European Commission

Regional economic climate risks in Europe

Early insights from a spatial growth model

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July 2025

EUROPEAN COMMISSION

Directorate-General for Regional and Urban Policy
Directorate B — Policy
Unit B.2 — European Semester and Economic Analysis

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Directorate-General for Regional and Urban Policy
Directorate B: Policy

2025

EN

Manuscript completed in July 2025

Luxembourg: Publications Office of the European Union, 2025

Print ISBN 978-92-68-32688-6 doi:10.2776/3145352 KN-01-25-100-EN-C
PDF ISBN 978-92-68-32687-9 doi:10.2776/9583538 KN-01-25-100-EN-N

Contents

1. Abstract

This report analyses the magnitude and geography of the economic consequences of climate risks across European NUTS3 regions. It introduces a new regional economic growth model that accounts for spatial spillover effects. The study, based on the JRC PESETA V project, focuses on a 2ºC scenario of global warming by 2050 and considers seven climate impact categories: labour productivity, droughts, coastal flooding, river flooding, storms, wildfires and transport infrastructure. By 2050, the 2°C global warming scenario could lead to a 0.7% EU GDP loss and a 0.8% loss in consumption; over the 2021-2050 period, this could result in a GDP loss of €2.5 trillion, showing a substantial economic cost. The results also indicate that there is a large spatial asymmetry in climate risks, affecting relatively more regions in Southern and Eastern European countries (Greece, Cyprus, Croatia, Portugal, Spain, and Italy). Northern European regions are more vulnerable to river and coastal flooding, while Southern and Eastern European regions are disproportionately affected by productivity losses, droughts, and coastal flooding. Furthermore, the analysis reveals that the existing distribution of European cohesion funds helps to partially offset the uneven distribution of climate-related risks across regions.

2. Introduction

Climate change presents a profound global challenge, manifesting through increasingly frequent and severe extreme events like floods, droughts, and wildfires. These events threaten lives, livelihoods, and ecosystems, while simultaneously posing significant economic risks. Within the European Union, these climate risks are not uniformly distributed; geographical differences, varied hazard patterns, and diverse socio-economic conditions mean that impacts vary considerably across regions. Critically, this uneven distribution poses a direct challenge to the EU's core objective of fostering economic, social, and territorial cohesion. Poorer regions, often possessing weaker governance structures, limited resources, and less resilient infrastructure, are typically more vulnerable and face a disproportionate share of the climate burden, potentially exacerbating existing regional inequalities and hindering convergence – the very issues Cohesion Policy seeks to address (Cappelli et al., 2021; Islam and Winkel, 2017).

Therefore, a detailed understanding of climate risks at the regional level is not merely an environmental concern but a fundamental prerequisite for designing effective and equitable adaptation measures and for ensuring the continued success of EU Cohesion Policy. Targeted investments and support mechanisms under Cohesion Policy must be informed by robust evidence on where vulnerabilities lie and where adaptation efforts will yield the greatest benefit in promoting resilience and sustainable development across all regions.

This need for detailed regional assessment is further underscored by the evolving EU policy landscape. Under the new European Commission mandate, the Commissioner responsible for Cohesion and Reforms will play a key role in contributing to the Commission's forthcoming proposal for a comprehensive EU climate adaptation strategy.

The objective of this report is to present the economic analysis of regional climate risks in Europe. In this respect, by delivering a high-resolution spatial assessment of regional economic vulnerabilities to climate change, the analysis can support the formulation of targeted future policies, including adaptation options.

The analysis is based on key, preliminary findings from the TRACE (Territorial Risk Assessment of Climate in Regions of Europe) project, funded by DG REGIO and representing the fifth iteration within the JRC's long-standing PESETA programme assessing climate impacts in Europe (JRC PESETA V). Focusing on a 2°C global warming scenario by 2050, our assessment covers seven critical climate risks – impacts on labour productivity, agricultural droughts, coastal floods, river floods, windstorms, wildfires, and damages to transport infrastructure – downscaled to nearly 1400 NUTS3 regions.

TRACE provides climate impact results that are consistent with the dynamic socio-economic scenarios. Regarding the economic framework, the previous PESETA projects mainly relied on a static setting, i.e. how future climate might affect today's economy). In TRACE we have developed a novel dynamic regional economic model. The model extends the Solow growth model — where GDP is generated by labour, capital and technology — by incorporating spatial and technical spillover effects on labour productivity (Ertur and Koch, 2007). As a result, the model can simulate how exogenous climate shocks, such as floods or droughts, directly impact capital accumulation, productivity and output, and how these effects propagate through regions and time, with household responses to housing losses further influencing savings and investment. The integrated assessment of spatial and temporal interactions provides a more comprehensive evaluation of how climate change may reshape regional economic trajectories, with the potential to provide useful insights for shaping resilient and cohesive European regions in the face of a changing climate.

The study partly addresses the uncertainty associated with climate variability. In particular, it considers two Representative Concentration Pathways (RCPs, RCP4.5 and RCP8.5) and eleven combinations of Global Circulation Models (GCMs) and Regional Climate Models (RCMs), as in the JRC PESETA IV project. While a comprehensive risk assessment would ideally also account for uncertainties related to biophysical and economic modelling, incorporating these additional factors is beyond the scope of this analysis.

