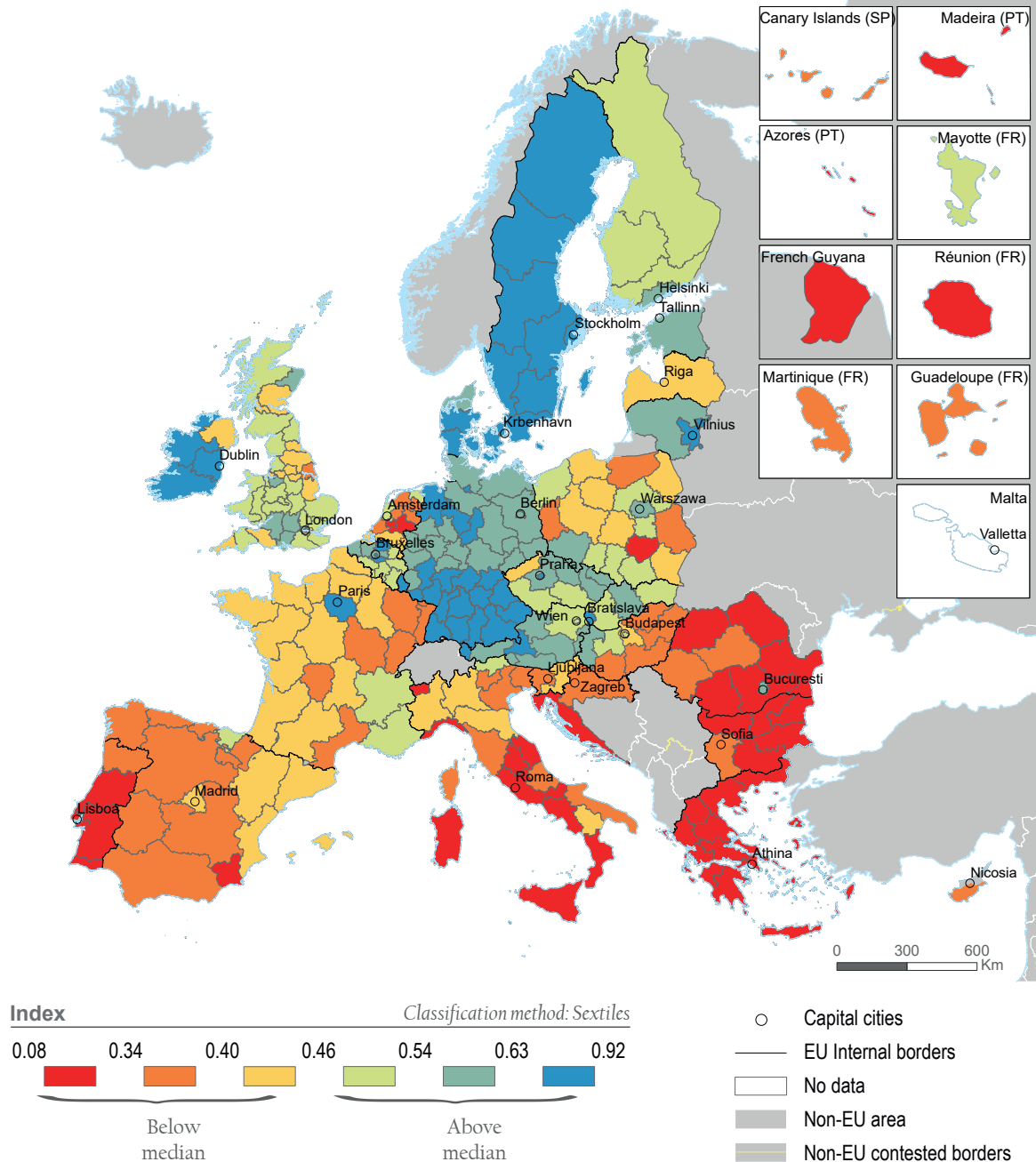
Overall economic resistance



An overall lower economic resistance on the western fringe of the EU

The regions that showed the lowest level of resistance are those from Ireland, Great Britain, Spain, and Sweden, as well as those (globally well-connected) that accommodate capital regions from East-Central countries. On the contrary, the regions that showed an above-median resistance are those in the continental western Europe (most regions in France, Germany, Belgium, and Austria), but also some post-socialist regions, particularly from Bulgaria and Slovakia.

