SUSTAINABLE DEVELOPMENT & SYSTEMIC SHOCKS

Master SASI - HEC Paris - 2024/2025
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Introduction to TAC ECONOMICS

AI-passionate Data Scientists

Economic and financial experts

Active in academia with a taste for intellectual challenge

TAC ECONOMICS is a fully independent 35-year-old company focusing on economic and financial research with an operational focus. We combine an intensive use of quantitative data and models with in-depth analysis to deliver decision-oriented intelligence to large international companies (financial and industrial), with a client-base ranging from North America to Japan, from the UK to South Africa.

Lecture on Sustainable development & systemic shocks

The objective of the course is to help incorporating the notion and consequence of major systemic / macro shocks that can derail even the best designed sustainable development strategies.

The course focuses on …

→ Understanding the key macro factors behind long-term development, the likelihood of adjustments and the factors for breaks in development paths.

→ Identifying the types of methods and tools that are best suited for analyzing risk of systemic disruptions

Structure of the lecture

1. A glance at the world situation today and the risks of polycrises
   → Why we need a multifaceted and cross-disciplinary approach to “country-risk”

2. Measuring and assessing country-risk: uncertainties, risk and consequence on tools and methods
   → From concepts to operational instruments and methodologies

3. Measuring and assessing country risk: Key Factors
   → Data and sources, key metrics
   → Illustration with RiskMonitor from TAC ECONOMICS

4. Macro-transmission of crises on development paths and corporate performances

Schedule

03/02 14h40-17h50	04/02 8h00–11h10	10/02 14h40-17h50	11/02 8h00 – 11h10	24/02 14h40-17h50	25/02 8h00–11h10
Introduction to the course *A glance at the world situation today and the risks of polycrises* *Couple of semantic remarks*	*Concepts and methods for assessing risks of systemic shocks* *Quantitative techniques* *Scenario construction* *EBUs*	*Measuring and assessing country- risk:* *Key Risk Factors to look at:* *Economic & financial* *Political & governance* *Environmental* *Others* *Data and sourcer of information*		*Impact of shocks on development paths and corporate performances* *Case Examples (countries to be selected)*	*Case Examples (country to be selected)* *& illustration with RiskMonitor* *Final comments and discussions*

Evaluation

- ✓ 1-hour exam, with no document, computer or connected device allowed, scheduled on campus on Thursday, March 18 from 14:40 to 15:40
- ✓ Multiple-Choice Questionnaire requiring a combination of no-nonsense, fundamental understanding derived from the lecture and key ideas about methods or data discussed during the lecture
- ✓ The Questionnaire will include two “open” questions to be answered to in a limited space / number of words.

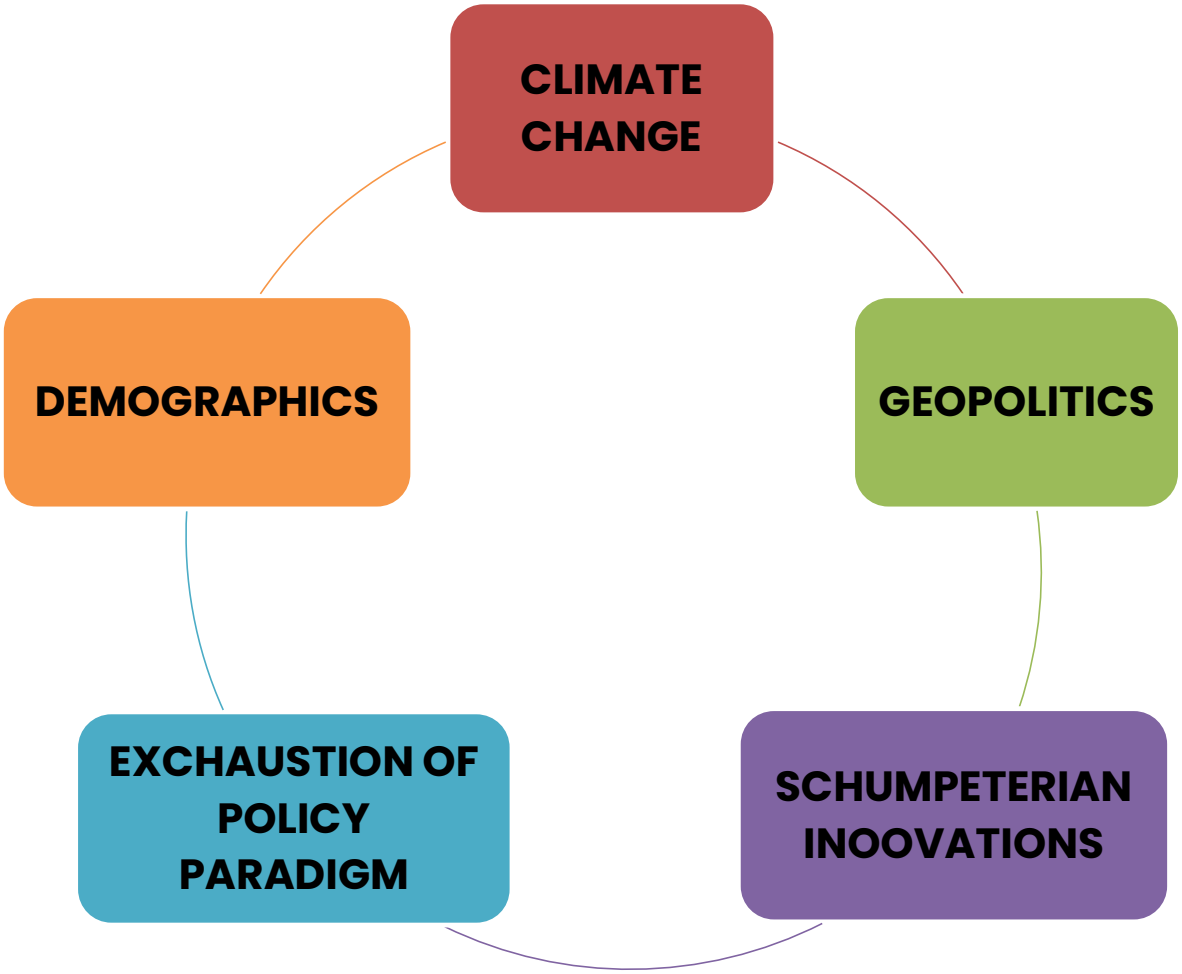
1. A glance at the world situation today and the risks of polycrises

→ Why we need a multifaceted and cross-disciplinary approach to “country-risk”

→ Beware the bias (and mental charge) of the risk analyst!

1. A glance at the world situation today and the risks of polycrises

A convergence of five worldwide tectonic changes



A rare convergence of four major worldwide tectonic changes

These tectonic changes have the capacity to disrupt demand, production and trade, and 4 out of 5 imply a multiplication of Expected But Unpredictable (EBU) events.

