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WHO'S MOST AT RISK?

A GLOBAL INDEX OF CLIMATE RISK FOR COUNTRIES

European Investment Bank

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Abstract

We present an index to measure climate risk for over 170 countries, separately assessing physical and transition risk while accounting for adaptation and mitigation capacity. Crucially, we carefully select the most relevant risk factors and assign the related weights based on the literature and empirical evidence. This integrated approach distinguished our index from existing rankings which, through the use of numerous equally-weighted indicators, implicitly assign equal importance to risk factors. Our climate risk country scores for 2024 show that low-income economies are more vulnerable to physical risk, in particular to extreme weather events and excessive heat. Countries dependent on fossil fuel revenues are among the most exposed to transition risk, while high-income economies, which generate significant emissions, tend to face high transition risks as well. The scores can be used as a risk management tool, both at the country level and, as starting point, for the assessment of economic entities in each geography. In addition, they can also help to identify mitigation and adaptation priorities and related financing needs. Appendix B of this paper presents the individual country scores, enabling users to tailor them to specific contexts and apply them for a range of purposes.

JEL Classification Numbers

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Keywords

Climate risk; Climate change; Climate scores; Physical risk; Transition risk.

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1 INTRODUCTION

As the effects of climate change become increasingly apparent each day, the need for thorough risk evaluations is increasingly evident. However, the myriad ways through which climate change affects the way we live complicates any assessment, even when zooming out and considering risks at the country level. Indeed, despite climate change being a global phenomenon and risks being at “code red” level for the entire humanity (IPCC, 2022), each country is exposed to significantly different intensities of risks related to assets and productivity (physical risk) and to the required reduction in greenhouse gas (GHG) emissions in the coming years (transition risk). Properly covering all the different risks is only gradually moving from art to science.

Demand for climate risk assessments at the country level is high. Despite some risks being very much local, the country context matters for assessing risks to the business environment, e.g. to infrastructures, supply chains, customer demand, legislation and the decarbonisation path. Given the high economic impact and interest from society, governments and financial institutions, it is no surprise that the number of assessments is increasing (Ahairwe, Bilal, Duranovic and Monasterolo, 2022). Some country rankings are provided by think-thanks, consultancy companies, investment banks and universities, each based on their own underlying methodology. Examples include the ND GAIN ranking (Chen, Noble, Hellmann, Coffee, Murillo and Chawla, 2015), INFORM (Marzi, Mysiak, Essenfelder, Pal, Vernaccini, Mistry, Alfieri, Poljansek, Marin-Ferrer and Vousdoukas, 2021) or HSBC (Acton and Bloxham, 2021) (see section 2 for an overview). Given the lack of a uniform “industry standard”, approaches vary widely. For example, some only consider physical risk, often narrowing their scope further to acute risks while discarding chronic risks. Others only rely on historical data, ignoring how well-defined plans to mitigate transition risks reduce risks. Many apply “equal weights” to a large number of indicators, instead of carefully selecting the variables.

The wide range of approaches and modelling choices for climate risk indices yield vastly different results (Batten, 2018). The various country assessments provide a similar high-level picture when it comes to the regions most exposed to physical or transition risk. However, individual country scores vary widely from one index to another, and even accounting for the different purposes of the indices, the divergence can be large. For example, for physical risk São Tomé and Príncipe is ranked among the best countries (3rd best decile) in ND GAIN index and among the worst (last decile) in INFORM. Similarly, Qatar is in the first-best decile for HSBC and in the worst for INFORM. The high dispersion is not specific to climate change assessments, as Berg, Kölbel and Rigobon (2022) find that for (non-sovereign) ESG ratings, the correlations between ratings from six different institutions are on average 0.54. However, it is in sharp contrast with sovereign credit ratings which, notwithstanding the different approaches used by the credit rating agencies, have a correlation of 0.92. Clearly, the coexistence of rather different rankings for the same climate risks is possible due to the absence of an external benchmark and the lack of track records.

The choice of risk factors is obviously a major driver of differences. And even if the risk factors accounted for would be the same, the variables chosen to measure such risks can cause significantly different outcomes. Any assessment is further complicated by data manipulations (including cleaning, treatment of outliers, etc) and transformations, such as scaling (OECD, 2008; Dobbie and Dail, 2013; Burgass, 2017; El Gibari, Gómez, and Ruiz, 2018). Finally, model complexity, in particular the weights and aggregation (first by factor, or directly into the index) further complicates the link between the raw data and the model outcome (Wulf, Zapp, Schreiber, Marx and Schlör. 2017).

Our contribution to the growing literature on climate risk and to the existing methodologies is threefold. First, we contribute to the understanding of climate risks at the country level by developing a stylised index with various appealing properties:

- Comprehensive: for both physical and transition risk, the index covers all major risk factors, based on past data, trends, adaptation and mitigation capacity[3] and expressed commitments,
- Traceable: restricting the number of included variables makes it possible to easily gauge the contribution of a specific risk factor, thereby simplifying any sensitivity analysis, while the modular structure makes it straightforward to adapt or expand the index,
- Global: physical and transition scores are obtained for 173 countries (physical risk score even for 206 countries) and an overview of individual country scores is available upon request,
- Data-driven: impact of risk factors is based on scientific analysis and econometrics, eliminating the need for *ad hoc* assumptions and aggregations, and the need for more discretionary "expert opinions",
- Robust: scores are designed to change gradually over time, but major events or a change in underlying trends will be reflected more quickly,
- Reproducible: only public data is used with minimal transformations, and the detailed derivation of the scores is available upon request so that scores can be used, reproduced or adapted to specific needs, and
- Relevant: benchmark analysis confirms a broad alignment with main alternative assessments, while the relevance for credit assessments has been confirmed by an independent study (Cappiello, Ferrucci, Maddaloni, Veggente, 2025).

Second, our comprehensive approach incorporates factors beyond the ones usually considered by existing methodologies, such as chronic risk for physical risk or mitigation for transition risk, for instance.

Third, we carefully select the risk factors and the associated weighs for the aggregation. Following an integral approach sets us apart from other methods where a large number of variables are collected and subsequently "equally weighted" to obtain a score.

Our 2024 scores indicate that emerging and developing economies are the most exposed to physical risk, in particular to acute physical events (hurricanes and storms, floods, fires), sea level rise and heat. In general, emerging and developing economies are more exposed to higher temperatures (additional increases of temperatures in already hot environments impact human activities) and to the agricultural sector, which is the most dependent on weather conditions. They are also less able to adapt, i.e. to protect themselves from the effects of weather. Transition risk is more relevant for fossil fuel producers (Jensen, 2023) and wealthier countries which need to reduce emissions, and for those countries which are less prepared for the transition to net-zero in terms of energy efficiency and deployment of renewable energy.

This paper is organised as follows. In the next section, we discuss various approaches to climate assessments at the country level, including the main rankings. Section 3 considers the main methodological considerations and assumptions and the risk factors of our index. Subsequently, we present the results, including a comparison with alternative rankings. Section 5 concludes.

[3] Adaptation is the ability to protect from the actual or expected harmful impact of climate change (for instance, ensuring infrastructure can withstand more extreme weather events, protections from floods or sea level rise, etc.). Mitigation is related to the prevention or reduction of the emission of greenhouse gases (GHG) into the atmosphere (including, for instance, energy efficiency measures, deployment of renewable energy, etc.).

2 LITERATURE AND ALTERNATIVE CLIMATE ASSESSMENTS

Interest in climate risks at the country level, including quantification and assessment approaches, has increased in recent years, in particular after the Paris Agreement in 2015 (UNFCCC, 2015) which determined for each country clear patterns to decarbonisation. Investors are also increasingly conscious about the long-term risks. Indeed, the exposure to physical climate risk can have negative implications on sovereign debt (Zenios, 2022; Bernhofen, Burke, Puranasamriddhi, Ranger, and Shrimali, 2024), especially after the Paris agreement (Cappiello, Ferrucci, Maddaloni, Veggente, 2025), the cost of debt (Beirne, Renzhi and Volz, 2021; Buhr, 2018; Cevik and Tovar Jalles, 2020; Mallucci, 2020; Kling, Lo, Murinde and Volz, 2018), sovereign ratings (Standard & Poor's, 2015; Agarwala, Burke, Klusak, Kraemer and Mohaddes, 2021; Revoltella, Bending, Santos and Zwart, 2022), fiscal sustainability (Agarwala, Burke, Klusak, Mohaddes, Volz and Zenghelis, 2021), financial stability (Liu, Sun and Tang, 2021; Bolton, Despres, Pereira Da Silva, Samama and Svartzman, 2021), international trade and even on political stability (Moody's, 2016; Fitch, 2022; Volz, Beirne, Ambrosio Preudhomme, Fenton, Mazzacurati, Renzhi and Stampe, 2020). The potential impact is more evident for some small countries and those with lower capacity to bear climate change costs (Mejia, 2016; Nordhaus, 2010), but advanced countries are not immune to debt sustainability concerns related to climate events (Gagliardi, Arévalo and Pamies, 2022). The impact of climate risk can be largely non-linear (Franzke, 2014; Dell, Jones and Olken, 2014; Woetzel, Pinner, Samandari, Engel, Krishnan, Boland and Powis, 2020), for instance when considering the effect of higher temperatures on overall productivity of a country (Burke, Hsiang and Miguel, 2015).

Transition risks emerge from three main factors (Semeniuk, Campiglio, Mercure, Volz and Edwards, 2020): policies, shifts in consumer preferences and technological breakthroughs. These risks can influence economies via depreciation, higher default probability, reduced ability to exchange and refinance assets, and under-pricing of financial instruments related to transition-exposed assets (Bolton Despres, Pereira Da Silva, Samama, Svartzman, 2020). Wilkins (2018) also mentions reputational effects and legal actions due to failure to comply with environmental standards. The objective of most studies (Unruh, 2000; Carney, 2015; Van der Ploeg and Rezai, 2020; Bertram, 2020; NGFS, 2020) is to assess the relative importance of carbon-intensive structures in the economy, especially in the case of a disorderly transition in which changes are abrupt and disruptive.

Daumas (2021) provides an extensive literature review of applying transition risk approaches, classifying them into three main categories. Studies on asset stranding investigate the probability of assets losing their value or being costly to be maintained (Meinshausen, Meinshausen, Hare, Raper, Frieler, Knutti, Frame and Allen, 2009; McGlade and Ekins, 2015; Caldecott, Tilbury and Yuge, 2013; Hambel, Kraft and Schwartz, 2020). Studies on financial asset pricing consider financial markets' attitude towards the transition to a carbon-neutral economy by using surveys (Amel-Zadeh, 2018; Krueger, Sautner and Starks, 2020; Bingler, Colesanti Senni and Monnin, 2020), extending traditional asset-pricing models with environmental indicators such as carbon emissions (Bolton and Kacperczyk, 2020b), or conducting event-studies to assess how the financial markets react to transition risk-related information (Sen and von Schickfus, 2020). Finally, direct transition risk assessments are backward-looking and indicate how financial markets react to transition policy developments, similar to climate-stress tests (IPCC, 2021; ECB, 2022; NGFS, 2021).