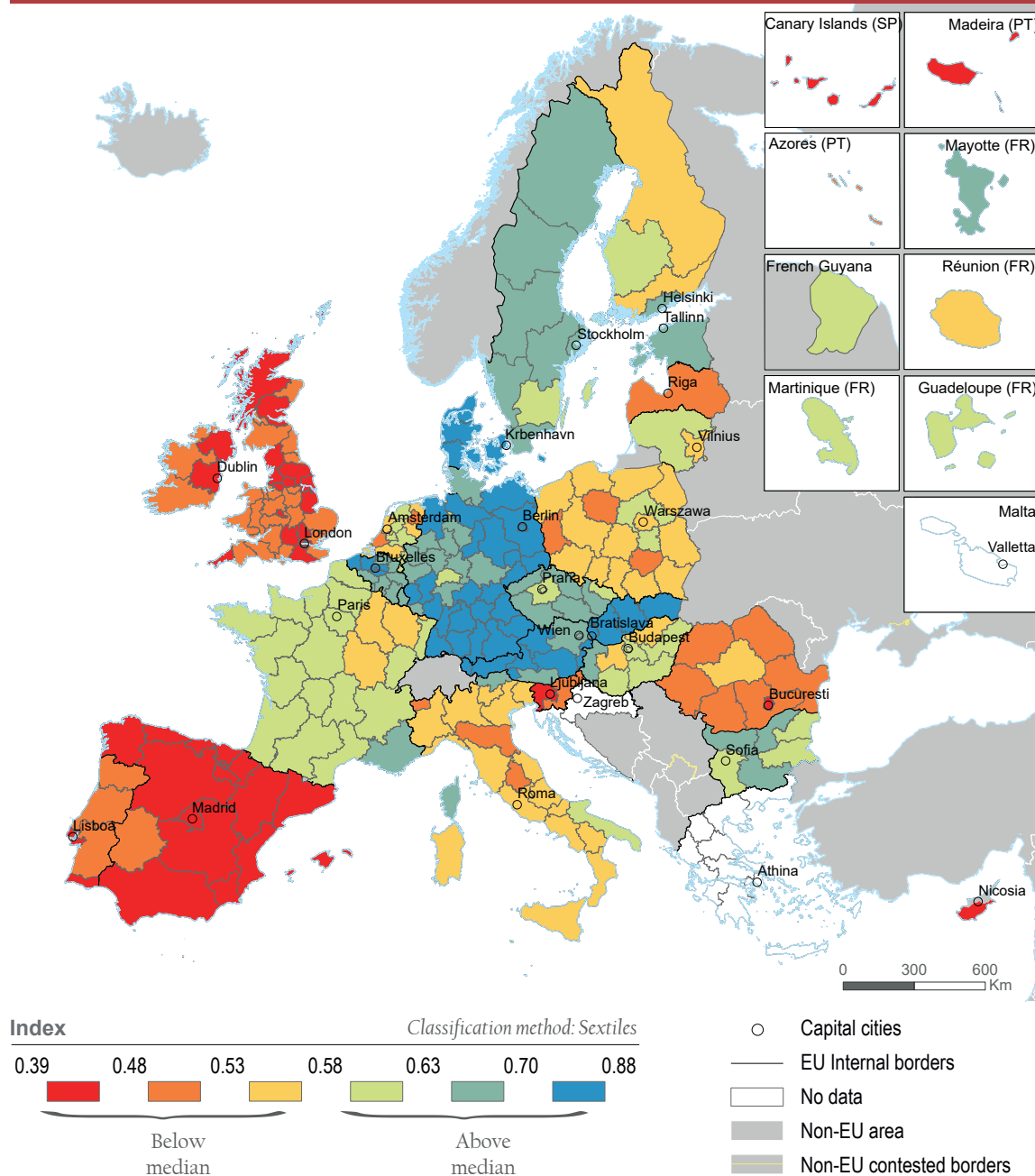
Overall economic recovery



An overall lower economic recovery in southern and south-eastern parts of the EU

The recovery process turned out to be a rapid one in most regions of Germany, Austria, Belgium, Sweden and Ireland. The lowest values of the recovery index were registered in the regions of the Mediterranean countries, such as Portugal, Spain, Italy, Greece, countries whose recovery has been slow during the latest major economic crisis. In the countries of Central and Eastern Europe, the recovery process had a medium to low speed, the lowest values of the index being registered in Romania and Bulgaria.