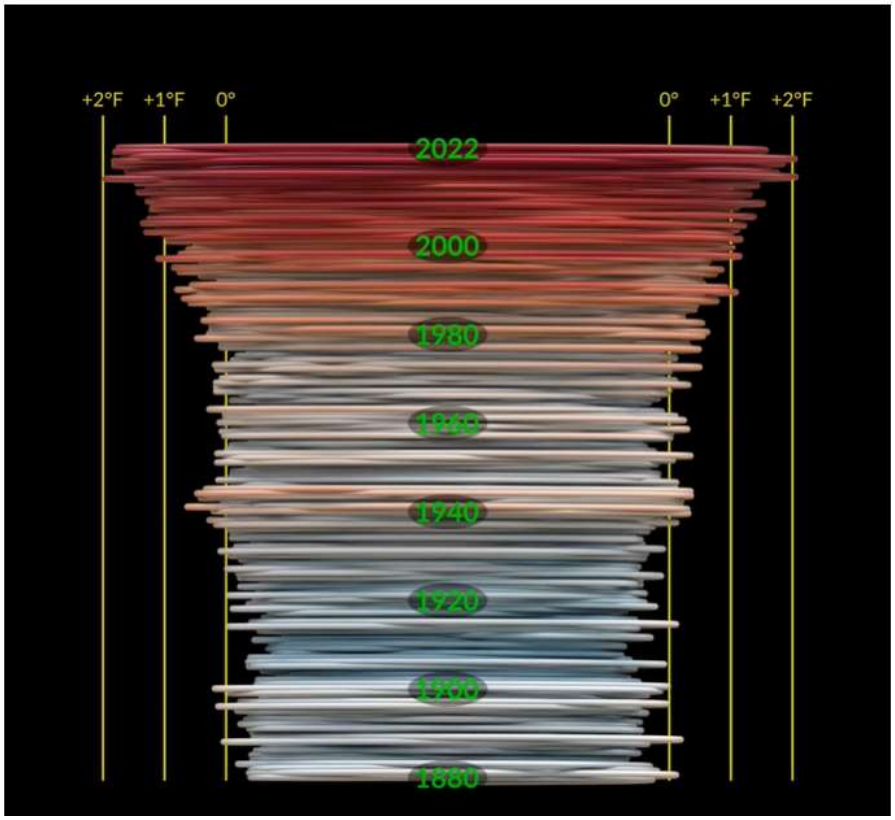
They all have self-reinforcing effects that converge today and at least for the next decade, notwithstanding highly different time-schedules.

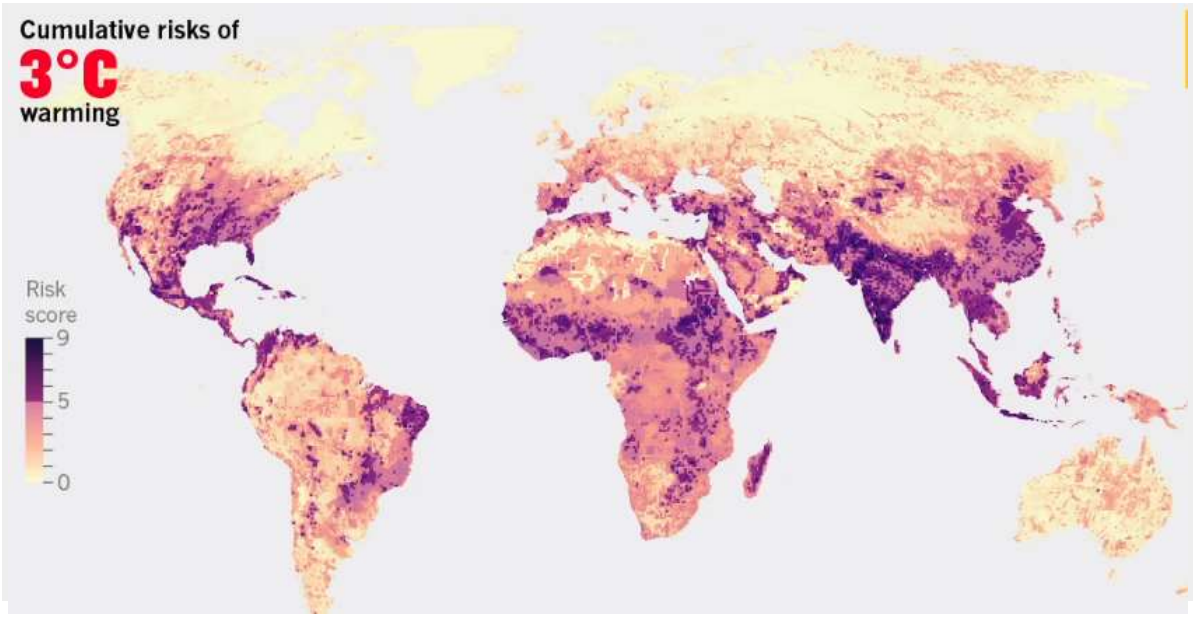
They do not substitute, or erase the other traditional sources of risks, but change the way we need to look at macro developments, with the set of additional layers of uncertainties as well as new opportunities.

1. A glance at the world situation today and the risks of polycrises

Climate change: a reminder

NASA Climate Spiral (1880-2022)





Climate change: knowns and unknowns

The known impact of climate change:

→ Chronic risk (temperatures, sea levels…) with implications on living /working conditions, transportation…)

→ Higher frequency and higher intensity of extreme weather events, with implications on human lives, infrastructure and budget spending