In practice, to assess the climate risk for countries three approaches are followed: modelling, scenario analysis and (index-based) scores. Multidimensional macroeconomic models aim to evaluate the macro impacts of climate change. The most-widely used are

- **General Circulation models (GCMs)**, coordinated under the Intergovernmental Panel on Climate Change (IPCC), consider the GHG concentrations and articulate the consequent temperature rises.[4] GCMs are climate models with no estimation of economic impacts.
- **Integrated Assessment Models (IAM)** integrate the science of climate change and the policies addressing GHG emissions. The most popular IAM model is the DICE (Dynamic Integrated model of Climate and the Economy) model developed by Nobel laureate W. D. Nordhaus (Nordhaus, 1992). Such approach, which evolved over time, is based on a Ramsey-Cass-Koopmans neoclassical model of economic growth, combined with a climate module and feedback effects.[5]
- **World Energy Model**, maintained by the International Energy Agency (IEA), uses as inputs some socioeconomic drivers, policy and technology assumptions including carbon price and energy demand. It produces an assessment on fuels consumptions and carbon emissions, investment needs, with projections until 2050.[6]

Given the difficulties in projecting future emission paths and other factors that influence climate change, some institutions are regularly developing scenario analyses, often based on the output of the models mentioned above, to sketch multiple plausible and consistent representations of the future (they are not forecasts) under different policies and circumstances. In general, such scenarios are looking at the possible long-term impacts of climate change, as the time horizon is normally 60-80 years from now. For instance, NGFS (Network for Greening the Financial System, which is a group of more than 100 central banks and financial supervisors) produced various climate scenarios for both physical and transition risk using different climate models. These scenarios provide a coherent view of how the various channels of climate change affect economies and can be used (or prescribed) as the starting point for analysing risks of, e.g., financial institutions.[7]

In addition to modelling and scenario analysis, index-based scoring help assess climate risk and rank countries accordingly. Frequently used indicators are:[8]

- **ND GAIN**, the Notre Dame Global Adaptation Initiative Index (Chen, Noble, Hellmann, Coffee, Murillo and Chawla, 2015), covers a broad set of countries, and is derived from 74 data sources and consists of two components: Vulnerability and Readiness (the latter including Social and Governance indicators such as Corruption, Regulatory Quality, Political stability, etc.). Transition risks are not included. ND GAIN index consists of a large number of sub-indicators (36 for Vulnerability and 9 for Readiness) with equal weights. The relevance of each single sub-indicator on the overall index is hence rather low.
- **HSBC** developed a "Fragile planet" approach (Acton and Bloxham, 2021), covering 77 countries. It was catered to the needs of financial investors and covers four sub risk factors (physical risk, transition risk, green opportunities and climate governance) which are equally weighted at 25%. HSBC is no longer producing this assessment and the related report.

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4 The IPCC uses the emission scenarios (Representative Concentration Pathways, RCPs) to estimate average global temperature increases by the year 2100. The worst-case scenario for IPCC ("Business as usual" scenario, RCP 8.5) would generate a rise in temperature of 4°C. More benign scenarios, with emissions halved by 2050, would entail a rise in temperatures below 2°C.

5 The DICE model adds to the neoclassical models the so-called "natural capital", an additional type of capital stock, with GHGs emissions as negative flows of natural capital. In this framework, economic growth generates emissions, which in turn raise temperatures and modify consumption patterns, production and welfare. Such models are looking at a long-term perspective and cannot be easily calibrated for short term needs. Moreover, they are very sensitive to some assumptions (the discount rate to be applied or the utility function, for instance).

6 Among the various IEA scenarios, the "Current Policies Scenario" is projected to generate warming of 6°C; while the "Energy Technology Perspectives" entails a cut in CO_2 emissions by almost 60% by 2050 and would limit warming to 2°C.

7 Among climate scenarios, since 2022, NGFS (NGFS, 2022; NGFS, 2024) include also country-specific impacts.

8 Other indicators include the Energy Trilemma Index (World Energy Council, 2022) which assesses energy policies and related issues, ranking almost 130 countries in terms of their energy systems (energy security, energy equity, and environmental sustainability); the Environmental Performance Index of Yale University (Wolf, Emerson, Esty, de Sherbinin and Wendling, 2022) which uses 32 performance indicators to rank 180 countries based on their ability to establish environmental policy targets; and the Climate Action Tracker (Climate Action Tracker, 2021) which is rating of the ability and readiness of national governments to a zero emissions society.

- **Germanwatch** produces a Climate Risk Index (Adil, Eckstein, Kuenzel, Schaefer, 2025) for extreme weather events (considering only acute risk), and a Climate Change Performance Index (Burck, Uhlich, Bals, Höhne, Nascimento, 2024) assessing four transition categories for 67 countries: GHG Emissions, Renewable Energy, Energy Use and Climate Policy. This is one of the few indices with unequal weights, putting twice as much on GHG Emissions (40%) as on the other categories (20% each).
- **The Climate Change Indicators Dashboard** of the IMF is a statistical tool and repository for various climate data. For physical risk, the Climate-driven INFORM Risk covers current hazards, future riverine floods, storms, and droughts, and it is a subcomponent of the INFORM Risk Index (Marzi, 2021). Designed as a tool for managing humanitarian crises, it is produced by the Joint Research Center of the EU Commission, and it is made of 75 sub-indices, incorporating natural and human hazards (considering as well conflict intensity and conflict risks). Transition risks are captured through the Resilience and Exposure to Low-Carbon Economy Transition measures (Peszko, Van der Mensbrugghe, Golub, Ward, Zenghelis, Marijs, Schopp, Rogers and Midgley, 2020).
- **The Energy Transition Index** (Singh, Bocca, Gomeza, Dahlke and Bazilian, 2019; WEF, 2024), ETI, ranks 115 countries across 40 indicators bases on the current performance of their energy system, and their readiness for the energy transition.

Ratings agencies started to develop their own assessments to complement their rating methodologies (Volz, Beirne, Ambrosio Preudhomme, Fenton, Mazzacurati, Renzhi and Stampe, 2020; Gratcheva, Emery and Wang, 2020). Typically, they combine the three main ESG sustainability criteria, Environmental[9], Social and Governance, to guide investors in their investment choices. Their assessments have become increasingly prominent in the assessment of corporate and financial institutions risk (Berg, Koelbel and Rigobon, 2019; Fitch, 2019; Moody's, 2021). Sovereigns rating methodologies have typically focussed on governance indicators, but social and environmental components are increasingly considered an integral part of the analysis (Moody's, 2016; Moody's, 2018; Revoltella, Bending, Santos and Zwart, 2022). Fitch Ratings in particular is introducing Climate Vulnerability Signals (Fitch, 2025) to identify potentially credit-relevant climate risks in its credit rating process for 122 sovereigns. Physical risk is determined by 4 categories and 23 sub-variables; transition risk is composed of fossil fuel dependence (4 sub-variables) and the cost of de-carbonising economies ("green energy costs", 5 sub-variables). Physical and transition risk are also combined in a unique climate risk score. The scores vary from 10 (climate risk factors neutral to the credit profile, i.e. no downward rating pressure) to potentially 90 (multi-category rating impact and high default risk) and increase considerably over time as impacts compound. For instance, Seychelles, Maldives and Cabo Verde, the most exposed to physical risk among the countries rated by Fitch, evolves from a score of 25 in 2025 to 65 in 2050. Overall, the variability of Fitch scores is high across years and more homogenous across countries.

Finally, data availability which has long been an issue but is improving gradually (see, e.g., the Sovereign ESG Data Portal of the World Bank, or the United Nations Human Climate Horizons platform, and the IMF Climate Change Indicator Dashboard).

[9] The Environmental component is a broader concept than climate risk (Physical and Transition risk), as it includes as well other factors such as, for instance, water consumption, waste management, energy management, air and water pollution, natural capital.

3 A GLOBAL INDEX OF CLIMATE RISK FOR COUNTRIES

3.1 Main considerations shaping the methodology

The lack of industry standards reflects the various assumptions and trade-offs that need to be made for any assessment of climate risk (Ferrazzi, Kalantzis and Zwart, 2021). We first discuss the main issues before detailing our methodology.

3.1.1 Need for separate physical and transition risk scores

Physical and transition risk are very different in nature. Physical risk is directly stemming from the climate impacts of weather events. Physical risk can be acute, if deriving from extreme weather events and hazards: floods, landslides, extreme temperatures, storms and hurricanes, droughts, wildfires; or chronic, if related to a more gradual effect of global warming: gradual increase of sea level, lower crops, lower labour productivity due to higher temperatures, for instance. Transition risk is generated by the actions taken towards a lower carbon economy as it stems from climate policies which can impact some businesses more than others. Transition risk can also derive from shifts in consumer preferences, technological change, or litigation (risks of facing litigations due to lack of adequate climate action; UN, 2017; Setzer and Higham, 2022).

It may be appealing to aggregate the two risk assessments into a single score, and computationally this is of course possible. However, the two risks are very distinct, and combining the scores thus merely reduces transparency instead of providing additional insights. Moreover, it brings up the non-trivial issue of how to weigh these different risks, as resorting to equal weights should be a deliberate decision, instead of the default approach.

3.1.2 Expectations/scenario

Assumptions on how climate change will work out affect the results considerably. Hence, any assessment needs to be underpinned by a specific scenario, or at least its general outline,[10] in order to ensure that the underlying assumptions are coherent, and results are meaningful. The IPCC (2022) has developed various scenarios, as did the Network for Greening the Financial System (NGFS, 2022). For our risk assessment, we assume that emissions are halved by 2050 which would entail a rise in temperatures just below 2°C ("Aggressive mitigation" scenario, RCP 2.6). Given that in our approach the scores are generated by ranking the countries, alternative scenarios (for instance hot house or disorderly, where impacts are inflated) would generate similar rankings[11].

3.1.3 Time dimension, policy reaction and uncertainty

The effect of climate change is increasing over time, making the time horizon of the analysis very important when assessing the scale of the risks.[12] The impact is also becoming more pronounced over time (NGFS, 2024), but uncertainty about the pace of changes and the interaction of various effects rises as well. The scope for mitigation, policy reactions and technical advancements also increases. Clearly, the uncertainty surrounding the assessment increases for time horizons further out. In this respect, it is noteworthy that credit rating agencies

[10] In practice, some adjustments may be needed to fully align forecasts and findings from the academic literature with the used scenarios.

[11] Moreover, for shorter term horizons, physical risk is less dependent on the chosen scenarios as the materialization of physical risk is the effects of the pollution that lingers in the atmosphere and continues to heat the planet for years after it is emitted.

[12] Even though the overall impact in the first years is similar across many scenarios, the effect on individual countries can vary widely.

typically focus on shorter horizons as they are more certain about the risks (Moody's, 2016), although their typical horizon of 3-5 years is probably too short when considering climate change. Our index focusses on 5-10 years and, given the importance of policies, reflects country commitments and recent policy changes (mitigation) instead of extrapolating recent trends.

3.1.4 Geographical dimension and data quality

Without a very detailed underlying local analysis, country-wide risk measures are necessarily a proxy. Risks factors for a specific area can be very different from those at a more aggregated scale (Deryugina, Hsiang, 2014). For instance, vast desert areas which push the average country temperature up, may be sparsely inhabited, as is the case for several countries in the Sahel. Sea level rise may be less problematic on the coast than further inland, as for flat countries, such as the Netherlands, water levels in rivers will increase accordingly. In addition, changing weather patterns, even further upstream, could raise extreme water levels in rivers substantially, thereby aggravating flooding risks. Especially for physical risk, understanding the various risks at the country level often requires at least some assessment at the sub-national level (e.g., population distribution, regional temperature increases). While disaggregated climate data exist for many countries, the related economic impacts are not available. Relatedly, the size of countries is relevant for the understanding and quantification of risks, as, e.g. large countries have higher probabilities of experiencing disasters, but any event has a smaller impact relative to the size of their economies (i.e. GDP).