The remainder of the working paper is divided into three sections, including this introduction. Section 2 presents the main results and section 3 contains concluding remarks. The Annex gives an overview of the economic model and its data sources.

3. Results

The modelling results are analysed with using two complementary indicators: GDP and consumption changes. The GDP metrics measures overall economic production. Consumption changes provide a more comprehensive view of the economic consequences of climate shocks, as they account for some welfare losses not captured by GDP, such as those due to the reallocation of consumption in order to repair residential building damages.

In this paper, the baseline scenario (representing the climate for 1990-2020 projected to 2050, with a resulting warming of 0.9ºC) and the 2ºC climate scenario are measured against a hypothetical reference scenario with no climate-related costs. The reference scenario corresponds to the GDP projections of the Ageing Report 2021 (DG ECFIN, 2021). The time horizon for the analysis is the year 2050, a timeframe of particular relevance to cohesion policy, allowing for a detailed assessment of the impacts over the next few decades.

3.1. Impacts across regions

Figure 1 shows the regional distribution of expected economic losses in Europe in 2050 (based on an average over the 2040-2060 period and all the climate models and RCPs). The top row represents results for the 0.9ºC scenario, and the bottom row for the 2ºC scenario. Maps on the left show GDP losses; maps on the right show consumption losses. The figure reveals a pronounced asymmetry in the distribution of economic impacts. Southern and South-Eastern European regions are particularly vulnerable and suffer more severe economic losses than other regions, highlighting the need for policy measures to mitigate these impacts and address these regional inequalities. In addition, clear spatial patterns emerge within countries, including a clear north-south divide in Spain, where economic losses are more pronounced in the southern regions, and a pronounced vulnerability in the central part of France.

The disparities observed are largely due to the different exposure to various climate-related risks. Northern European regions are more susceptible, in general, to river and coastal flooding, while Southern and Eastern European regions are disproportionately affected by productivity losses, droughts and coastal flooding.

When looking at the GDP and consumption losses under the 2ºC scenario, it is interesting to note that two main areas can be distinguished: an area where the impact is rather homogeneous (higher than 1%, in dark red colour or darker) and another area where the impact is lower than 1% (the orange and yellow colours). The first area roughly corresponds to the three southerner European peninsulas, a good share of France and the oriental North-South stripe. The second area covers the Netherlands, Denmark and Norway as well as large parts of Germany, Austria, Switzerland, Sweden and Ireland (see Figure 1, bottom right).