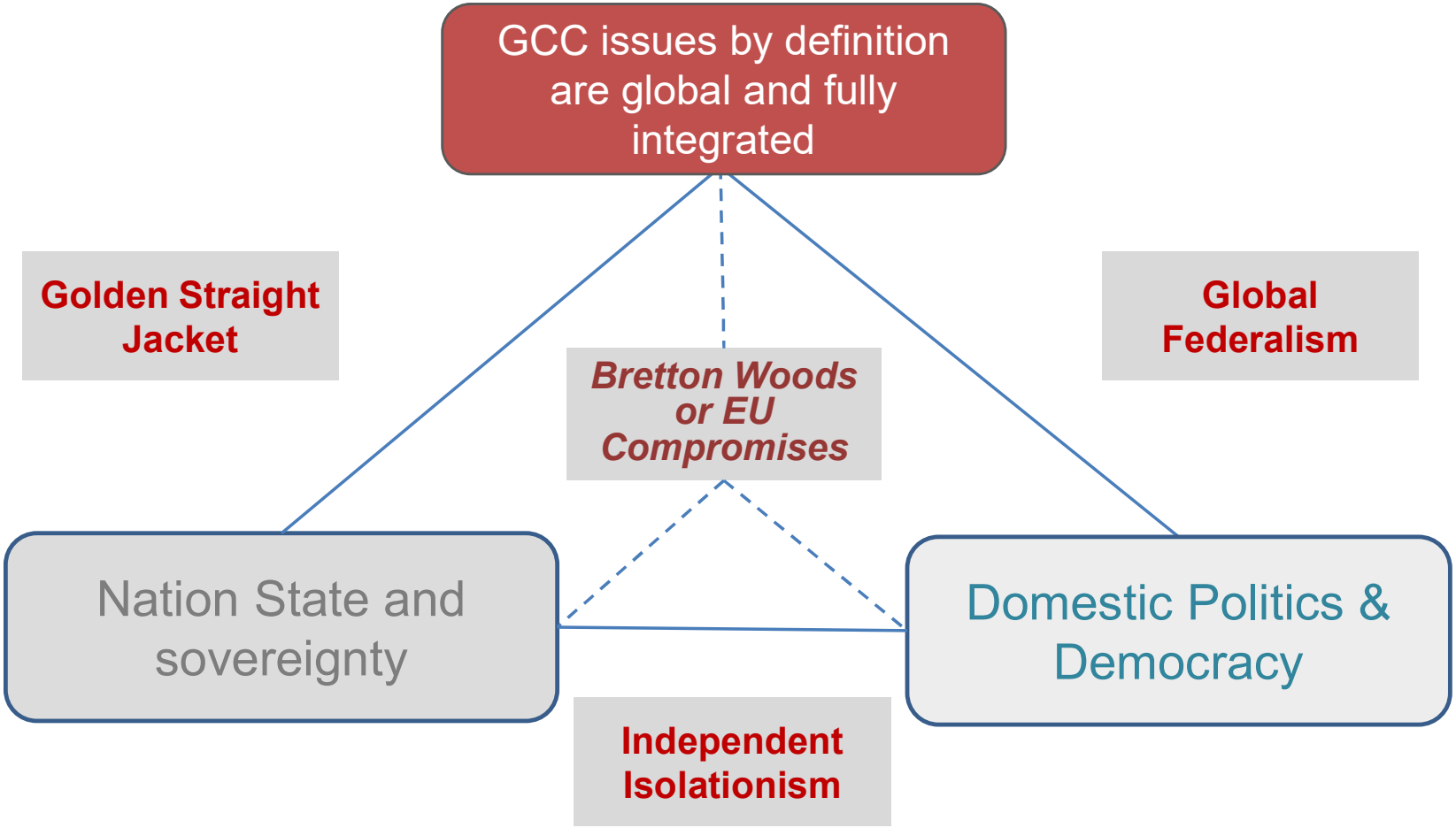
The deep uncertainties and management issues:

→ As a global phenomenon, climate change requires cooperative process and probably a new set of governance bodies

→ Priority arbitrage between adaptation and mitigation will become a critical element for future developments

1. A glance at the world situation today and the risks of polycrises

Climate changes: revisiting the Rodrick Triangle of impossibilities



Geopolitics: attributes of power and successive waves of integration

→ Geopolitics originates from the combination of *Attributes of Powers* and *International Relations*: **a *Multipolar Hierarchized World***

→ ***Attributes of power:***

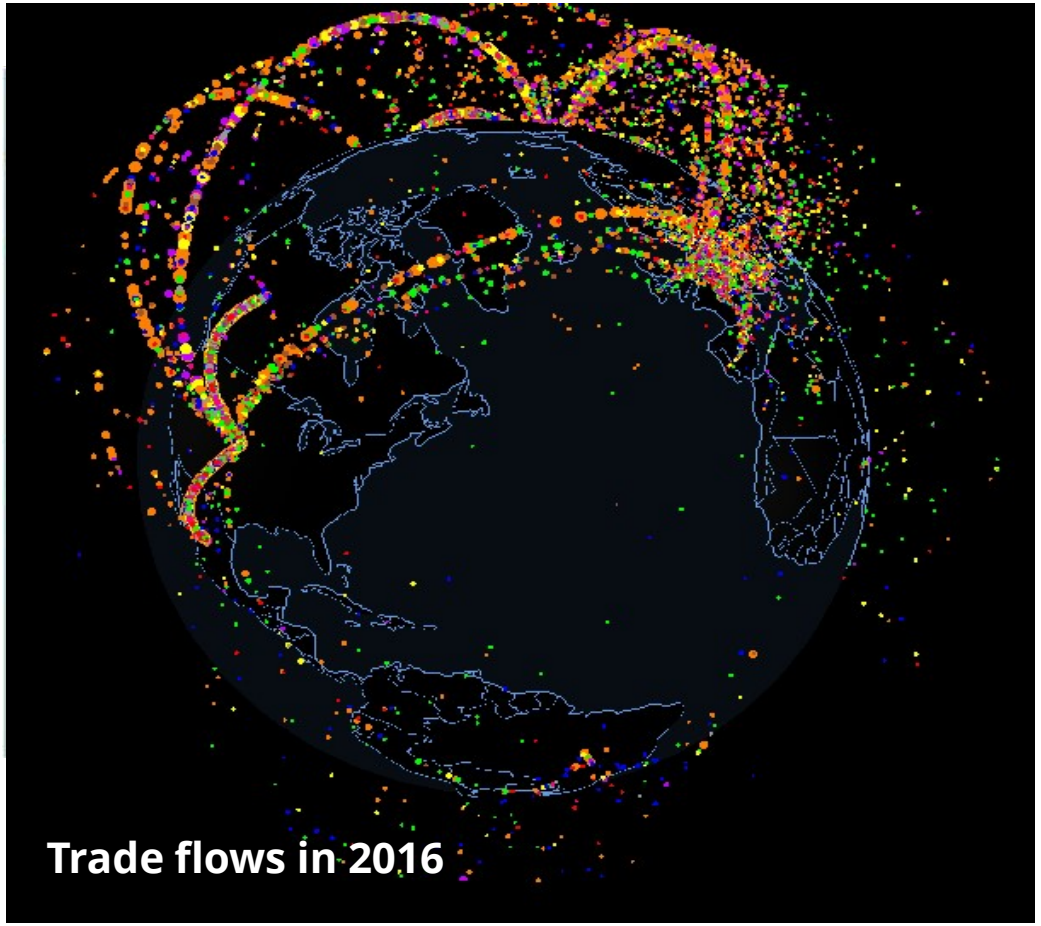
- *Economic and financial*: "gravitational effects" on trade, investment and finance, leading corporates, trademarks, financial institutions, and large funding resources for international objectives.
- *Military capabilities*: technology, overall strength, ability to project forces abroad and lead / organize international operations, intelligence network, and alliances.
- *Diplomatic influence*, through the density of international presence (embassies etc.), the role in international governance, the explicit formulation of economic, political or military agreements.
- *Cultural values*, i.e. the ability to influence / spread beliefs, values and characteristics of both way of life and political structures. Implications for cognitive war / influence / propaganda.