3.1.5 Risk factors and weights

At first sight it may be reasonable to believe that including more risk factors could provide a more accurate assessment. In practice, however, the value of additional risk factors is likely to diminish beyond a certain point, and once the most relevant ones are identified, gains in accuracy are minimal. Moreover, assigning equal weights to all risk factors lowers the relative weight of each factor, including the major ones, which beyond a certain point is bound to reduce the quality of the index. Hence, the weighting should be such that it reflects the relative importance of each factor, and it is thus ideally grounded in scientific research or stemming from a statistical analysis. It may not be worthwhile to include risks that are small on average, but they can only be discarded if they are not relevant for an important subset of countries. For our index, we have parsimoniously selected the 6 main risk factors for physical risk and the main 5 for transition risk.

3.1.6 Limitations

A purely quantitative methodology cannot fully capture the myriad ways in which climate change affects countries. The above discussion already highlighted some major assumptions that need to be made for any assessment. The analysis is further complicated by non-linear effects and tipping points (Franzke, 2014; Dell, Jones and Olken, 2014). Hence, the scores obtained as the output of a quantitative methodology are providing a consistent overall assessment but are ideally complemented by potential expert adjustments to ensure that country-specific aspects are included. Importantly, our methodology focuses on risks and does not account for "climate opportunities" (e.g. a country becoming more attractive as a tourist destination) and their potential to increase a country's resilience.[13] Lastly, we would caution against overinterpretation of small differences. We

[13] Similarly, our approach does not consider the possible net positive effects of climate change on economic activity in a limited group of countries. According to the Stern Review 2006 paper commissioned by the UK government, temperature increases may produce small net economic benefits in Canada, Russia, and Scandinavia (Moody's, 2016)

consider the level of detail sufficient to distinguish about 10 different risk classes and would refrain from any analysis that is more granular.[14]

3.2 Assessing physical risk

The physical risk score measures the likelihood and extent that climate change may destroy or damage the physical assets of a country. Acute physical risk captures the risks generated from extreme weather events, while risks deriving from longer-term gradual shifts in climate patterns are considered chronic. We express all impacts in GDP terms and then sum all damages, costs and losses then yields a measure of the annual amount a country would need spend to fully offset all climate-change related impacts.[15] Hence, the physical risk score before adaptation for country *i* is then given by

$$physical\ risk_i^{ba} = \sum_{f\in\{factors\}} g_f\left(x_{i,f}\right), \quad (1)$$

where for each factor *f*, the function g_f transforms the country's value $x_{i,f}$ into the GDP impact before summing. This approach automatically provides the relative importance of each risk factor for each country, solving the issue of finding adequate weights. Importantly, instead of deriving a single weight based on the entire sample of countries, the weights can reflect the country-specific exposure.

To quantify the impact of climate change, we first collect structural information about the economy (e.g., the economic contribution of agriculture, population) and climate-related information (e.g., temperatures, share of the population exposed to sea level rise). We then typically resort to results of empirical studies and the academic literature to transform the data into economic impacts. Finally, adaptation capacity, also expressed in percentage points of GDP, is accounted for. The various physical risk factors are discussed below, the underlying variables are shown in Table 1 and Table 2, and Appendix A.1 contains the methodological details.

Table 1: Physical risk factors

Risk factor	Variables used	Unit	Source
Damages due to extreme weather	Damages	% of GDP	EM-DAT
	Germanwatch	Rank (based on % of GDP impact)	Germanwatch
Agricultural loss due to disasters	Agriculture	% of GDP	Dataset: World Bank WDI
	Production Loss	% of GDP	Academic paper: FAO (2017)
Cost of protecting from sea level rise	GDP impact	% of GDP	Academic paper: Diaz (2016)
Cost of upgrading infrastructures	Adaptation gap	index, % of GDP	Academic paper: World Bank (2016)
Productivity loss due to heat	Outdoor activity	% of GDP	World Bank WDI
	Labour productivity	%	Academic paper: Woetzel, Pinner, Samandari, Engel, Krishnan, Boland and Powis (2020)
	Monthly average temperature	Celsius degrees	World Bank

[14] For comparison, sovereign risk ratings which benefit from a well-defined risk concept and a much longer history typically distinguish 22 risk classes.

[15] The aim of our methodology is not to estimate the precise impact on GDP or on the fiscal balance for each country, for which even more detailed information and assumptions would be needed, but rather to provide a ranking of countries in terms of climate risk. We thus explicitly refrain from interpreting the level of the index in absolute terms and focus instead on a country's relative position.

Economic loss due to water scarcity	GDP impact	% of GDP	Academic paper: World Bank (2016)

Damages due to extreme weather. This factor captures the risks generated from extreme weather events. The economic quantification of the damages of past years is sourced from EM-DAT, the Emergency Events Database, maintained by the Université Catholique de Louvain (Feyen, Utz, Zuccardi Huertas, Bogdan and Moon, 2019). The database is compiled from various sources, including United Nations agencies, non-governmental organisations, insurance companies and press agencies. We included hydrological (floods and landslides), meteorological (extreme temperatures, fog, storms), and climatological (droughts, wildfires, glacial lake outburst) events, while discarding geophysical (earthquakes, volcanoes), technological (industrial accidents) and biological (from epidemic, insects, animals) events as they cannot be associated with climate change. We express the damages in percentage of GDP and then take the average over 2004-2023 to avoid volatility due to infrequent high impact events.

However, EM-DAT suffers from underreporting (Centre for Research on the Epidemiology of Disasters, 2021; Jones, Guha-Sapir and Tubeuf, 2022), as for a large number of events the respective monetary damages are not included. To complement EM-DAT, we use the Global Climate Risk Index of Germanwatch, an independent development and environmental organisation. It ranked countries in terms of the GDP impact of damages based on the MunichRe damage dataset (for an assessment of disaster datasets, see Mazhin, 2021). We consider that EM-DAT is underreporting damages for a country if it is not compatible with the Germanwatch ranking. In this case, the level of damages is raised and aligned with that of similarly ranked countries.

Agricultural loss due to disasters. Disasters – especially droughts, and especially during certain times of the plant life-cycle – can be detrimental to crop growth, livestock health, fisheries (FAO, 2017; Cui, Kuiper, Van Meijl and Tabeau, 2018). EM-DAT considers damages to physical agricultural infrastructures (machineries, irrigation systems, livestock shelters, etc.) but not the loss of farmers due to lower crop yields. We estimate the impact by multiplying the weight of agriculture in the economy, the production loss and the probability to be in a “disaster year”. The FAO estimates the loss by region as the difference between actual and expected production (the amount that would have materialized in the absence of the hazardous events) in disaster years during 2005-2015. Regarding the probability to be in a disaster year, large countries tend to have a climate event in their territory almost every year; smaller countries tend to have a lower probability. We group countries into four categories depending on their geographical size and assign probabilities accordingly.

Cost of protecting from sea level rise. Higher temperatures induce ice melting and the increase of sea levels (Bamber, Oppenheimer, Kopp, Aspinall and Cooke, 2019; IPCC, 2019; McMichael, Dasgupta, Ayeb-Karlsson and Kelman, 2020; Moody, 2020; Kopp, DeConto, Bader, Hay, Horton, Kulp, Oppenheimer, Pollard and Strauss, 2017; Oppenheimer, Glavovic, Hinkel, Van de Wal, Magnan, Abd-Elgawad, Cai, Cifuentes-Jara, DeConto, Ghosh, Hay, Isla, Marzeion, Meyssignac and Sebesvari, 2019). To assess which countries are most exposed to sea level rise we leverage on the work of the Intergovernmental Panel on Climate Change (IPCC, 2019), which is building its estimates on Diaz (2016). Diaz (2016) is estimating the cost of protection from the sea level rise in percentage of GDP, for each country.

Cost of upgrading infrastructures. As the occurrence of the acute risk may damage the infrastructures, in a similar way the gradual effects of climate change can affect the quality and adequacy of a country’s infrastructure. The World Bank (2016) provides the climate-related adaptation cost for infrastructures as the percentage of GDP to be spent each year to upgrade the various infrastructures, by region. Total cost is calculated as the current spending on infrastructure adaptation (public and private) plus the estimated spending gap. Spending on protection against sea level rise is excluded to avoid double-counting.

Productivity loss due to heat. Labour productivity is non-linear as a function of average temperature (Burke, Hsiang and Miguel, 2015) and in particular is falling rapidly for temperatures above 29°-30° Celsius (Woetzel, Pinner, Samandari, Engel, Krishnan, Boland and Powis, 2020; Deryugina and Hsiang, 2014). We suppose that temperature only affects outdoor activity, which is calculated as the share of the economy devoted to Agriculture, Construction and Mining. Extrapolating the increase in a country's average monthly temperature over the last two decades (the most recent decade is compared to the previous one) then allows to calculate the implied productivity losses.

Economic loss due to water scarcity. Water is needed in agriculture (70% of water is used for irrigation of land), industry and cities. In some regions, the increase in water deficits due to climate change could constrain growth, as water intensive activities will be reallocated within and between industries. To quantify this effect, we leverage on a study of the World Bank, which developed a global economic model (World Bank, 2016; Moody`s, 2021) and estimates GDP impacts for 14 regions.

Adaptation capacity. Countries boasting economic and political stability, strong institutional capacity, strong fiscal capacity, and the technical capability to put in place the necessary measures are better placed to offset climate risks. Gauging adaptation capacity and expressing it in GDP terms is necessarily a rather arbitrary exercise, as governments can reduce other expenditures, raise revenues or borrow to finance additional climate-related expenses. We conservatively take 0.5% of GDP as the upper limit for additional spending on adaptation capacity that a country can mobilise in the short run without too much inconvenience and disruption. So, we first estimate adaptation capacity as value between by 0 and 1 by considering a country's economic ability to respond and its institutional capacity and governance, and we then scale this such that the maximum possible offset equals 0.5% of GDP.[16] The physical risk score of country *i* is thus given by

$$physical\ risk_i = \sum_{f \in \{factors\}} g_f\left(x_{i,f}\right) - 0.5\% \times \sum_{d \in \{dimensions\}} w_d x_{i,d}^s, \quad (2)$$

where $x_{i,d}^s$ denotes the adaptation capacity dimension standardised to values between 0 and 1 (see the appendix for details). For economic readiness, we consider fiscal revenues in percentage of GDP as the variable that best captures how much financial resources a country may have available for climate risk adaptation. We complement this with sovereign risk ratings to assesses a country's potential to borrow in case of need.[17] We use the World Bank Worldwide Governance Indicators and the Human Development Index produced by the United Nations as proxies for the ability to use the available funds adequately for climate adaptation measures. For countries where adaptation capacity exceeds the physical risk, we cap the score at 0.

Table 2: Adaptation capacity for physical risk

Dimension	Variables used	Unit	Source	Weight[18]
Economic ability to respond	Fiscal Revenues	% of GDP	Dataset: IMF	23%
	Sovereign risk rating	Rating scale	Data: Fitch, Moody's, S&P	35%
Institutional capacity and governance	Governance Indicators	Index	Dataset: World Bank	23%
	Human Development Index	Index	Dataset: UN	19%

3.3 Assessing transition risk

The transition to a low carbon economy generates longer-term benefits and opportunities at world level. However, in the shorter term, it can generate a negative impact on some countries, sectors, companies and individuals and potentially expose various stakeholders to "stranded assets" – such as fossil fuel resources (a coal

[16] Due to the high negative correlation between physical risk and adaptation capacity, the level of the maximum off-set only has a limited impact on the ranking of countries, which can be seen in the ANNEX B.