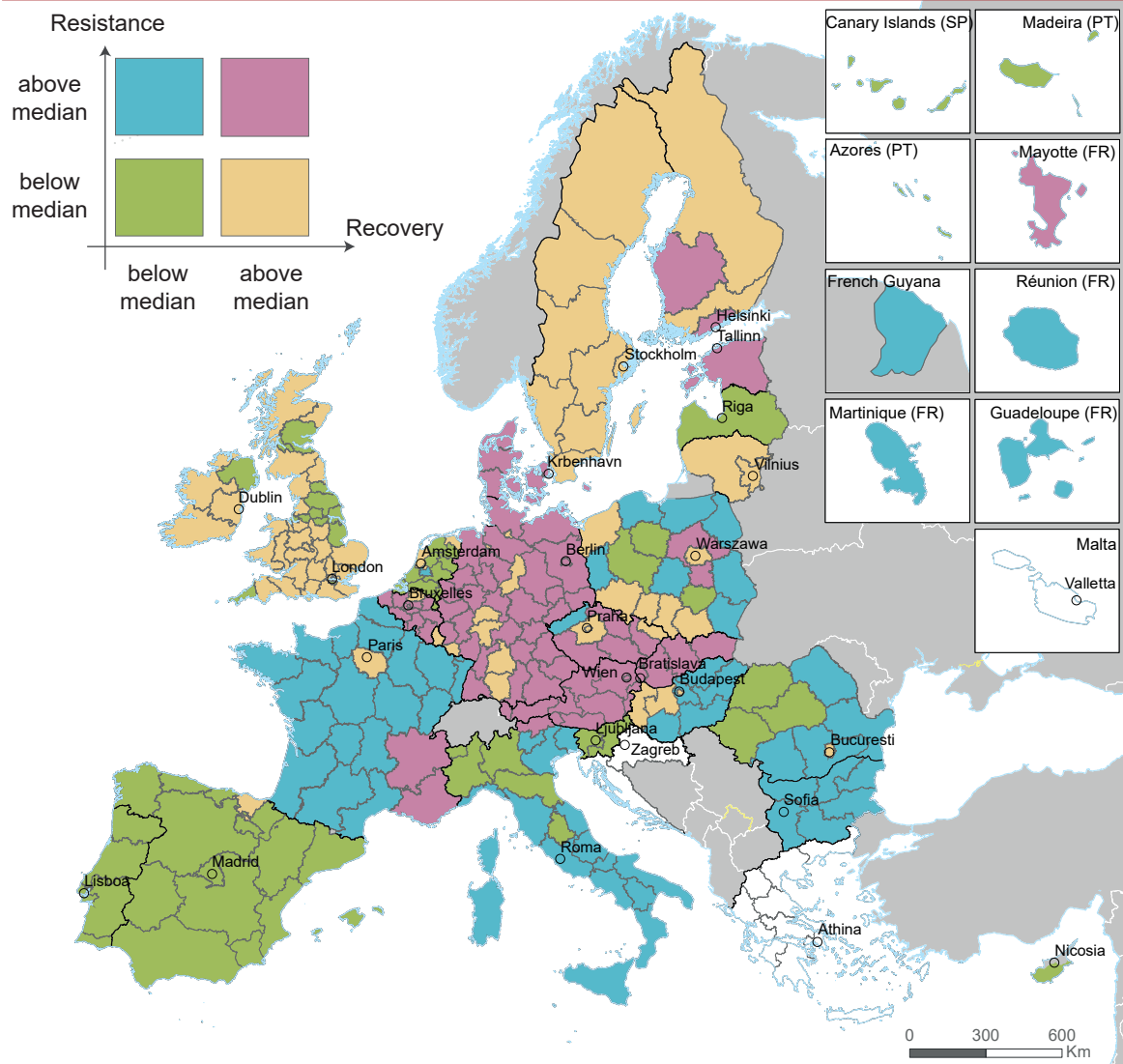
Overall economic resilience performance



Overall economic resilience at European regional level

The overall economic resilience at the regional level proved to be the highest in the regions of Germany, Austria, Belgium, Slovakia and Czech Republic. Values of near-average resilience index were registered in the regions of France, Sweden and Finland. In the group of the Mediterranean countries, Spain and Portugal proved to be the least resilient. Within the Central and Eastern European countries, the regions in Romania had the lowest values of the overall resilience index, while Hungary and Bulgaria registered values above the European average.

Typology of overall economic resilience



Typology of overall economic resilience at European regional level

The analysis of the typology of resilience from the perspective of resistance and recovery highlighted the four groups of regions and the existence of interregional inequalities. The regions with above-average levels of both resistance and recovery were mostly found in Germany, Austria, Belgium, Czech Republic, Slovakia, Estonia, Denmark, South-Eastern France, Southern Finland and the capital region of Poland. Most regions that showed higher levels of resistance but lower recovery values are found in France, Hungary, Bulgaria, Central and Southern Italy, Southern and Eastern Romania, Northern and Eastern Poland. Regions with high levels of recovery, but less resistant, are found mainly in Sweden, Finland, Lithuania, Southern Poland, much of Ireland and the United Kingdom. The regions that registered values below the European average both in resistance and in recovery are found in Portugal, Spain, Latvia, Slovenia, Northwestern Italy, Northwestern Romania, Eastern Great Britain and the Central-Western part of Poland.