→ ***International relations***

- *Long-term historical observation: a strong relationship between geopolitics and economic and corporate internationalization (trade / production / capital)*

Geopolitics: attributes of power and successive waves of integration

A 2,000-year history of successive waves of trade and economic integration



Source: TAC ECONOMICS

Geopolitics: a history-based framework of successive waves of integration

- Step 1 → emergence / affirmation of a "central" or structuring power; — 1935-1945 US
- Step 2 → the integration process around the center accelerates (rules, institutional set-up), with benefits in all integrated territories (higher efficiency, larger markets, stronger profit opportunities); — 1945-1995
- Step 3 → progressive deformation of benefits from integration, with "rent-income" at the center and declining relative attribution to periphery; — 1995-2005
- Step 4 → tensions increase as the hierarchical structure imposed on international trade entices contenders for primacy; — 2005-2015
- Step 5 → a combination of technology break-through, strategic rivalry and resentment against center create conditions for a "break-up" of the previous integration system and emergence of a new center. — Now US vs China

Geopolitics: a history-based framework of successive waves of integration

→ **Lasting global strategic rivalry** between China and the United States, with an explicit desire for China to catch-up, and an equally explicit intention of the US to prevent it.

→ The economic and financial integration process has entered a very **bumpy transition**.

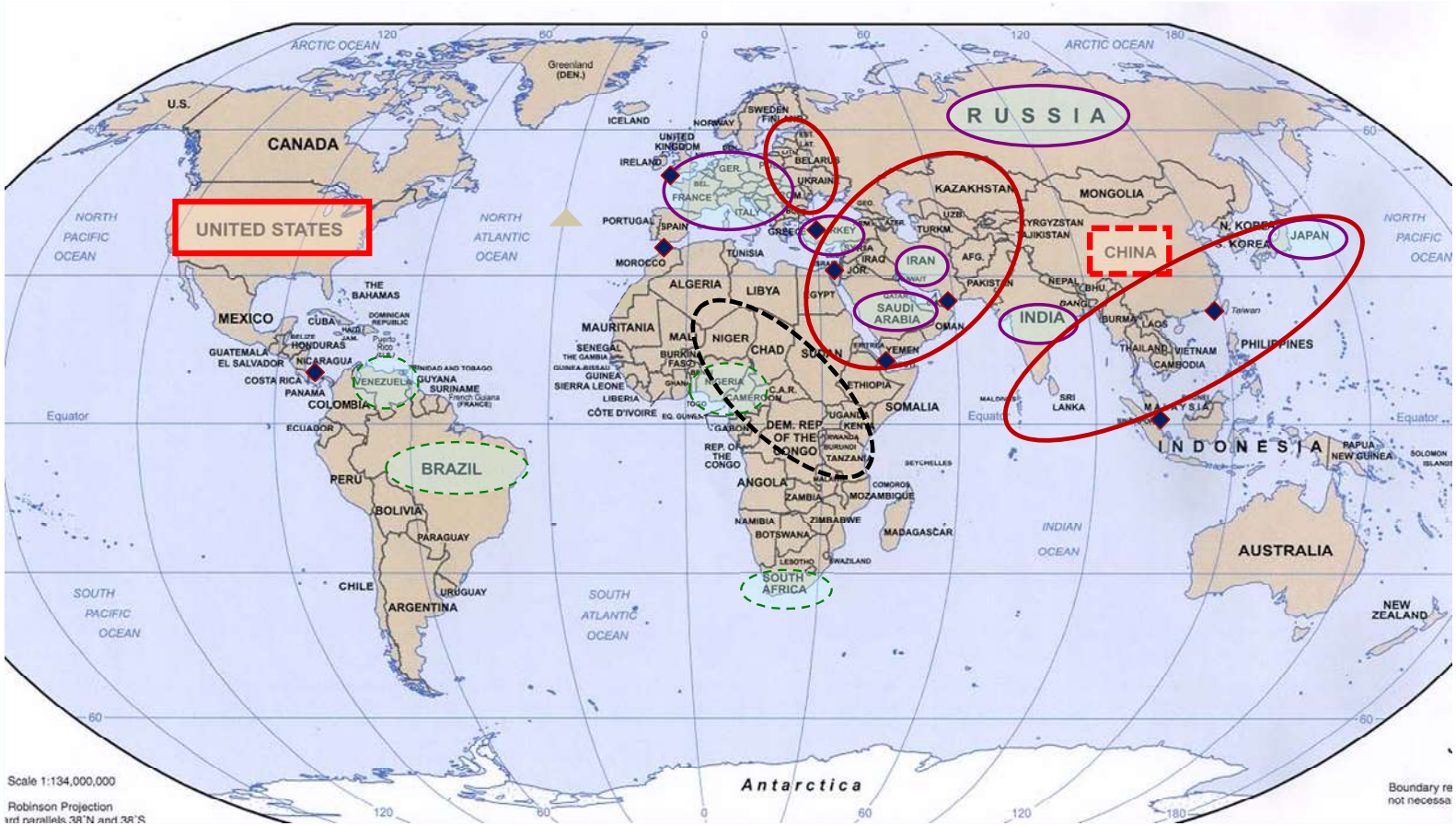
→ **2nd tier powers** able and willing to exert an influence and weigh on global balances, **creating recurrent frictions**.

→ **Two critical medium- to long-term consequences:**

- **More confrontational international relations** (plausible conflicts, mostly 2nd tier vs 1st tier, 2nd tier vs 2nd tier, 1st tier or 2nd tier vs others);
- **Economic and financial fragmentation** with growing polarization by rival blocs (trade, capital, regulations and standards, etc.).