[17] For non-rated countries, a proxy, typically based on the IMF's Debt Sustainability Assessment, is used.

[18] The weights stem from a Principal Component Analysis (PCA), see Appendix A.1.

plant that needs to be run down, for instance) – driven by changes in policies, changes in consumers and investors' preferences, and technologies.

The transition risk score measures the potential liabilities and cost stemming from the decarbonisation of the global economy. Unfortunately, the literature linking transition risk with costs is still in an early stage, and hence there is no obvious quantitative way to assess the relative importance of the risk factors. Instead of first collecting a (large) number of related variables and then assigning equal weights, we take an integral approach. We recognise that a comprehensive assessment cannot just consider the current values of risk drivers but needs to take into account actual progress (trends) and ambitions (targets). We first discuss the selection of risk factors before turning to their aggregation.[19] Various energy and climate-related indicators to measure transition risk are reported in the literature (IEA, 2019; SDSN and IEEP, 2019; or databases such as the Climate Analysis Indicators Tool, see also Section 2), which support the selection of risk factors (OECD, 2008; Dobbie and Dail, 2013; Burgass, 2017; El Gibari, Gómez, Ruiz, 2018).

To account for differences in CO_2 emissions between countries, we broadly follow the 'common but differentiated convergence' (CDC) approach, which is part of Paris agreement and initially discussed at Rio de Janeiro Earth Summit in 1992 (Höhne, 2006). It is a concept for an international climate regime for the differentiation of future commitments: under CDC the per-capita emission allowances of industrialised countries converge to a low level, while the allowances of other countries converge to the same level and within the same period ('common convergence'), but only after their per capita emissions are a pre-defined percentage above the global average ('differentiated').[20] This approach eliminates two concerns often voiced in relation to gradually converging per-capita emissions: (i) more advanced developing countries have their commitment to reducing emissions delayed and their targets are not the same as industrialised countries with equal per-capita emissions; (ii) CDC does not provide excess emission allowances to the least developing countries.

To obtain a comprehensive view of CO_2 emissions per capita,[21] the methodology also includes its main drivers based on the following decomposition (Kaya, 1990; Kaya, Yokoburi, 1997)

$$\frac{CO2}{POP} = \frac{GDP}{POP} \times \frac{E}{GDP} \times \frac{CO2}{E} \tag{3}$$

This identity expresses CO_2 emissions per capita as the product of economic output per capita (GDP/POP), the energy intensity of economic activity (E/GDP) and the carbon intensity of energy consumption (CO_2/E). Reducing economic growth in per-capita output may have a mitigating influence on emissions, but governments generally pursue policies to increase rather than reduce output per capita to advance economic objectives. Therefore, countries focus on the energy intensity of economic output (E/GDP) and CO_2 intensity of the energy supply (CO_2/E) in order to reduce their carbon footprint. We capture these factors through energy intensity and the deployment of renewables, respectively.

In addition, our methodology includes fossil fuel rents (calculated as revenues minus costs deriving from fossil fuel production, in terms of GDP), geography-specific carbon-indicators, their relation to the global climate ambition and speed of adjustment, and finally the commitment of each country to decarbonize as part of its adaptive capacity in the context of the transition. It thus combines measures of exposure (fossil fuels rents and emissions) with mitigation capacity (energy efficiency, renewables and countries' commitments).

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19 In practice, these steps are done iteratively. For example, energy consumption was expressed relative to GDP instead of population due to its lower correlation with other risk factors.

20 Until then they may voluntarily take on 'positively binding' targets.

21 Carbon emissions relative to population provides a more useful metric than the level itself, as it shows that, for example, the US faces higher risks than China, despite the latter country being the largest emitter.

The various transition risk factors are discussed below, the underlying variables are shown in Table 3, and Appendix A.2 contains the methodological details.

Table 3: Transition risk factors

Risk factor	Variables used	Unit	Source
Emissions: current level, trend and distance to "well-below 2°C" scenario	GHG emissions	MM tonnes CO_2/capita	Energy Information Administration
	Commitments to mitigate GHG emissions	0-1	CAIT/NDCs
	Global GHG emissions budget 2030	GT CO_2	United Nations
Energy intensity: current level, trend and distance to "well-below 2°C" scenario	Energy consumption GDP	quad BTU/GDP	Energy Information Administration
	Commitments to mitigate GHG emissions	0-1	CAIT/NDCs
	Global consumption 2030	PJ	International Energy Agency
Fossil fuel rents	Rents from coal production	% of GDP	World Bank
	Rents from oil production	% of GDP	World Bank
	Rents from natural gas production	% of GDP	World Bank
Renewables: current level and trend	Renewable's production	% of final energy consumption	Energy Information Administration
Climate policy ambition	Nationally Determined Contributions	"ambition levels"	World Resources Institute

CO_2 emissions. Given the vastly different starting points of countries, current values of CO_2 emissions per capita do not provide a good indication of the involved risks, as this could generously reward countries that have reduced emissions from a very high level, or those that that still have a low, but rapidly increasing level of emissions. To obtain a comprehensive picture, our analysis also includes policy effectiveness (the change of emissions over 5 years) and the distance to the optimal pathway for reaching the 2°C scenario (UNFCCC, 2015). To obtain this distance, we calculated the distance to the remaining global "CO_2 budget", the cumulative amount of CO_2 that may be emitted in 2030 to be in line with the well-below 2°C scenario. We set to zero the indicator for countries with a positive difference (those countries are still allowed to emit) and equal to the distance for those with a negative difference. To allow for compensation across periods, the (arithmetic) average of the past trend, current and future indicators is taken (after scaling to 0-1 by the min-max approach[22]).

Fossil fuel rents. Revenues stemming from fossil fuels are expected to decline due to stricter climate policies and changes in consumers' preferences. Fossil fuel rents are calculated as the difference between the price of a commodity and the average cost of producing it, multiplied by the physical quantities, and expressed as a share of GDP. This factor also captures potentially stranded assets (Leaton, 2011; Van der Ploeg and Rezai, 2020; Cahen-Fourot, Campiglio, Godin, Kemp-Benedict and Trsek, 2021). It is scaled to 0-1 by the min-max approach.

Energy intensity. The current level of energy intensity (in 1000 Btu/$2015 over GDP) provides a measure of energy efficiency and captures whether energy consumption grows slower than economic activity. We again complement this indicator by the past trend of the level of energy intensity (average annual growth rate of the

[22] Normalisation based on categories or Z-scores yields comparable results.

last 5 available years) to gauge the effectiveness of existing energy-efficiency policies and by a comparison to a well-below 2°C scenario. Again, the indicator average of the past trend, current and future indicators is then calculated.

Renewables. Given a country's energy needs, actual CO_2 emissions depend on the sources. The current share of renewables in energy consumption measure a country's progress towards reducing the impact of energy consumption on the environment. The change in the share over the past 5 years captures the effectiveness of existing renewable policies. The average of the past trend and current indicators is used.

Climate policy ambition. The Paris Agreement (Article 4, paragraph 2) requires each country to prepare, and submit successive Nationally Determined Contributions (NDCs). These plans, aimed to reduce GHG emissions domestically, are updated every five years. We classify countries into 4 categories with values 0, 1/3, 2/3 and 1. Countries with lower ambition levels (i.e. countries that have not set a climate target for reducing GHG emissions), are considered late movers and receive a higher score (i.e. more risk). The most ambitious countries are considered those with targets unconditional on the funding they may receive to reach the target.

The weights of the risk variables are chosen based on 1) literature review; 2) distribution of variables and 3) the calibration across dimensions and time. In line with the literature discussion above (in particular Burck, Uhlich, Bals, Höhne, Nascimento, 2024), emissions and energy intensity are considered most important, followed by renewables and finally fossil fuel rents and climate policy ambition. Concerning the distribution of variables, all risk factors are normalised to the 0-1 range, but some are skewed towards low values and others to high values. The distribution of the latest available data suggests that a higher weight for fossil fuels and CO2 emissions could be considered and a lower weight for renewables and fossil fuel rents. Finally, the current level of risk drivers is considered most important, with trends and ambitions each making a lower, but broadly equivalent, contribution.

The final weighting scheme is summarised in the next table. A naïve, but not-so harmless approach, would assign weights of 20% to each of the five risk factors. However, guided by the literature, the weights of the risk factors are set higher or lower, while also taking into account the distribution of each variable. The number of variables per risk factor is broadly aligned with the chosen weights. In addition, the weighting scheme is centred on a country's current performance (levels), with its past (trends) and future (mitigation activity) having somewhat lower weights.[23] Hence, the transition risk score of country *i* is given by

$$transition\ risk\ score_i = \sum_{f\in\{factors\}} \sum_{t\in\{period\}} w_{f,t} x_{i,f,t}, \tag{4}$$

where for each factor *f* and each period *t*, the country's value $x_{i,f,t}$ is weighted by coefficient $w_{f,t}$ before summing.

[23] Variables within a risk factor are all assigned the same weight.

Table 4: Weighting scheme for transition risk scores

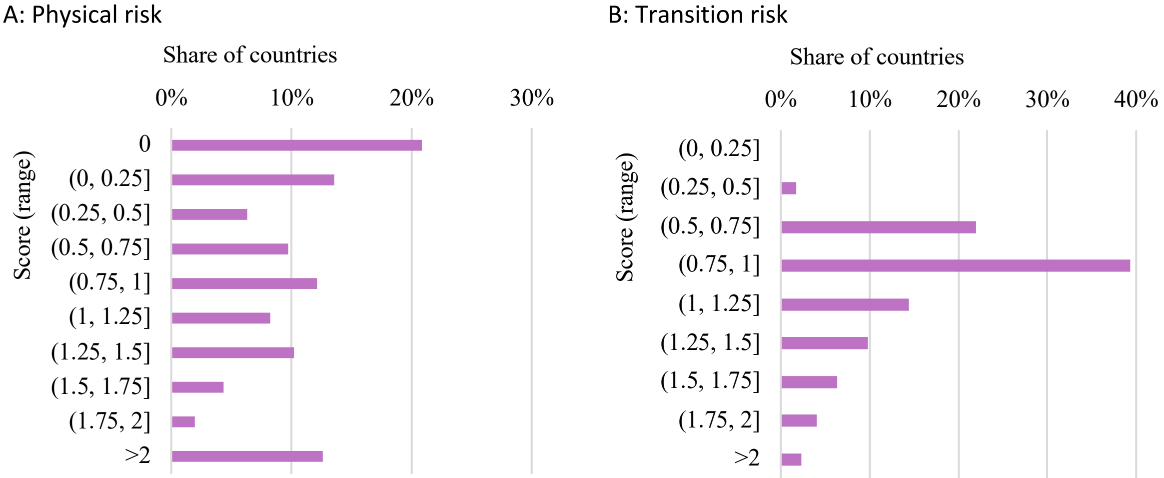
Risk factor		Exposure			Total
		Trend *(past)*	Level *(current)*	Path *(future)*	
Exposure	CO_2 emissions	13.3%	13.3%	13.3%	**40%**
	Energy intensity	8.3%	8.3%	8.3%	**25%**
	Fossil fuel rents		10%		**10%**
Mitigation	Renewables	7.5%	7.5%		**15%**
	Climate policy ambition			10%	**10%**
	Total	**29.2%**	**39.2%**	**31.7%**	**100%**

4 CLIMATE SCORES FOR 2024

4.1 Climate scores and underlying factors

The index assesses physical and transition risks, on a *relative* basis (i.e. relative to other countries), and both scores are standardised such that the average global score is 1.[24] The scores presented here are based on the data available at end-2024. The distribution of physical risk is skewed towards lower risk, with around two-thirds of countries having a score below the mean (Figure 1). For about a quarter of the countries, the score is negative, indicating that the adaptation capacity is well-suited to the risks (adaptation capabilities are more than compensating the impact). However, over 10% of countries face risks at least twice as large as the average. The distribution of transition risk is more bell-shaped, but with a long tail of higher risks, highlighting the profound impact for a range of countries. Importantly, the absence of very low scores indicates that all countries face some challenges.