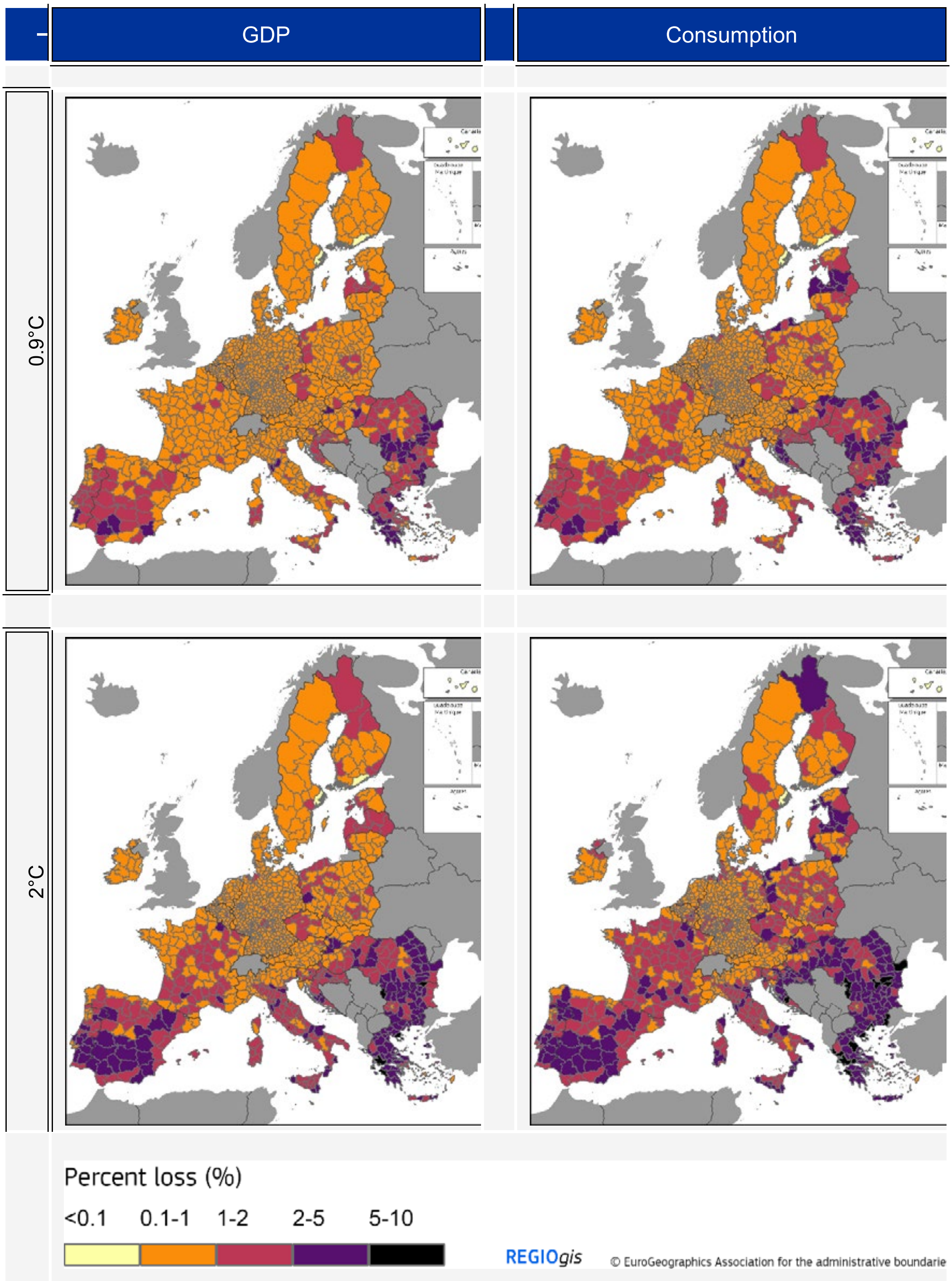

Figure 1: Geographical distribution of GDP and Consumption changes in 2050 under baseline (0.9^{o}C) and 2^{o}C warming scenario.

3.2. Aggregated results

Figure 2 shows the annual projected losses of both GDP and aggregated consumption (in % with respect to the reference scenario) in the period 2021-2050 for the baseline scenario (0.9ºC) and the 2ºC climate scenario. The figures also show the 10 to 90% range of the projections, depending on the different climate runs.

The 2ºC scenario leads to average (across all climate runs) or expected total impact of up to 0.7% of EU GDP and 0.8% of EU consumption by 2050. Consumption losses are larger than GDP losses because they account for compulsory consumption shifts (e.g. mandatory repairs to damaged housing in floods). These losses are about three times larger than current (2025) annual losses. The cumulative GDP loss from 2021 to 2050 can amount to EUR 2.5 trillion (without discounting) in the 2°C scenario, which highlights the significant economic burden that climate change could imply for the European economy in the coming years.

The 90th percentile of losses across all climate runs are about 60% higher than the average losses for both GDP and consumption. For example, in the 2ºC scenario, the highest consumption losses can reach 1.3% by 2050, compared to an average of 0.8%.

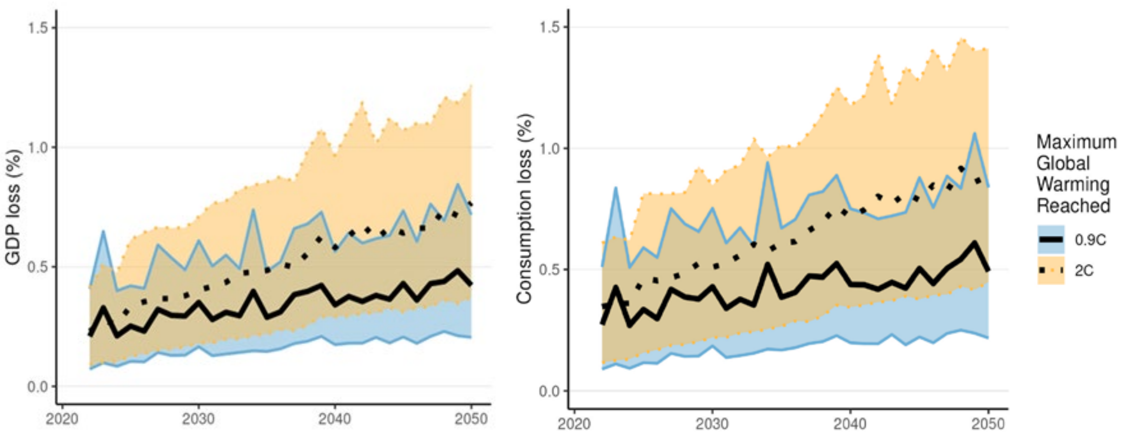

Figure 2. EU GDP and consumption losses (%) for the baseline (0.9ºC) and 2ºC scenario. Shaded areas represent the range between the 10 and 90th percentiles of climate models, with the central lines (thick black line for the 0.9ºC scenario and the points line for the 2ºC scenario) referring to the mean.

3.3. Impacts on the EU population

The analysis now focuses on the distributional effects on the population, —that is, how many people are affected by different levels of economic damage. This highlights the social dimension of climate risks. Figure 3 shows the population distribution across to five ranges of economic damages, using a colour gradient. The numbers within the bars represent the millions of residents within the affected regions, while the vertical axis indicates the corresponding share of the EU population.

In a 2ºC warming scenario, the number of people in Europe exposed to economic impacts greater than 1% almost triples for both GDP and consumption compared to the baseline scenario. For example, in the baseline scenario, 86 million people face consumption losses greater than 1% by 2050, while in the 2ºC scenario, 191 million people face losses greater than 1%. Strikingly, our analysis shows that more than a third of the European population will be affected by significant GDP losses (defined as larger than 1%) by 2050. This increases to almost half of the population with the consumption losses metrics.