1. A glance at the world situation today and the risks of polycrises

Geopolitics: a history-based framework of successive waves of integration



1st order power

2nd order power

2nd order power with key domestic constraints

Critical choke point

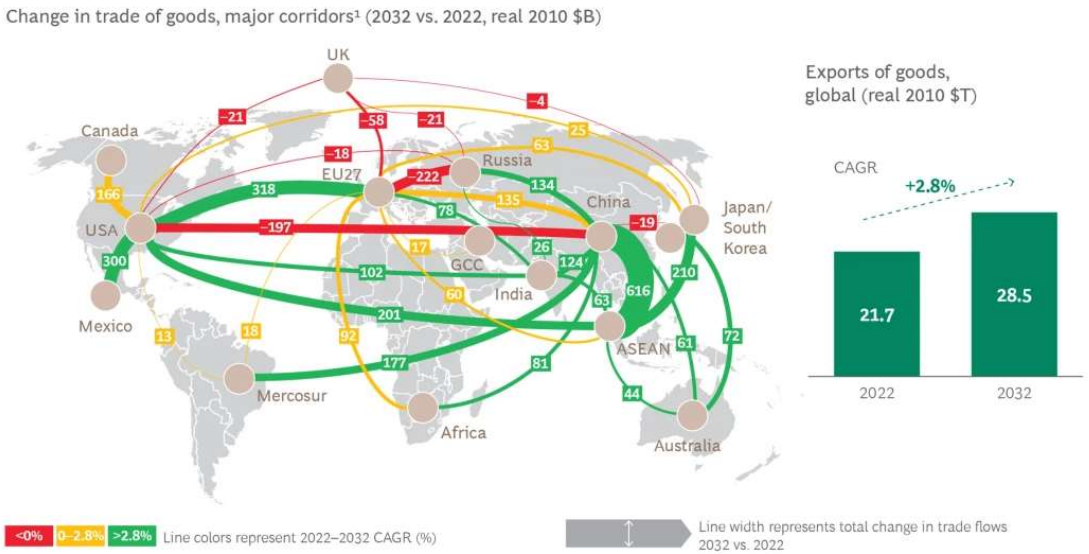
Areas with too many contenders for influence / control

Areas with lack of regional influence

1. A glance at the world situation today and the risks of polycrises

Geopolitics: implications for changing trade (and investment) patterns

Exhibit 1 - Trade Flows Will Be Reshaped by 2032

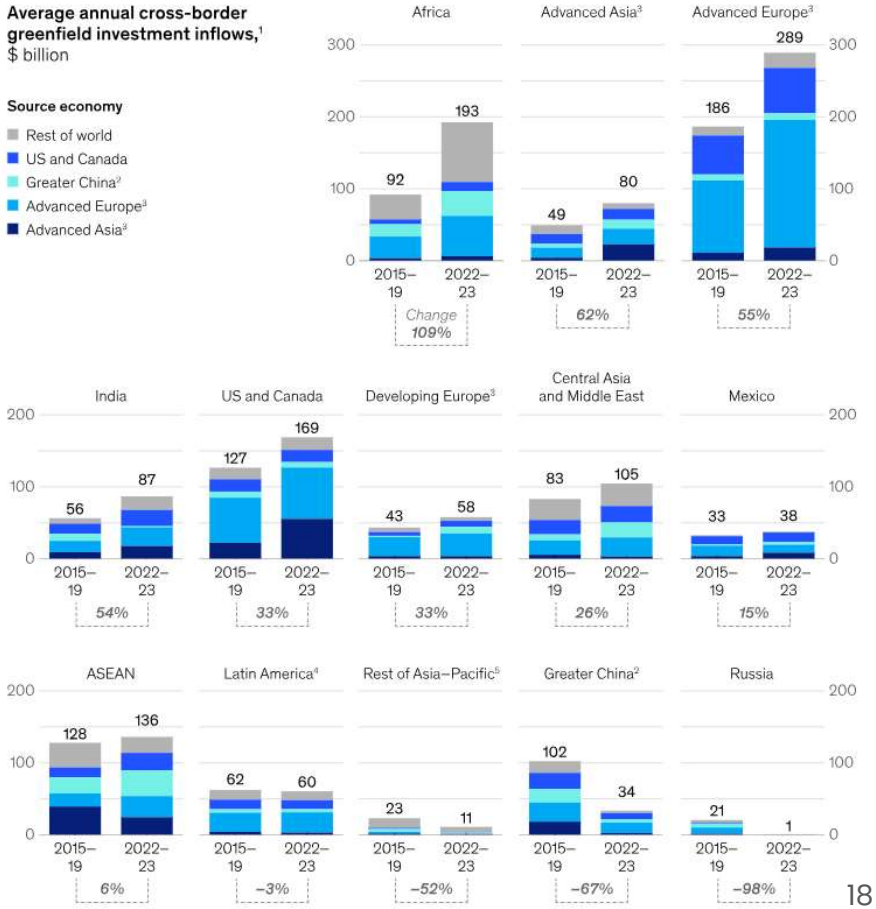


Sources: UN Comtrade, Oxford Economics, IHS, WTO, BCG Global Trade Model 2023, BCG analysis.

¹Map corridors represent ~45% of global trade in 2022. Map does not include trade of services.

Sources: BCG, McKinsey, 2023

Some developing economies are seeing strong investment inflows, supplied by a wide range of economies.



Disruptive innovations: a wave unfolding over the next decades

Innovation is a permanent feature of economic development, but there are moments when a set of different but inter-related breakthrough have the ability to disrupt the whole economic processes, from household behavior and preferences, to production, distribution, finance and trade.

Experts today highlight four areas of such disruptive innovations

- Artificial Intelligence and Quantum Computing
- Internet of Things and Autonomous Objects
- Genomics and Genetic Engineering
- Renewable Energy, Carbon Capture

Exhaustion of economic policy paradigm: ending the 1980-2015 phase

From the 1980s to the 2008-09 GFC, economic policy models included fiscal caution, monetary neutrality, global trade integration, and key role of market-based mechanisms. Such foundations are now deeply flawed.

→ Public debt close to unsustainability

→ Monetary policy away from neutrality

→ Trade restrictions have flourished

The "new paradigm" is not yet defined, but it is likely to include stronger "government direction", from industrial strategies and fiscal support, to constraints on sourcing, finance and technology.

Demographics: time sequence and geographic divergences

A global trend of ageing:

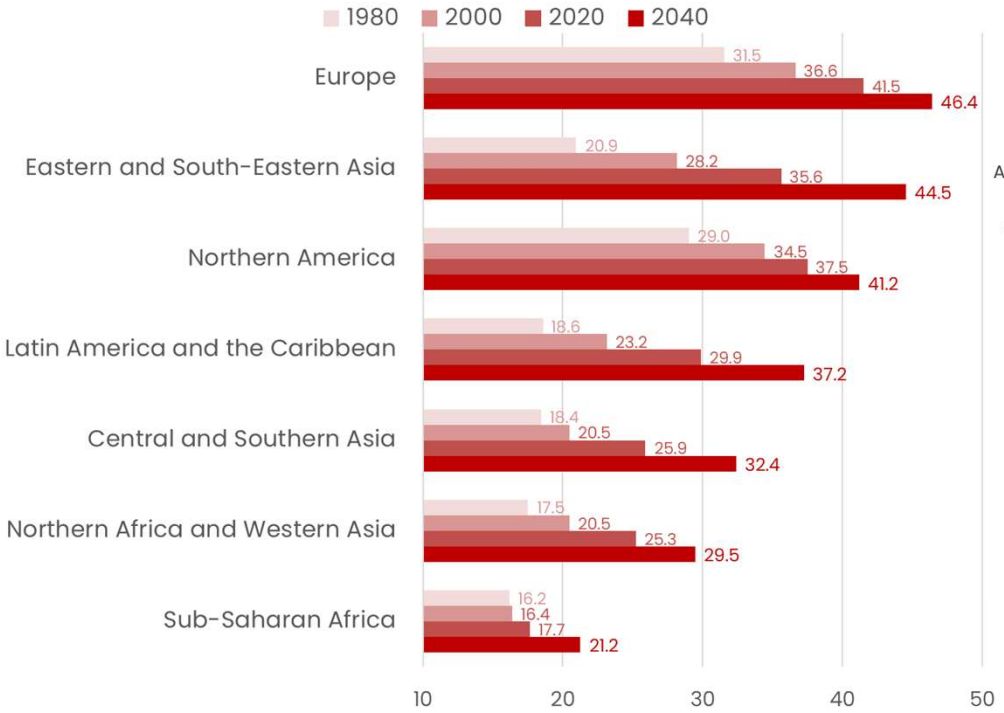
→ Very visible in Europe and Asia, with the exceptional case of China