Figure 1: Distribution of scores



Note: Global average of both the physical and the transition scores is 1. For physical risk, negative scores are set to 0.

Damages due to extreme weather events are the most important risk factor for physical risk, accounting for almost 50% of the total score (Figure 2, Panel A). Infrastructure upgrades are also a relevant factor, with a contribution slightly above that of agriculture, sea level rise and water scarcity. Productivity losses have a more limited effect globally, as their impact is limited to those countries that start with high temperatures.

Broadly speaking, the countries most exposed to physical risks are emerging and developing economies, and those exposed to rising sea levels and heat (Figure 2, Panel B). The small-island nations in the Caribbean and Pacific, sub-Saharan Africa (SSA) and the Middle East/Northern Africa (MENA) stand out as the regions facing the highest physical risks. However, the risk drivers vary: the small-island nations are more vulnerable to damages, from hurricanes and cyclones (acute risk). In Sub-Saharan Africa, the agriculture impact and the need to upgrade infrastructure dominate. In MENA the chronic risk factors are much more important than damages or agriculture, implying a gradual impact of climate change on these countries. Importantly, these regions also have a relatively

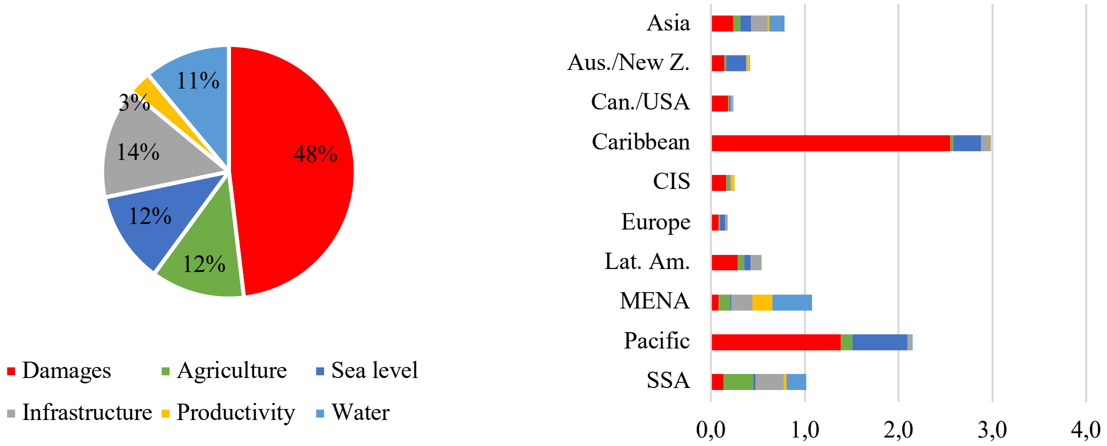
[24] An overview of the individual country scores is available upon request from the authors. We consider the scores for individual countries to be an approximation, and we strongly recommend reviewing the scores and adjusting for country-specific conditions before any use, including reporting. In addition, we caution against overinterpreting small differences between countries.

low adaptation capacity (Figure 3, Panel A). Indeed, typically the countries most exposed to physical risk are also the ones least able to deal with it (Figure 3, Panel B; Noy (2009)).

Figure 2: Physical risk (before adaptation)

A: Relative contribution of risk factors (global)

B: Contribution of risk factors by region

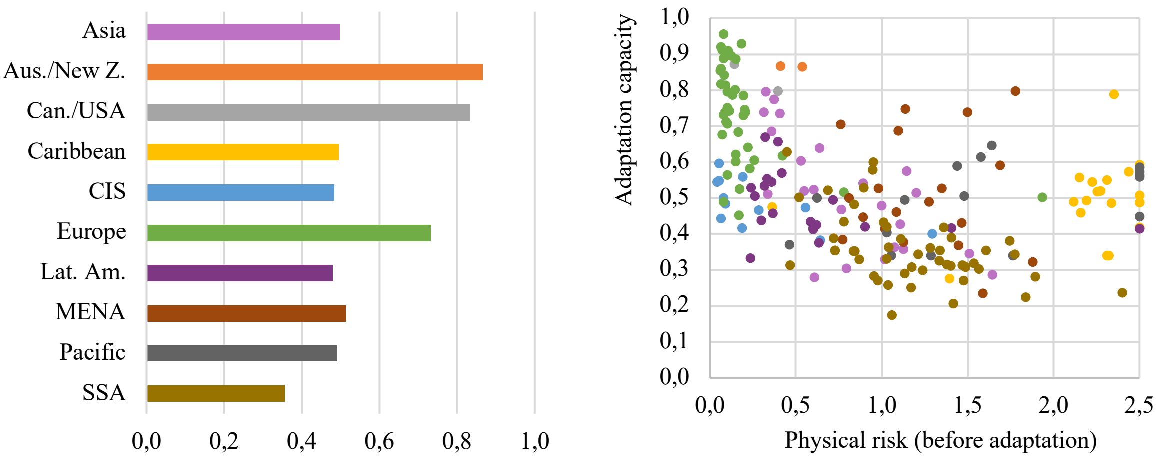


Note: Non-weighted average across countries. Global average of the scores (including adaptation) is 1.

Figure 3: Physical risk and adaptation capacity

A: Adaptation capacity by region

B: Physical risk and adaptation capacity



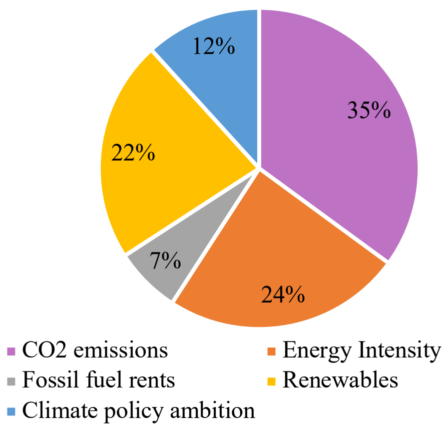
Note: Global average of the physical risk scores is 1. Physical risk (before adaptation) is capped at 2.5 in Panel B.

Physical risk is relevant for advanced economies as well, in particular for Australia and New Zealand. But also in North America the acute risk alone generated damages for USD 80 bn per year on average between 2010 and 2023 according to EM-DAT and around USD 13 billion for Europe. However, in *relative* terms - relative to other countries, and compared to the size of their economies - USA, Canada and Europe are least exposed. More generally, most advanced countries are less subject to weather events (especially less exposed to heat and acute events) and have greater ability to implement adaptation measures. Having strong institutions, better fiscal capacity and the ability to put in place protective measures tend to protect them from being exposed to the full economic impact of climate change at country level (despite damages at local level - in a region, a city, a specific location - can be very relevant).

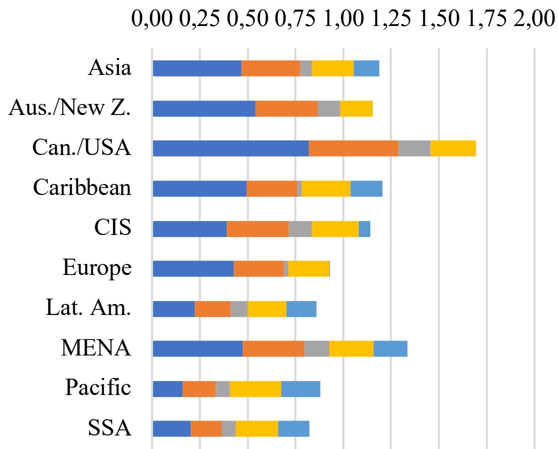
The transition risk scores depict a very different picture, albeit one which is broadly reflecting the strong correlation between GDP-per-capita and emission levels: on average, advanced countries are more exposed to the risks stemming from the transition to a net-zero carbon future environment than developing countries. Generally, fossil fuel-producing countries, advanced countries and those that do not see the transition to net-zero emission future as an opportunity - as reflected by low renewables deployment and low energy efficiency improvements - are the most exposed to transition risk. Overall, the contributions of the various risk factors closely resemble the relative weights (Figure 4, Panel A), with only for renewables the difference being more pronounced.[25] Across regions, North America is the most exposed to transition risks followed by Asia, Australia/New Zealand and MENA (Figure 4, Panel B). Latin America, the Pacific and sub-Saharan Africa (SSA) are the least exposed regions.

Figure 4: Transition risk

A: Relative contribution of risk factors (global)



B: Contribution of risk factors by region



Note: Non-weighted average across countries. Global average of the scores is 1.

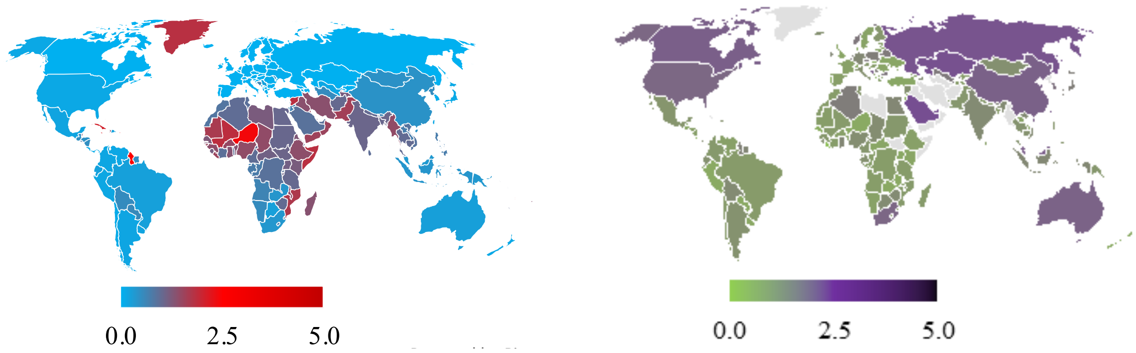
Comparing the physical risk and transition risk scores confirms the stark differences across countries and regions (Figure 5). Caribbean and Pacific countries face very high physical risks, while Bahrain, Qatar, Saudi Arabia, United Arab Emirates, and Kazakhstan have higher transition risks. The maps also shows that differences within regions can be substantial, for example India and Pakistan are facing considerably higher physical risks than the average Asian country. The divergent decarbonisation paths of countries are clearly visible as well, reflecting specific regional and national climate policy objectives. The maps provide a stark visual reminder that those countries and regions with the highest physical risks have often only contributed marginally to the built-up in CO_2.

25 Differences reflect the uneven distribution of data. For example, the smaller contribution of emissions (35%) compared to its weight (40%) reflects that the data is more skewed towards lower values than for some of the other risk factors.

Figure 5: Physical and transition risk by country

A: Physical risk

B: Transition risk



Note: Caribbean and Pacific (not clearly visible in the above map due to the size of the islands) face high physical risks and, respectively, high and elevated transition risks on average. Global average of the scores is 1 for both physical and transition risk.