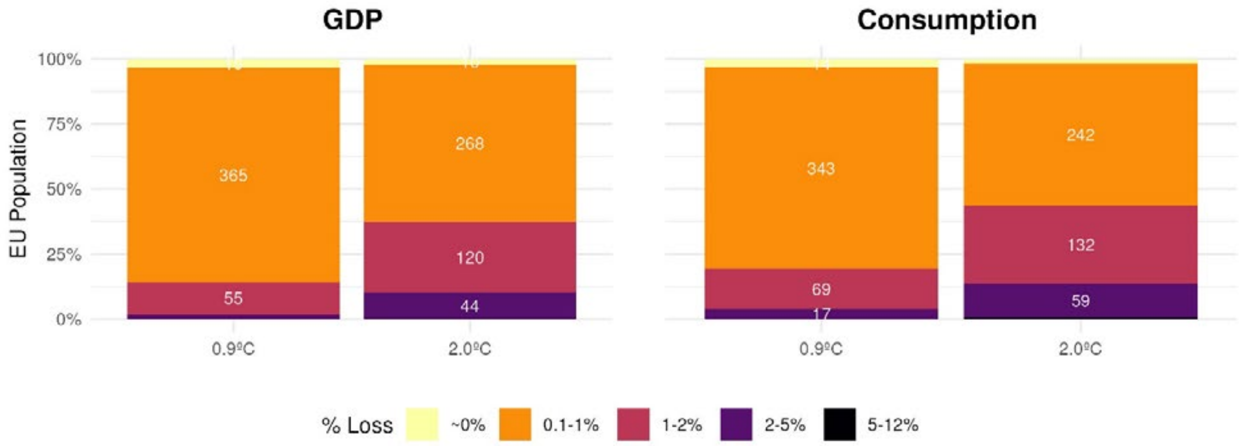

Figure 3: European population exposed at different GDP and Consumption reduction percentages (in the baseline and at 2.0ºC). The numbers within the bars represent the absolute number of people (in millions), while the vertical axis indicates the corresponding share of EU population.

3.4. Impacts on member states populations

Figure 4 shows a detailed breakdown of the population exposed to varying degrees of economic loss across EU Member States, with colours representing the same ranges of damages as in Figure 3. The top row represents results for the 0.9ºC scenario and the bottom one for the 2ºC scenario; the GDP results appear on the left and the consumption results appear on the right. Countries are ordered in the horizontal axis by their average GDP losses in the baseline, from higher economic losses on the left, to lower losses moving to the right.

Most of the population suffering significant losses (i.e. greater than 1%) is concentrated in Southern and Eastern European countries, with higher levels of vulnerability. A significant proportion of the population (more than 75%) in countries such as Greece, Cyprus, and Croatia are expected to suffer significant losses both of GDP and consumption. In countries with large populations, such as Spain and Italy, the affected population is still substantial and more than 50% are expected to suffer significant economic losses.

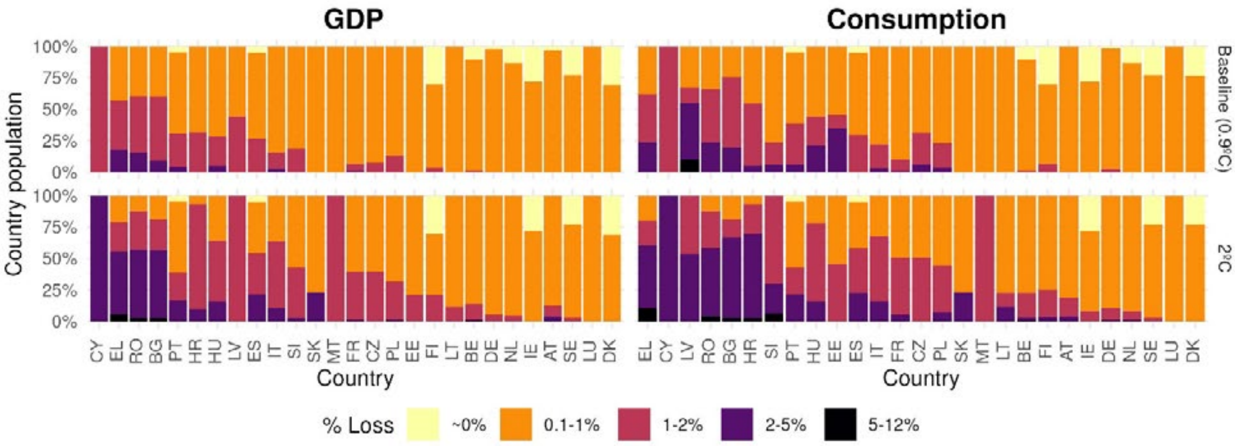

Figure 4: Member States population exposed at different GDP and Consumption reduction levels (in the baseline 0.9°C and at 2°C). The numbers within the bars represent the absolute number of people in millions, while the vertical axis indicates the corresponding share of each country's population. Countries are ordered by their average losses in the baseline.

3.5. EU Cohesion policy and regional climate risks

With the aim of understanding the extent to which the current allocation of EU cohesion funds (period 2021-2027) aligns with the projected climate impacts, we have conducted a first exploratory analysis.