→ South Asia, MENA and Sub-Saharan Africa will remain the regions with youngest populations

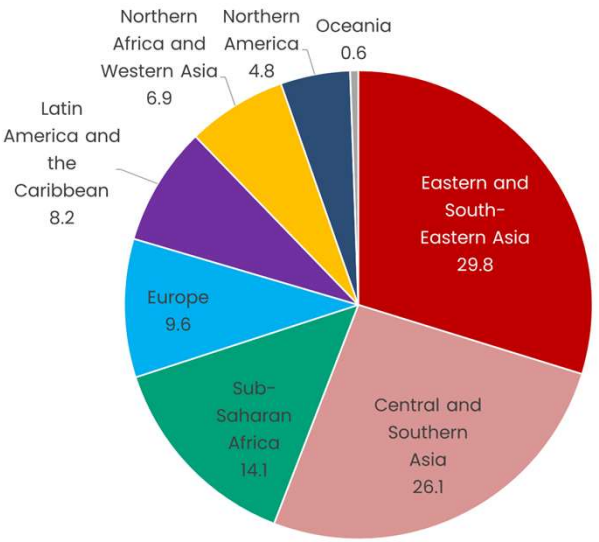
→ Induce large shifts in share of global population: South Asia and Sub-Saharan Africa will account for almost 50% of world population by 2050, against 40% in 2020.

Demographics: time sequence and geographic divergences

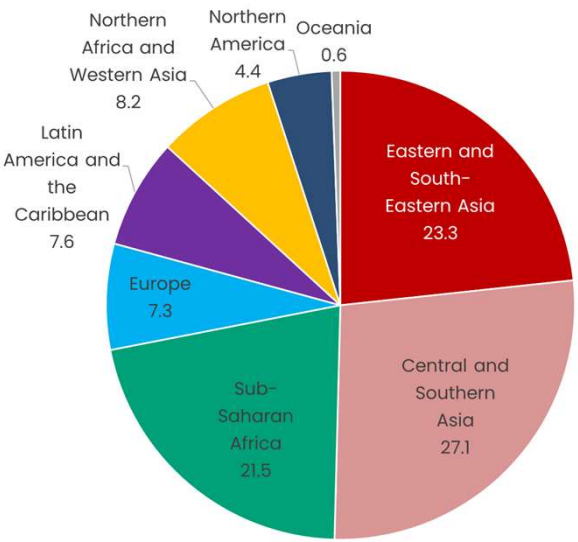
Median age (years)



Population (% of total world population)



2020



2050

Source: UN Population Prospects

1. A glance at the world situation today and the risks of polycrises

Interdependence and self –reinforcing features

GLOBAL CLIMATE CHANGE

- Global coordination / governance
- Sharing the financial burden (domestic, international)
- Managing catastrophic / extreme events
- Climate-related migrations

SCHUMPETERIAN INNOVATIONS

- Technology as a tool to weaken contenders / competitors
- Risks on jobs and the usual quest for scapegoats
- Military / confrontational usage

EXCHAUSTION OF POLICY PARADIGM

- Uncertainty on policy directions and resources available
- Issues of global coordination and risks of scapegoating
- Higher domestic polarization, rise of populism and government intervention

Beware of semantics! A few candid remarks on the meaning of words

Issues regarding the concept of development are acute

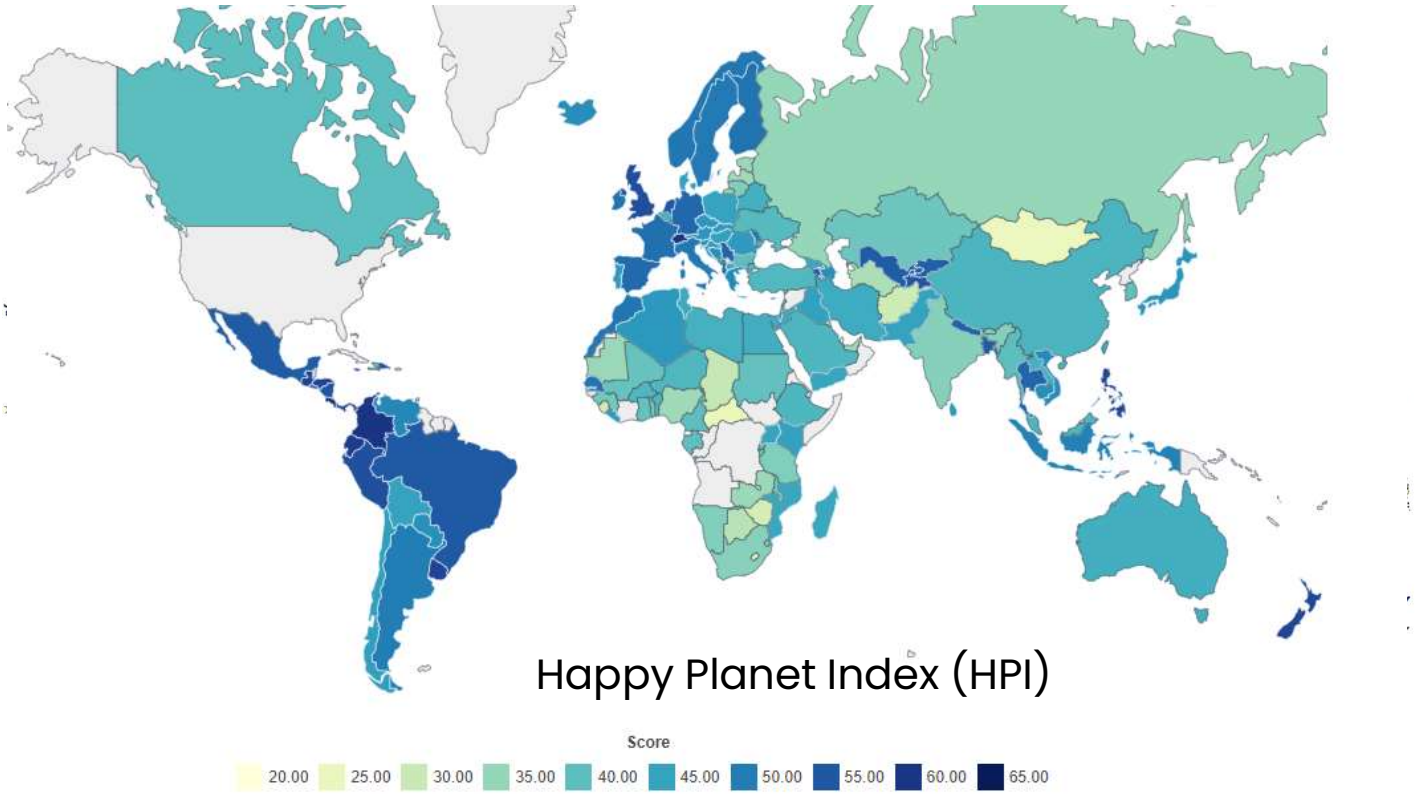
- Exit from poverty (absolute, relative)?
- Take-off, wealth generation, stock of capital and assets?
- Changing needs to be satisfied? A never-ending source of dissatisfaction fundamentally neglecting the “holistic” approach of human vs nature?
- « Willing Poverty » versus « Endured Misery »?
- Are there physical limits to development?