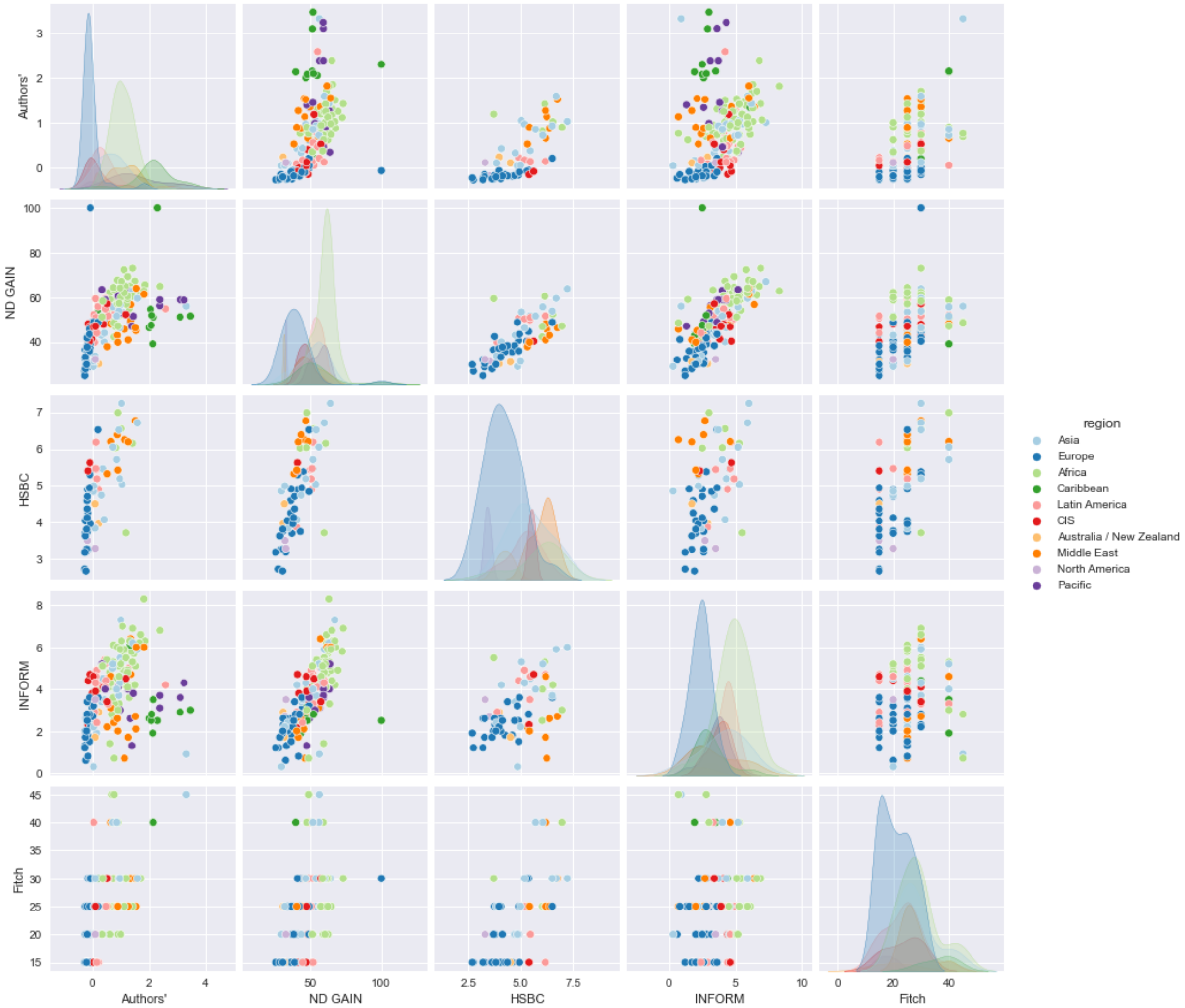
4.2 Comparison with main alternative assessments

Comparing various climate risk indices is coming with several caveats, as scores are not directly comparable for various reasons. First, some scores represent a *relative* rank which is based on a different number of countries (in particular, the HSBC score for physical risk is covering only 77 countries, neglecting many lower- and middle-income countries; the Germanwatch score for transition risk is covering only 63 countries) distorting the comparison. Second, scores comprise different risk factors (the chronic risk factor for instance, or some components of transition risk) and could refer to different periods. In addition, the scores have, by construction, different normalization methods and thus a different distribution. For example, our physical risk scores are concentrated on lower risk with a long tail on the right side (Figure 1), while the distribution of other indices is often more bell-shaped.

Regarding physical risk, we compare in the charts below our scores (Authors') with four other indices: ND-GAIN (Chen, Noble, Hellmann, Coffee, Murillo and Chawla, 2015), the "HSBC Fragile Planet" (Acton and Bloxham, 2021), the Climate-driven INFORM Risk (Marzi, Mysiak, Essenfelder, Pal, Vernaccini, Mistry, Alfieri, Poljansek, Marin-Ferrer and Vousdoukas, 2021) and Fitch indices in 2035 (Fitch, 2025). Regarding transition risk, we consider the Energy Transition Index (ETI; Singh, Bocca, Gomeza, Dahlke and Bazilian, 2019); "Peszko" (Peszko, Van der Mensbrugghe, Golub, Ward, Zenghelis, Marijs, Schopp, Rogers and Midgley, 2020), which is reported in the IMF climate change dashboard, and Germanwatch's CCPI (Burck, Uhlich, Bals, Höhne, Nascimento and Wong, 2021).

The highest correlation of our physical risk scores is with HSBC (0.71, in terms of Pearson correlation, based on the scores, and 0.76 in terms of Spearman rank-order correlation, which consider the ranks) followed by Fitch and ND GAIN (0.57/0.58 and 0.54/0.68, respectively) and the lowest with INFORM (0.34/0.47). Compared to the other three indices, our physical risk scores are differentiating less among developed countries (Figure 6), as, for example, European countries have very similar scores (on Europe, see also Lenaerts, Tagliapietra, Wolff, 2022). Our index also penalizes countries exposed to sea level rise (Egypt, Vietnam, Bahrain, Netherlands) and heat (Bahrain, UAE, Nigeria, Egypt).

Figure 6: Comparison of selected indices for physical risk

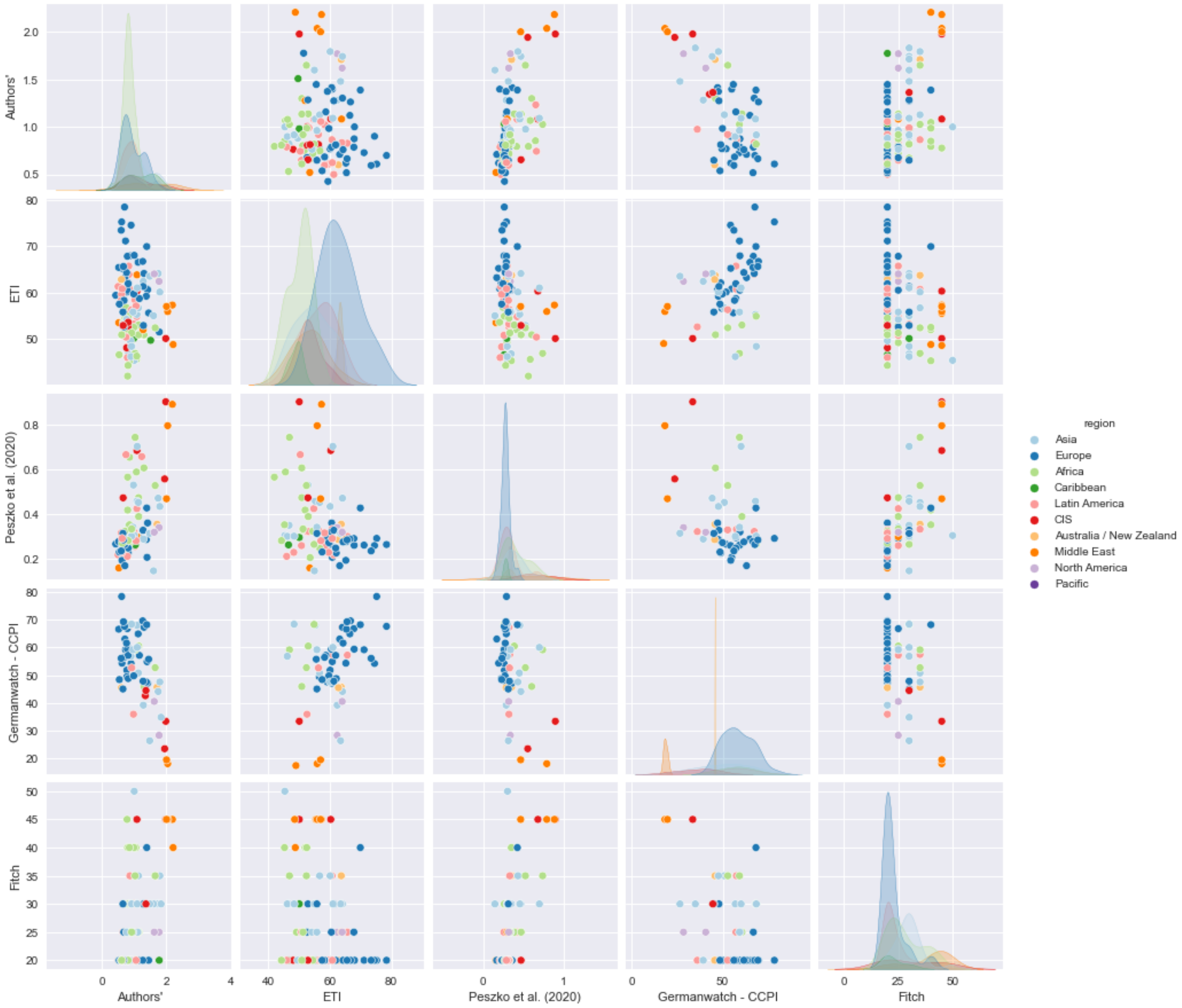


Note: Authors' physical risk scores (higher values indicate higher risk), ND GAIN (from 100 – low risk to 0 – high risk - the scale is inverted in the above chart), HSBC Fragile Planet (Climate risks and adaptation sub-score covering 77 countries, from 0 – low risk to 10 – high risk), Climate-driven INFORM Risk (from 0 – low risk to 10 – high risk), Fitch (from 10 – climate risk factors neutral to the credit profile - to 90 – in which climate-risk factors pose existential or default-like threat to the credit profile).

Regarding transition risk, we expect indices to be more dependent on the countries included in the analysis, as the allocation of scores is driven by the best and worst performers for each risk factor. An additional complication arises for two indices ("Peszko" and ETI) as they split their assessment between exposure and readiness without combining them into a single composite indicator. Hence, only the exposure part is used for the comparison here in the charts.

Overall, our scores appear to be positioned in the middle between "Peszko" and Germanwatch, while ETI is almost not correlated with the other indices, reflecting its focus on energy security (Figure 7). Despite the differences in the country scope and methodologies of "Peszko" and Germanwatch, the correlations with these indices are relatively high (0.50-0.66 in terms of Pearson correlation; and 0.50-0.60 in terms of Spearman correlation) and slightly lower with Fitch (0.50 and 0.47).

Figure 7: Comparison of selected indices for transition risk



Note: Authors' transition risk scores (higher values indicate higher risk), ETI (from 0 – very low risk to 0.5 – very high risk); "Peszko" (from 0 – very low risk to 1 – very high risk), Germanwatch CCPI (63 countries, from 0 – very high risk to 1 – very low risk), Fitch (from 10 – climate risk factors neutral to the credit profile - to 90 – in which climate-risk factors pose existential or default-like threat to the credit profile).