The cohesion policy distinguishes between three groups of regions: (a) less developed regions (GDP per capita <75% of the EU average), (b) transition regions (GDP per capita between 75% and 100% of the EU average) and (c) more developed regions (GDP per capita >100% of the EU average). The EU has allocated €13 billion (3.4% of the total cohesion budget) for climate change adaptation and risk prevention in the 2021-2027 period, to target flood and landslide prevention, wildfire prevention, and other climate-related risks.

We found that there is a certain degree of correspondence between level of development and climate risks. Thus, less developed regions, receiving relatively more cohesion funds, are indeed the most affected regions by climate change. 46 million people could experience consumption losses in their regions within a range of 2-5% of GDP in the 2°C scenario (see Figure 6 in Annex II along with further details of the analysis). Finally, we show an alignment between the allocation of Cohesion Policy funds for climate change adaptation in the 2021-2027 programming period and the regions most exposed to climate risks. Areas with higher expected damages tend to receive more adaptation funding per capita, particularly in the case of wildfire-related investments. This suggests that, to some extent, current funding priorities tend to follow future climate challenges (see Figure 6 in Annex II for details).

4. Conclusions

Understanding the scale and geography of the economic impacts of climate risks in European regions is essential for designing appropriate adaptation measures at the sub-national level. This report presented the main preliminary results of the economic analysis conducted for the TRACE project, analysing how much, where, and why climate change may affect GDP and consumption at the regional level (about 1400 NUTS3 regions) in Europe. The regional economic model builds upon the spatial Solow growth model, incorporating additional features such as spatial spillover effects on labour productivity, the impact of capital destruction, and the decisions households make regarding housing reconstruction.

The present assessment focuses mainly on a 2ºC scenario of global warming by 2050 and considers seven climate risks: labour productivity, droughts, coastal flooding, river flooding, windstorms, wildfires, and transport infrastructure.

Four findings stand out. First, by 2050, total EU welfare, which we measure with household consumption, is expected to decrease by 0.8% in a 2ºC scenario due to climate risks.

Secondly, the share of the European population affected by significant economic impacts (more than 1% of GDP) could almost triple by 2050 compared to today, with almost half of the EU population experiencing significant consumption losses.

Thirdly, there is a large disparity in climate risks, as these tend to have a bigger impact in Southern and Eastern European countries. These asymmetries already exist in the current climate and will be exacerbated by climate change.

Fourth, this asymmetric pattern of climate risks is partially mitigated by the current allocation of European cohesion funds. A future study could investigate the regional distribution of the cohesion funds planned for the new cohesion policy period (2028-2034) and how they relate to the regional pattern of climate risks, also considering the scale of the funding for climate adaptation in the overall EU budget. The methodology is subject to a few limitations, which are linked to possible avenues for further research. In this study, some of the uncertainty due to climate variability is accounted for by using twenty-two different climate projections; a more systematic risk assessment would also need to account for other sources of uncertainty, such as those arising from biophysical and economic modelling. The potential economic impacts do not take into account certain risks (such as agriculture, tourism and other risks) and the consequences of reaching climatic tipping points.

Furthermore, adaptation is not considered in TRACE. An exhaustive analysis of all the adaptation options for each damage pattern considered would require a very substantial additional effort in data collection and modelling, facing fundamental information gathering and research challenges that go beyond the scope, ambition, and budget of this study. Lastly, while the current version of the model is highly tractable, particularly given its high spatial granularity, it focuses on a limited aspect of regional interactions — specifically, productivity and economic spillovers via trade. Nevertheless, certain market adjustment mechanisms like trade, capital, labour mobility, or innovation, may potentially influence the outcome in ways the model does not account for yet. Addressing this model limitation will be a key focus of future developments, building on the model's current strengths to enhance its policy relevance.

5. Annex I: Economic model and data sources

This annex presents the regional growth model developed specifically for assessing the economic impacts of climate risks in the EU at sub-national level (NUTS3).

5.1. The extended regional Solow growth model

The backbone of the regional economic methodology is a spatially augmented Solow model as in Ertur and Koch (Ertur and Koch, 2007). GDP or output (Y) is generated by the combination of labour (L), capital (K) and technology (A) following a Cobb-Douglas function.

Labour grows exogenously, while capital grows via a perpetual inventory equation, where investments correspond to a constant share of GDP. The basic Solow model setup is augmented to capture both technical and spatial spillover effects on labour productivity.

Labor productivity growth has an exogenous component and an endogenous one that depends on (i) the amount of capital per worker technical spillovers, and on (ii) the technology level in neighbouring regions ("spatial externalities"). Due to this dynamic structure, climate shocks in a particular region and at a particular time can spread to other regions and subsequent time periods. For example, a flood can reduce both the capital stock and the output of the year in question in the affected region, leading to a decline in investment, which in turn reduces future capital and output in subsequent periods and also affects the GDP of the partner regions via spatial spillover effects.