Beware of semantics! A few candid remarks on the meaning of words

They find a reflection in measurement issues and debates

- GDP: sum of value addition across all sectors of the economy, also equivalent to total domestic income and all components of final demand
- Indicators adjusting GDP (green accounting)
- Indicators supplementing or combining GDP with other measures (HDI, Economic Environmental Accounts, SDI …)
- Indicators replacing GDP (HPI, ESI …)

Beware of semantics! A few candid remarks on the meaning of words



Beware of semantics! A few candid remarks on the meaning of words

Sustainable Development is an important "catch-up" concept but hard to define precisely, especially when thinking at different stakeholders having fundamentally different time-horizons

- Time horizon highly heterogeneous (by economic agent, according to cultural differences, etc.…)
- Fundamentally different timeframes for inter-dependent factors: natural resources / climate / environment, demography / urbanization, demand / job creation, finance / market prices
- Self-regulating mechanisms: prices, changes in demand patterns, technology…
- Unknown threshold effects accelerating changes

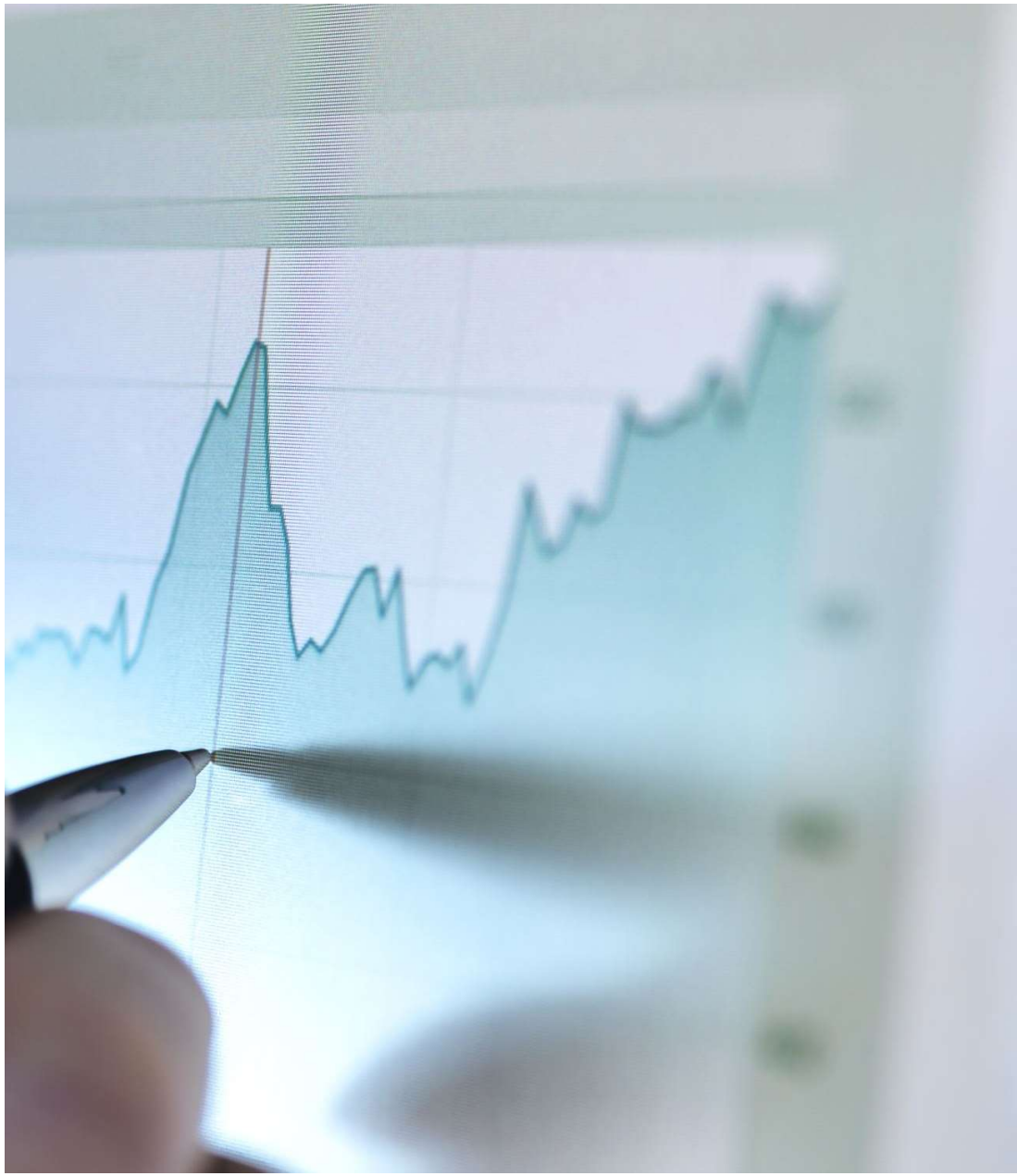
Beware of semantics! A few candid remarks on the meaning of words

What exactly is a shock or crisis?

- Intensity of development reversal:
- Adjustment, i.e. larger-than-normal cyclical behavior with peaks and troughs
- Structural break, i.e. major change in development model or institutions
- Systemic crisis, i.e. a shock so acute that it interrupts the functioning of the economy for a while and creates non-reversible damages
- Time dimension, resilience and lagged effects
- People, markets, companies?