5 CONCLUSIONS

Capturing the various climate risks a country faces by a score is a challenging task involving choices about the objective, time horizon, risk factors, level of granularity, etc. Almost all climate change indices (ND GAIN, HSBC, INFORM, ETI) rely on a large number of equally-weighted factors (“as much as you can find”), assuming they are all equally relevant. Instead, we carefully identify the main risk factors and calibrate the weights based on the literature and econometric analysis.

Our scores, obtained for over 170 countries, confirm that climate risks are not evenly distributed. Specifically, we observe that emerging and developing economies are the most vulnerable to physical risk: in many cases they are more exposed to acute physical risk, sea level rise and heat. They also have less adaptation capacity. By contrast, we find that transition risks are higher for wealthier and fossil fuels-producing countries that are in need of quickly reducing GHG emissions. Our scores indicate that countries follow diverging decarbonisation paths regardless of geography, starting point and income level.

Overall, our methodology contributes to a growing body of literature striving to capture climate change risks through a composite indicator. These climate change risk scores at a country level have a wide range of uses and implications. Firstly, as climate risks intensify and regulatory requirements evolve, banks and international financial institutions[26] can benefit from these scores to support their risk management. Indeed, using an earlier vintage of our scores, Cappiello, Ferrucci, Maddaloni and Veggente (2025) confirm the relevance of climate risks, in particular physical risk, for sovereign credit ratings. The scores can naturally be used for sovereign counterparts but also as a starting point for the assessment of climate risks for firms and banks within a given country. Secondly, our scores also help to get a better understanding of the impact of climate change – the widest-ranging market failure ever seen (Stern, 2006), due to the businesses’ inability to account for the costs of their emissions and the negative impacts on society. The insights in adaptation and mitigation investment needs will help to identify and prioritise opportunities to enhance climate resilience. Thirdly, the results stress that international cooperation is key, as the challenges of climate change are broad-based and affecting countries across the globe. Finally, we hope that our scores raise public awareness about climate change and the related risks, and increase support for the measures necessary to address the climate emergency.

[26] For example, at the European Investment Bank (EIB), we are assigning scores based on a slightly adapted methodology. For physical risk, the impact in GDP terms (before adaptation) is transformed in a non-linear way to 10 risk classes, with adaptation capacity lowering a country’s assessment by at most two classes. For both physical and transition risk, the quantitative assessments are always reviewed by experts leading very often to adjustments. The resulting scores serve as country anchor scores for the EIB Climate Risk Screening Tool and can be complemented (depending on the counterpart) by sectoral climate scores. The Climate Risk Screening Tool assesses the sensitivity of EIB counterparties to both physical and transition risks in a consistent manner, with the objective of monitoring and reporting, thus providing transparency over the portfolio’s exposure to climate risk. It is thus solely used for risk management purposes, and not to establish project eligibility.

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APPENDIX A: DETAILS OF THE METHODOLOGY

A.1 Physical risk

The data sources are indicated in Table 1. In case of missing data, we resort to alternative data sources, regional averages or incidentally to neighbouring country data.

Damages due to extreme weather. The damage component is built leveraging on the monetary damages registered in EM-DAT. However, working with the dataset present two challenges: 1) the data is largely incomplete and 2) acute risk is a high-impact/low-probability event for small countries: a smaller surface is less likely to be affected by extreme weather in a given year. As damages are arguably the most important driver of physical risk, we give due care to obtaining good estimates. Throughout, we assume that when no number is reported, damages are 0.

To take into account the peculiarity of the small countries and the underreporting, we thus follow two steps after obtaining the average EM-DAT damages/GDP ratio for each country for 2014-2023.

1. To account for small countries and underreported data,[27] we calculate the average GDP impact for 29 homogenous climate areas in the world of the IPCC 6th Assessment Report. Having these values aggregated is helping to understand the exposure of each area, but such information is still heavily affected by underreporting in EM-DAT. Hence it can be considered as a *minimum* impact for the area rather than an *average* impact. For small countries with a surface below 20,000 km^2 covered by EM-DAT, we then take the maximum of the country's EM-DAT value and that of its climate area.
2. To remedy the overall underreported data, we cross-check with the Global Climate Risk Index provided by Germanwatch in 2021 (Eckstein, Kuenzel, Schaefer, 2021). This index considers a country's GDP impact based on weather-related loss events during 2000 to 2019 using MunichRe dataset on damages. However, the impact in percentage of GDP is not disclosed beyond the top-10, but the ranking of 180 countries is publicly available. We derive a simple model that is helping to proxy the impact when data in EM-DAT are missing or underestimated:

EM-DAT = 1.586 · exp(-0.031·Germanwatch)Information is considered underestimated by EM-DAT when the impact was below the level implied by the Germanwatch ranking and is then replaced. The calculated level is also used for countries covered by Germanwatch but not by EM-DAT, while in case of no data the regional[28] average is taken.

Agricultural loss due to disasters. To estimate the impact of higher temperature on agriculture we mainly relied on academic literature and on the information regarding the structure of the economy. The overall GDP impact deriving from agriculture is the product of the following three terms:

- Role of the agriculture in each economy (i.e. weight of agriculture in percentage of GDP), last available value of the past 5 years. In case of missing values, earlier World Bank WDI data (at the earliest from 2010), data from the CIA World Factbook, or regional averages are taken.
- Production loss due to a natural disaster as percentage of potential production, according to the estimates of FAO (FAO, 2017). This is computed as the difference between actual and expected production in the

[27] We considered various estimation techniques for the probabilities (rare events, quantiles, VaR, cluster of countries using some supervised Machine Learning algorithm, etc.), trying to leverage on other fields of analysis (finance, operational risk, insurance). These approaches were not fruitful due to the incompleteness of EM-DAT and the limited amount of "rare events" for each area, especially concerning emerging countries and small islands countries.

[28] When calculating regional averages, Asia is split into East, South and Southeast, Latin America in Central and South, MENA in Middle East and Northern Africa, and Sub-Saharan Africa in Central, East, Southern and West.

disaster years, taking into account the years 2005-2015. The expected production is the amount that would have materialized in the absence of the hazardous events. A minimum loss of 1.5% is imposed.

- Probability to be in a "disaster year". Leveraging on the damage dataset, we make an assumption about the probability of being in a disaster year (i.e. to have a damage event). Some larger countries tend to have an event in their territory or "disaster year" every year, while smaller countries tend to have a lower probability of having an impact on their territory. We thus group countries into four categories depending on their size (thresholds of 10k, 90k and 3m km^2), with associated probabilities of 90%, 35%, 25% and 10% stemming from the analysis of events occurred in the last twenty years.

Cost of protecting from sea level rise. In absence of structured databases assessing and quantifying such risks at world level, we leverage on the work of the Intergovernmental Panel on Climate Change (IPCC, 2019), which in turn is based on Diaz (2016). This study estimates the cost of protection from the sea level rise using the Coastal Impact and Adaptation Model (CIAM) under RCP8.5 (the high-emissions scenario referred to as "business as usual"), looking at the 2050 horizon. The impact as percentage of GDP in 2050 is provided at the country level. To arrive at a conservative estimate for our time horizon of 5-10 years, we halved the impact. In case of missing data for non-landlocked countries, the value of a comparable neighbouring country is used, and if not available, the regional average.

Cost of upgrading infrastructures. We estimated the total cost of upgrading infrastructure as the sum of current infrastructure spending (public and private) plus the spending gap. The spending gap comes from the World Bank (2016), which estimates the climate-related adaptation cost for infrastructures for four regions (East Asia Pacific, Sub-Saharan Africa, Latin America and Caribbean, South Asia) and presents the percentage of GDP to be spent each year to upgrade the various infrastructures to adapt to the gradual change of climate (excluding costs of acute weather events). The included infrastructures are related to 1) waste and wastewater management; 2) agriculture, forestry and land use; and 3) infrastructure, energy and other built environment (incl. urban and transport infrastructure). We excluded disaster risk management, as it is related to acute climate risk, and coastal protection to avoid overlapping with the sea level rise component previously described.

Productivity loss due to heat. The increase in global temperature can be expected to reduce the productivity of workers and crops (Woetzel, Pinner, Samandari, Engel, Krishnan, Boland and Powis, 2020). The impact is estimated as the product of the following two terms:

- The share of outdoor activity (in percentage of GDP), i.e. the share of the economy devoted to Agriculture, Construction and Mining (or equivalently, the complement of the Manufacturing and Services Sectors). Indoor activity is excluded as it is shielded from direct exposure to heat while adaptation measures, like the use of air conditioning, may significantly reduce the potential impact. In case of missing values, earlier World Bank WDI data, data from the CIA World or regional averages are taken.
- The change in labour productivity. Heat only has an impact in case the monthly average temperature is above 29.30°C (corresponding to 25°C wet bulb, Woetzel, Pinner, Samandari, Engel, Krishnan, Boland and Powis, 2020) and if the average monthly productivity loss during 2013-2022 is higher than for 2003-2012. In this case, a similar loss in labour productivity is assumed over the next decade. In case of missing data, regional averages are used.

Economic loss due to water scarcity. The World Bank developed a global economic model to estimate the possible impacts of water-related climate impacts, considering various regions of the world (World Bank, 2016, Moody`s, 2021). The two main scenarios correspond to the Shared Socioeconomic Pathways (SSPs) that have been developed in the climate-change modelling literature, and SSP1, "Sustainability," is followed here instead of SSP3, "Regional Rivalry,". Mild reallocation of water intensive activities within and between industries is assumed. We convert the impacts estimated for each region by the World Bank in 2050 to the average impact over the first decade, assuming that the impact is doubling every decade.

Adaptation capacity. The four variables discussed in the main text are standardised to range from 0 to 1 and subsequentially aggregated, with the weights for each component stemming from a Principal Component Analysis (PCA), which is a machine learning dimensionality reduction technique. In case of a missing value for one or more of the components, the weights are rescaled. Fiscal revenues as share of GDP: Scaled to 0-1 on the interval from 0% to the 95th percentile value.

- Sovereign risk rating: Average of the available ratings (C/SD/RD/D = 0, Ca/CC = 0.05; Caa3/CCC- = 0.1, …, Aaa=1) of the three major rating agencies. For non-rated countries, the IMF's Debt Sustainability Assessment (DSA) is used, with Low risk, Medium risk, High risk and debt distress associated with their averages of 0.34, 0.28, 0.20 and 0.13 respectively. Non-rated countries without DSA are assumed to be of low risk.
- Governance: Average of the six components such as Voice and Accountability, Political Stability and Absence of Violence, Government Effectiveness, Regulatory Quality, Rule of Law and Control of Corruption. Scaled to 0-1 on the interval of the possible scores (from -2.5 to 2.5).
- Human Development Index: No additional computations as the scores range from 0 to 1.

Finally, the obtained adaptation capacity is then multiplied by 0.5 to impose that adaptation capacity can at most off-set 0.5% percentage points of GDP, and if adaptation capacity exceeds the GDP impact, the obtained physical risk score is set to 0.