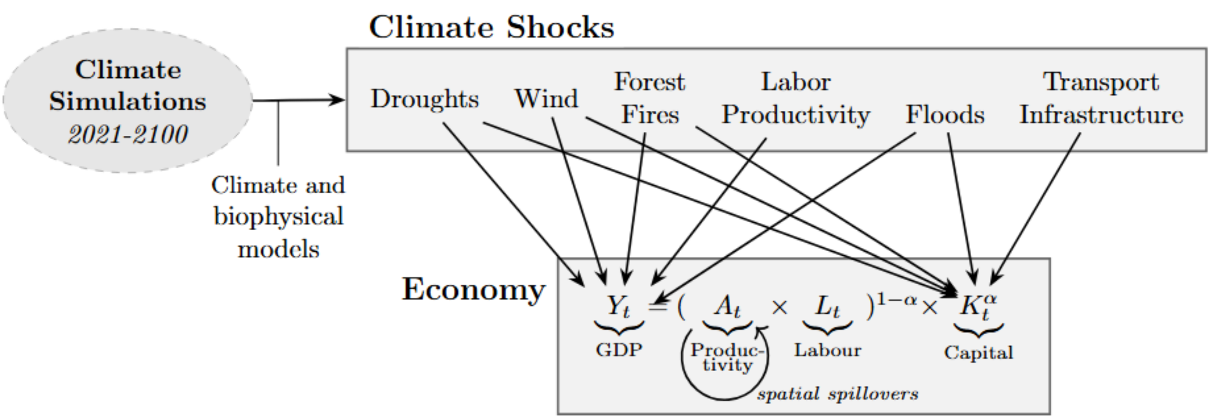

Figure 5. Schematic representation of the integrated assessment framework used for TRACE (arrows are not exhaustive).

We calibrated the model to the NUTS3 regions and made a mapping between the direct damages and the variables of the model. As shown schematically in Figure 1, a set of climate projections (from a given global warming scenario) feeds PESETA's biophysical impact models, which then translate changes in climate variables into direct economic losses affecting production (GDP), productive capital (industry, infrastructure) and residential properties. These direct effects are therefore included in the regional economic model as exogenous shocks.

The recovery from a capital loss is influenced by savings and depreciation rates. A higher savings rate means that a larger share of GDP is used for investment, allowing a faster rebuilding of capital and a faster return to the original convergence path to steady-state levels of capital and GDP. Conversely, a lower depreciation rate, which reduces the rate at which existing capital stock deteriorates, can also facilitate reconstruction by preserving more of the remaining capital, thereby requiring less new investment to restore pre-loss levels, and enabling a more rapid recovery and return to long-term growth trends.

Household losses account for most direct economic losses in high impact areas such as coastal and river flooding. A fundamental aspect of the dynamic consequences of climate shocks is then the response of households. It is assumed that households fully repair the damage to their residential buildings, reducing the consumption of other goods by an equal amount and thus keeping the overall consumption level unchanged. Since the expenditure required to repair the damage reduces consumption opportunities for other goods and services, the repair expenditure is referred to as welfare losses. For instance, consumers would have to reduce their travel to replace household appliances damaged by a flood.

If household losses are very large and exceed a level of "necessary or obligatory consumption" (a value set to the expenses in basic needs such as food, housing and medical expenses), the household would then reduce its savings by this excess. This triggers a strong dynamic process within the model, as the reduction in savings for home repair leads to a reduction in investment and thus the capital stock, which affects the level of output in the years following the shock.

5.2. Data sources

The model relies on multiple data sources to ensure robust regional economic projections. The GDP reference projections (i.e. excluding climate shocks) at the NUTS3 level are downscaled using the DELi model (Curtale et al., 2024) and are consistent with the national level projections from the Ageing Report 2021 (DG ECFIN, 2021). The labour force projections are based on the latest demographic projections from EUROPOP for these EU regions. The capital stock data at the NUTS3 level for the base year (2020) comes from the HANZE database (Paprotny et al., 2018), which contains tangible assets for both industry and the housing sector.

There are two important region-specific parameters when calibrating the model. The investment rates (s) and depreciation rates (δ) at the NUTS3 level are taken from the ARDECO database and are held constant at their 2021 values (Auteri et al., 2024). The investment rate is computed by dividing gross fixed capital formation by GDP; the depreciation rate is calculated by dividing the consumption of fixed capital by capital.

The dynamic trajectories of labour productivity are calculated by inverting the production function with GDP, labour, and capital stock data, using a capital share parameter (α) of 0.35 (this is the value assumed in the Ageing Report 2021).

The spatial weighting matrix used to define the regional interactions is constructed by combining trade flow data from higher-level input-output matrices such as the PBL EUREGIO database (2000-2010) at NUTS2 level (year 2010) and the FIGARO country-sector matrix (year 2021) for selected regions together with NUTS3 estimates of sectoral GVA from ARDECO.

6. Annex II: Climate risks and cohesion funds

In this section the regional distribution of climate risks is compared with the current regional distribution of the EU cohesion funds. The EU cohesion policy allocates funds across EU regions according to their GDP relative to the EU average. In particular, there are three main categories of regions, as defined in the classification used for the 2021-27 funds, which are: (a) less developed regions (GDP per capita <75% of the EU average), (b) transition regions (GDP per capita between 75% and 100% of the EU average) and (c) more developed regions (GDP per capita >100% of the EU average).

Figure 5 shows the impact on consumption and GDP according to the three categories of beneficiaries of cohesion policy. The colours represent the scale of economic impacts, in a similar way to the previous figures. The width of the bars is proportional to the size of the population. The regions that are relatively most affected are those classified as less developed under the EU cohesion policy. This vulnerability is further exacerbated by the lack of investment capabilities to adapt to climate change, reinforcing the regressiveness of the climate externality. In the 2ºC scenario, 46 million out of the 59 million EU inhabitants who would experience consumption losses of between 2 and 5% live in the less developed areas, i.e. significantly more than in the baseline scenario. Therefore, it appears that the allocation of cohesion funds for 2021-27 is concentrated in the regions that are expected to suffer relatively the most from climate damages in the future, although the cohesion fund purposes may require some redesign to specifically address the climatic vulnerabilites. Furthermore, note that the shares and amount of people impacted in the more developed regions are higher than in the transition regions, so the less affected regions are the middle-income ones.

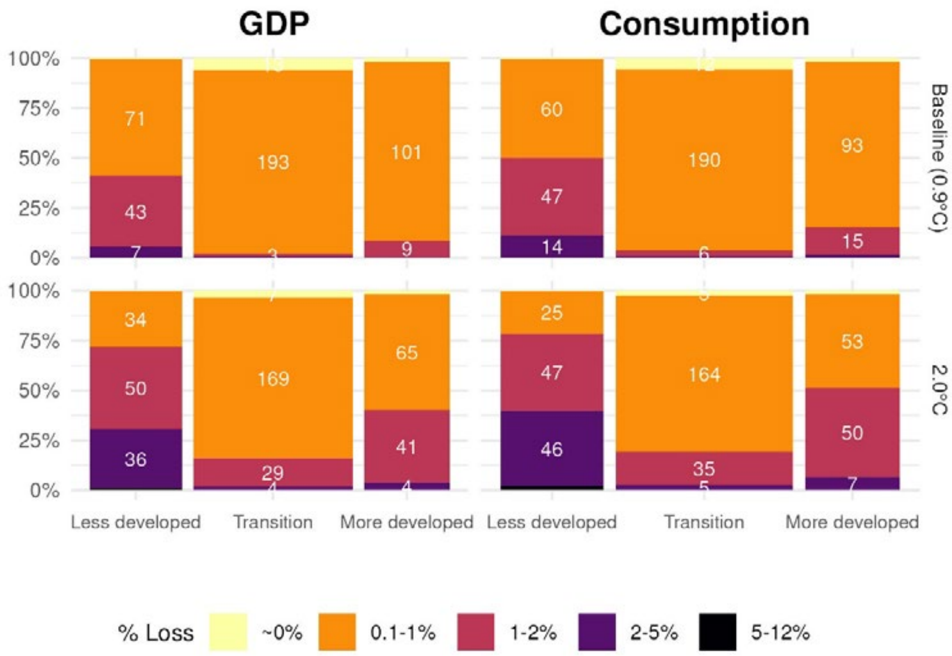

Figure 6: **Distribution of GDP and consumption losses for each cohesion policy category. The area is proportional to the population affected; the numbers display the people affected, in millions.**

The amount of Cohesion Policy funds allocated to climate change adaptation and risk prevention is 13 billion € in the 2021-2027 programming period, representing 3.4% of the total cohesion budget. They target three specific investment areas: flood and landslide prevention and management (6.6 billion €), wildfire prevention and management (2.1 billion €), and other climate-related risk prevention and management including storms (4.2 billion €). Member States negotiate partnership agreements with the European Commission to allocate funds across various priorities and regions. For instance, some countries like Austria manage their cohesion policy budget through national thematic programs. Others, such as Italy, use solely regional programs. Still, other countries like Romania combine both national thematic and regional programs.

Including national co-financing, the total investment in climate change adaptation reaches 17.4 billion €. Furthermore, the Cohesion Policy invests an additional 1 billion € in preventing and managing non-climate related, human-induced risks, which can also enhance regional preparedness for climate shocks.

We disaggregated the budget allocated to climate change adaptation intervention fields in both national and regional programs. For national programs, we used population data to distribute funds across NUTS 2 regions. Figure 6 examines the relationship between the regional allocation of Cohesion Policy funds for climate change adaptation and the expected climate change damages for the 2°C scenario in 2050 (the mean of the 2040-2060 period, and over all climate runs).