A.2 Transition risk

Data are scaled by the min-max approach. Extreme observations (out- or underperformers) were trimmed to avoid them having a strong impact on the final result. Outliers were identified with the Interquartile Range (IQR) method, which does not assume normality of the data (Seo, 2006). Values are considered as outliers if they lay outside 1.5 times the IQR from the first and third quartiles (Q_1 and Q_3 respectively, Ghasemi and Zahediasl (2012)). In mathematical terms, X is an outlier if $X < Q_1 - 1.5*IQR$ or $X > Q_3 + 1.5*IQR$. This method identifies 126 outliers out of 2088 values (6%) in the present data set. These were trimmed to the nearest value that is not an outlier.[29]

Only the data for fossil and solid fuel rents has missing values. After double-checking trade statistics for coal, oil and natural gas exports, missing values were replaced by 0.

As annual changes can be volatile, the trend is calculated as the average annual change over 5 years. For the trend growth of renewables, annual averages are weighted by the share of renewables in the final energy consumption to avoid that trend growth is excessively high for countries with a low base.

For all indicators, higher values indicate higher risks and worst performance, except for those of renewables, which were hence flipped.

[29] The index was also calculated on the untrimmed dataset, with yielded comparable results.

APPENDIX B: THE CLIMATE RISK COUNTRY SCORES

The below Climate Risk Country Scores are presented for over 170 countries (with EU countries aggregated), separately assessing physical and transition risk while accounting for adaptation and mitigation capacity.

Suggested citation of the source:

Matteo Ferrazzi, Fotios Kalantzis and Sanne Zwart, Who's most at risk? A global index of climate risk for countries, ECONOMICS – WORKING PAPERS 2025/06, European Investment Bank, July 2025

[EIB Working Paper 2025/06 - Who's most at risk? A global index of climate risk for countries]

B.1 Climate scores for 2024

The index assesses physical and transition risks on a *relative* basis. Both scores are standardized such that the average global score is 1. The scores are derived by the methodology described in the paper and reflect the raw data. Hence, we consider the scores for individual countries to be an approximation, and we strongly recommend reviewing the scores and adjusting for country-specific conditions before any use, including reporting. In addition, we caution against overinterpreting small differences between countries. The scores presented here are based on data available at end-2024 and can be used freely on the condition that the source is clearly indicated.

Table 5: Scores for physical and transition risk Climate change

Country	Physical risk before adaptation	Adaptation capacity	Physical risk including adaptation capacity	Transition risk
	See note	0-1	Average = 1	Average = 1
EU Countries (average)	0.1	0.8	0.0	0.9
Afghanistan	1.1	0.3	1	
Albania	0.2	0.5	0	0.4
Algeria	1.1	0.5	0.9	1.3
Andorra	0.1	0.6	0	
Angola	0.7	0.4	0.6	0.8
Anguilla	2.3	0.5	2.2	
Antigua and Barbuda	3.2	0.5	3	1.7
Argentina	0.3	0.4	0.1	1
Armenia	0.1	0.5	0	1
Aruba	2.2	0.6	1.9	1.8
Australia	0.5	0.9	0.2	1.7
Azerbaijan	0.1	0.5	0	1.1
Bahamas	3.5	0.5	3.4	1.5
Bahrain	1.3	0.5	1.1	2.2
Bangladesh	1.1	0.4	1	0.8
Barbados	2.3	0.5	2.1	0.8

Belarus	0.1	0.6	0	1.3
Belize	1.4	0.4	1.3	1
Benin	1.4	0.4	1.3	0.7
Bhutan	0.8	0.5	0.6	1.2
Bolivia	0.6	0.4	0.5	1.1
Bosnia and Herzegovina	0.8	0.5	0.6	1.8
Botswana	0.4	0.6	0.2	1.1
Brazil	0.4	0.6	0.2	0.8
British Virgin Islands	2.3	0.3	2.2	1.7
Brunei	0.3	0.5	0.1	
Burkina Faso	1.5	0.3	1.4	0.8
Burundi	1.2	0.3	1.1	0.8
Cabo verde	0.8	0.5	0.7	0.9
Cambodia	1.1	0.4	0.9	1
Cameroon	1	0.3	0.9	0.9
Canada	0.1	0.9	0	1.8
Cayman Islands	2.4	0.8	2.1	1.6
Central African Republic	1.2	0.3	1.1	0.7
Chad	1.5	0.3	1.4	1
Chile	0.3	0.7	0.1	0.8
China	0.6	0.6	0.4	1.7
Colombia	0.3	0.6	0.1	0.9
Comoros	0.9	0.3	0.8	1
Congo	0.8	0.4	0.7	0.8
Costa Rica	0.3	0.5	0.1	0.5
Côte d’Ivoire	1	0.4	0.9	0.8
Cuba	2.2	0.5	2	
Curaçao	2.3	0.6	2.1	
Democratic Republic of the Congo	1	0.3	0.9	0.8
Djibouti	1	0.3	0.9	0.6
Dominica	18.4	0.6	18.2	0.8
Dominican Republic	0.4	0.5	0.2	1
Ecuador	0.4	0.5	0.2	1
Egypt	1.1	0.4	1	1.1
El Salvador	0.9	0.4	0.8	1
Equatorial Guinea	0.7	0.4	0.6	0.9
Eritrea	1.3	0.3	1.2	
Eswatini	0.8	0.4	0.6	0.8
Ethiopia	1.4	0.2	1.3	0.7
Fiji	1.5	0.5	1.3	0.5
French Polynesia	1.8	0.3	1.6	
Gabon	0.8	0.4	0.7	1
Georgia	0.2	0.6	0	0.8
Ghana	1.4	0.3	1.3	1.1

Greenland	1.9	0.5	1.8	
Grenada	9.4	0.5	9.3	1
Guatemala	0.6	0.4	0.4	0.6
Guinea	1.5	0.3	1.4	0.9
Guinea-Bissau	1.6	0.3	1.5	0.8
Guyana	2.7	0.4	2.5	1.2
Haiti	1.4	0.3	1.3	0.5
Honduras	0.6	0.4	0.4	0.8
Hong Kong	0.4	0.7	0.1	1.7
Iceland	0.1	0.8	0	1
India	1.2	0.5	1	1.1
Indonesia	0.5	0.5	0.4	1.1
Iran	1.4	0.4	1.3	
Iraq	1.5	0.4	1.3	
Israel	0.8	0.7	0.5	1.1
Jamaica	2.3	0.5	2.1	1
Japan	0.4	0.8	0.1	1.3
Jordan	0.8	0.5	0.6	0.5
Kazakhstan	0	0.5	0	2
Kenya	1.3	0.4	1.2	0.7
Kiribati	2.5	0.6	2.3	
Kosovo	0.2	0.5	0	
Kuwait	1.8	0.8	1.5	
Kyrgyzstan	0.1	0.4	0	0.8
Laos	0.8	0.3	0.7	0.7
Lebanon	0.8	0.4	0.6	1.3
Lesotho	0.9	0.5	0.7	0.8
Liberia	1.6	0.4	1.5	0.3
Libya	1.3	0.5	1.2	
Madagascar	1.4	0.3	1.3	0.8
Malawi	1.5	0.3	1.4	0.8
Malaysia	0.5	0.6	0.3	1.8
Maldives	3.4	0.4	3.2	1.1
Mali	1.9	0.3	1.8	0.8
Marshall Islands	3.2	0.6	3	
Mauritania	1.7	0.4	1.6	0.8
Mauritius	1	0.6	0.7	0.7
Mexico	0.4	0.5	0.2	0.9
Micronesia	1.4	0.6	1.2	
Moldova	0.6	0.5	0.4	0.8
Mongolia	0.6	0.5	0.4	1
Montenegro	0.2	0.6	0	0.8
Morocco	1	0.5	0.8	0.8
Mozambique	1.8	0.3	1.6	0.8
Myanmar	1.5	0.3	1.4	

Namibia	0.7	0.5	0.5	0.7
Nauru	1.6	0.6	1.4	
Nepal	1.1	0.4	1	0.9
New Caledonia	1.1	0.3	0.9	
New Zealand	0.4	0.9	0.1	0.6
Nicaragua	0.6	0.4	0.5	0.8
Niger	2.4	0.2	2.3	0.6
Nigeria	1.5	0.3	1.4	1
North Korea	0.6	0.3	0.5	
North Macedonia	0.1	0.6	0	0.7
Norway	0.1	1	0	1.4
Oman	1.7	0.6	1.5	
Pakistan	1.6	0.3	1.5	0.9
Palau	1.6	0.6	1.4	
Palestine	0.9	0.4	0.7	0.9
Panama	0.2	0.5	0	1.1
Papua New Guinea	0.5	0.4	0.3	0.9
Paraguay	0.7	0.5	0.5	0.6
Peru	0.3	0.5	0.1	0.6
Philippines	0.9	0.5	0.7	0.9
Puerto Rico	3.2	0.4	3.1	
Qatar	1.5	0.7	1.2	2.2
Russia	0.1	0.5	0	1.9
Rwanda	1	0.4	0.9	0.9
Saint Kitts and Nevis	2.4	0.6	2.2	1.4
Saint Lucia	2.1	0.5	1.9	
Saint Vincent and the Grenadines	2.2	0.5	2	0.7
Samoa	1.1	0.5	1	0.9
San Marino	0.1	0.6	0	
São Tomé and Príncipe	0.7	0.4	0.6	0.8
Saudi Arabia	1.1	0.7	0.8	2
Senegal	1.4	0.4	1.2	0.5
Serbia	0.4	0.6	0.2	1.3
Seychelles	0.9	0.6	0.7	0.7
Sierra Leone	1.2	0.3	1.1	1
Singapore	0.3	0.8	0	1.6
Sint Maarten	2.3	0.3	2.2	
Solomon Islands	1	0.4	0.9	0.7
Somalia	1.8	0.2	1.8	
South Africa	0.5	0.5	0.3	1.6
South Korea	0.3	0.7	0	1.5
South Sudan	1.1	0.3	1	
Sri Lanka	1	0.3	0.9	0.8
Sudan	1.1	0.2	1	0.9

Suriname	0.6	0.4	0.5	1.2
Switzerland	0.1	0.9	0	0.6
Syria	1.9	0.3	1.8	1
Taiwan	0.4	0.7	0.1	1.8
Tajikistan	1.3	0.4	1.1	0.8
Tanzania	1.1	0.4	1	0.8
Thailand	1.1	0.6	0.9	1
The Gambia	1.3	0.4	1.2	0.6
Timor-Leste	0.6	0.5	0.4	1.3
Togo	1	0.4	0.9	0.8
Tonga	2.5	0.6	2.3	0.8
Trinidad and Tobago	2.2	0.5	2	1.5
Tunisia	1	0.4	0.9	0.9
Türkiye	0.1	0.5	0	0.6
Turkmenistan	0.6	0.4	0.5	
Tuvalu	14.6	0.6	14.4	
Uganda	1.2	0.3	1.1	0.6
Ukraine	0.2	0.4	0	0.7
United Arab Emirates	1.1	0.7	0.9	2
United Kingdom	0.1	0.8	0	0.7
United States	0.4	0.8	0.1	1.6
Uruguay	0.4	0.7	0.2	0.6
Uzbekistan	0.3	0.5	0.1	1.4
Vanuatu	3.3	0.4	3.1	1.1
Venezuela	0.2	0.3	0.1	0.7
Vietnam	1	0.5	0.8	1.1
Wallis and Futuna	1.3	0.3	1.2	
Yemen	1.6	0.2	1.5	
Zambia	0.5	0.3	0.4	0.6
Zimbabwe	1	0.3	0.9	1.1

Note: To obtain the standardized scores, the sum of the physical risk factors as well as the adaptation capacity are scaled by a factor 0.725 so that the average score after adaptation capacity is equal to 1. Similarly, the weighted sum of the transition risk factors is multiplied by 2.520.

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