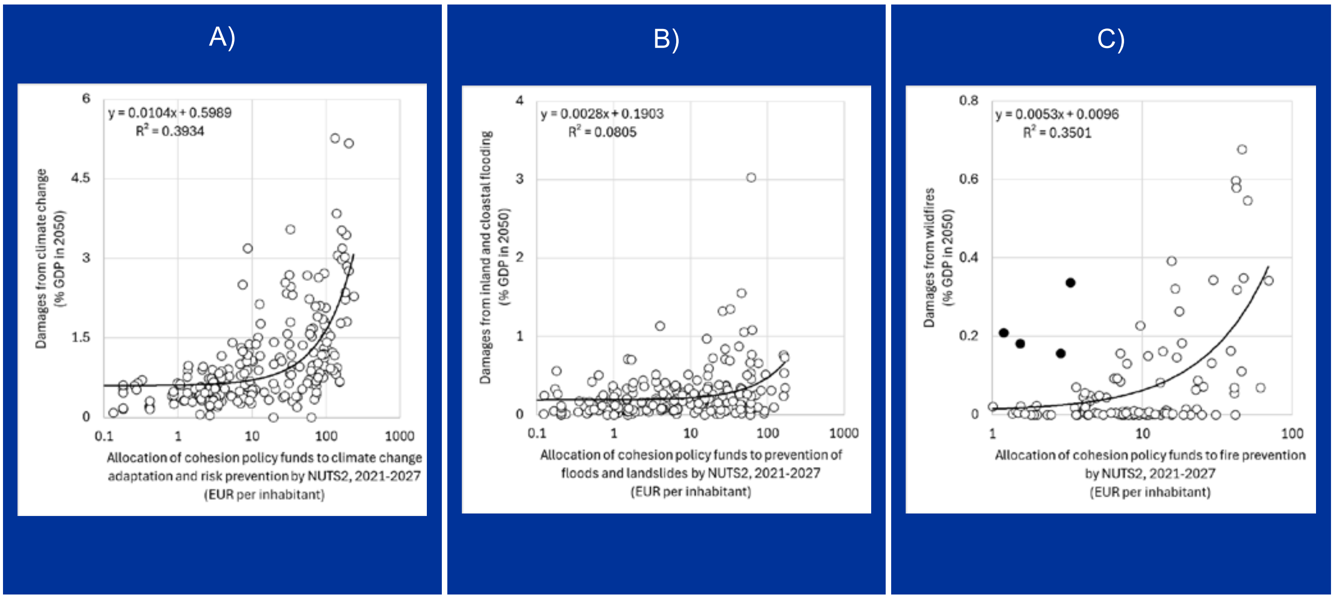

Figure 7: **Relation between the allocation of climate change adaptation investments under cohesion policy funds and the expected damages from climate change impact under a 2^{0}C scenario by 2050. Note that the X axis uses a logarithmic scale. Black dots in panel C represent four regions with low investment in forest fire prevention and protection but with high expected damages from forest fires.**

Panel A represents in the horizontal axis the total allocation of climate change adaptation funds for the 2021-2027 programming period in Europe, expressed per inhabitant at the NUTS 2 level. The vertical axis displays the projected climate change damage (% GDP) for the 2°C scenario. Generally, a positive correlation exists between these two variables, suggesting that areas with higher expected climate change damage receive already a relatively larger share of adaptation funds. This analysis shows to what extent current spending on climate change adaptation under the Cohesion Policy aligns with the projected climate impacts.

Panels B and C provide a more detailed breakdown for flooding and wildfires, respectively. There is no correlation in the case of flooding, which can possibly be attributed to the fact that Cohesion Policy funding encompasses the prevention of both floods and landslides, with a focus on inland flooding, whereas the damage calculations include both inland and coastal flooding. Panel C focuses on wildfires, with a correlation between allocated funds and expected damage. Cyprus, the capital region around Lisbon (Portugal), and the French regions of Corsica and Provence-Alpes-Côte d'Azur have low investment levels for fire prevention, despite experiencing high risks as indicated by significant GDP losses from wildfire damages. These four regions are mapped with black spots on Panel C.

7. Bibliography

Auteri, D., Attardo, C., Berzi, M., Dorati, C., Albinola, F., Baggio, L., Bucciarelli, G., Bussolari, I., and Dijkstra, L. (2024). *The Annual Regional Database of the European Commission (ARDECO)—Methodological Note* (JRC138212). European Commission.

Cappelli, F., Costantini, V., and Consoli, D. (2021). The trap of climate change-induced "natural" disasters and inequality. *Global Environmental Change*, *70*, 102329.

Curtale, R., Schiavone, M., Deuster, C., Alessandrini, A., Ueffing, P., Natale, F., Dijkstra, L., and Silva, F. B. e. (2024). *The Demography-Economy-Land use interaction (DELi) model* (JRC136498). Publications Office of the European Union. https://doi.org/10.2760/025883

DG ECFIN. (2021). *The 2021 Ageing Report: Economic and Budgetary Projections for the EU Member States (2019-2070)*. Publications Office of the European Union. https://ec.europa.eu/info/publications/2021-ageing-report-economic-and-budgetary-projections-eu-member-states-2019-2070_en

Ertur, C., and Koch, W. (2007). Growth, technological interdependence and spatial externalities: Theory and evidence. *Journal of Applied Econometrics*, *22*(6), 1033–1062. https://doi.org/10.1002/jae.963

Islam, S. N., and Winkel, J. (2017). *Climate Change and Social Inequality* [DESA Working Paper No. 152]. Department of Economic and Social Affairs, United Nations. https://www.un.org/esa/desa/papers/2017/wp152_2017.pdf

Paprotny, D., Morales-Nápoles, O., and Jonkman, S. (2018). HANZE: a pan-European database of exposure to natural hazards and damaging. *Earth System Science Data*, *10*(1), 565–581. https://doi.org/10.5194/essd-10-565-2018

PBL EUREGIO database (2000-2010). http://data.europa.eu/88u/dataset/pbl-euregio-database-2000-2010

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