2. Measuring and assessing country-risk: uncertainties & risk, and impact on methods

→ From concepts to tools and methods



Introduction: broad areas of investigation when assessing risks of shocks

With a dose of simplification, we would look at four categories of risk or drivers of shocks:

- **Economic & Financial Risks** (activity, inflation, currency, banking system, sovereign problems…)
- **Political, Governance & Social Risks** (political and social disruptions, coup d'états, geopolitics and international relations, wars…)
- **Environmental Risks** (climate, biodiversity, industrial pollution…)
- **Transmission Risks** (exogenous shock, e.g. problems in your neighbor country, collapse of major trade flows, US monetary policies, pandemics)

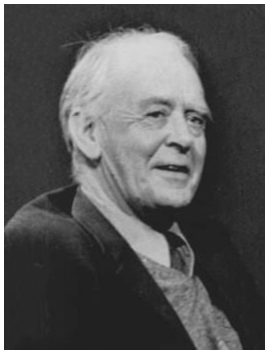
Introduction: reminder of what we can and cannot do

- Nobody has a crystal ball and can predict the future: it is a matter of measuring and if possible, reducing the uncertainty
- Major difficulties or systemic crises occur as a complex result of many inter-dependent factors, with “non-linearity” playing a core role
  –> *An analogy with the fire in my fireplace?*
- First step: defining what needs to be measured, what are the objectives and process for the measure, how will it be used

From concepts to methods: 3 major types of uncertainties and risks

Likelihood of events or gauge of uncertainty can be traced to three different types of events (cf. John Hicks)

1. **Events that can be subjected to long historical observations and substantial statistical analysis;**
   - causal relations are formalized even if they are complex to quantify;
   - explanatory variables / causal links can be described through long observations/large data sets;
   - the combination of causes can be used for timing analysis.

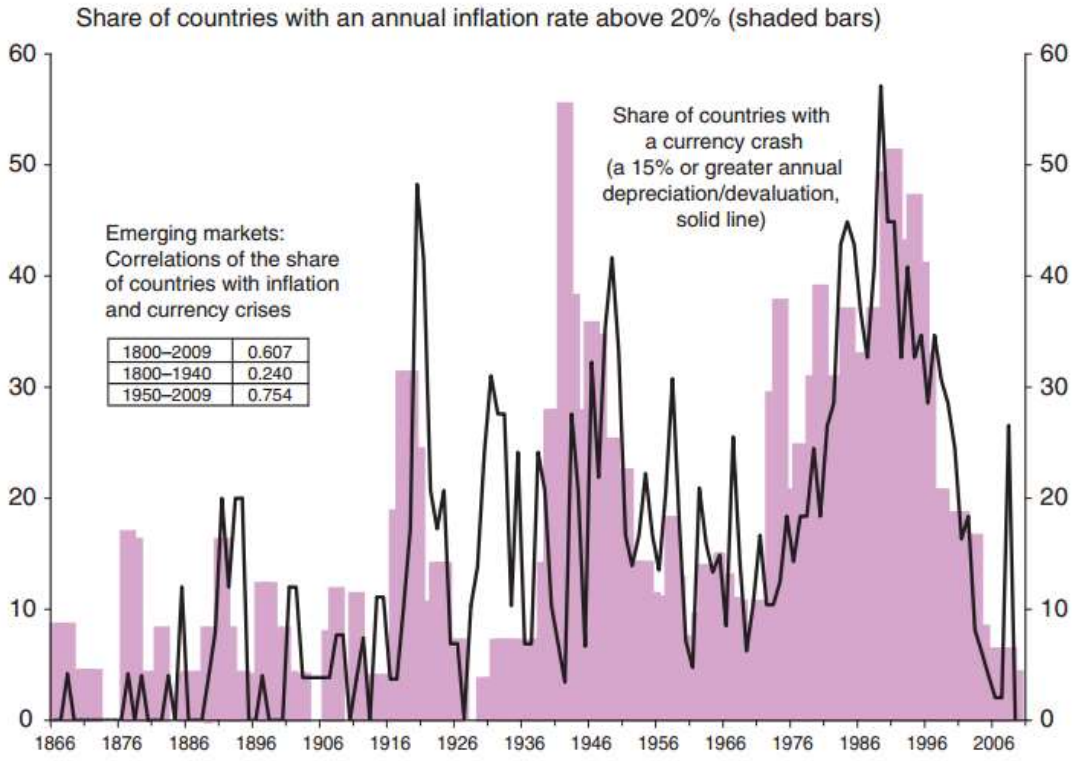


John Hicks, Economist, 1904-1989

→ Usable for economic and financial shocks, to a somewhatr lesser extent for traditional political difficulties

→ In such cases, methods would use a large dose of datamining, statistical techniques and modeling, able to provide probability of occurrence and magnitude at a given horizon

From concepts to methods: economic observations and data are plentiful



Source: Reinhart & Rogoff - 2011

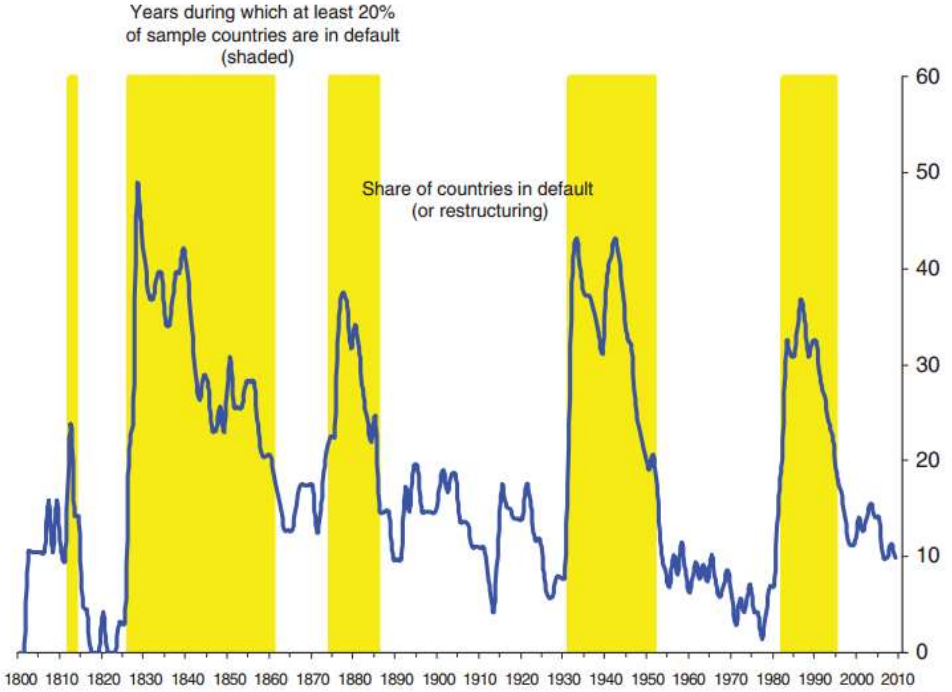
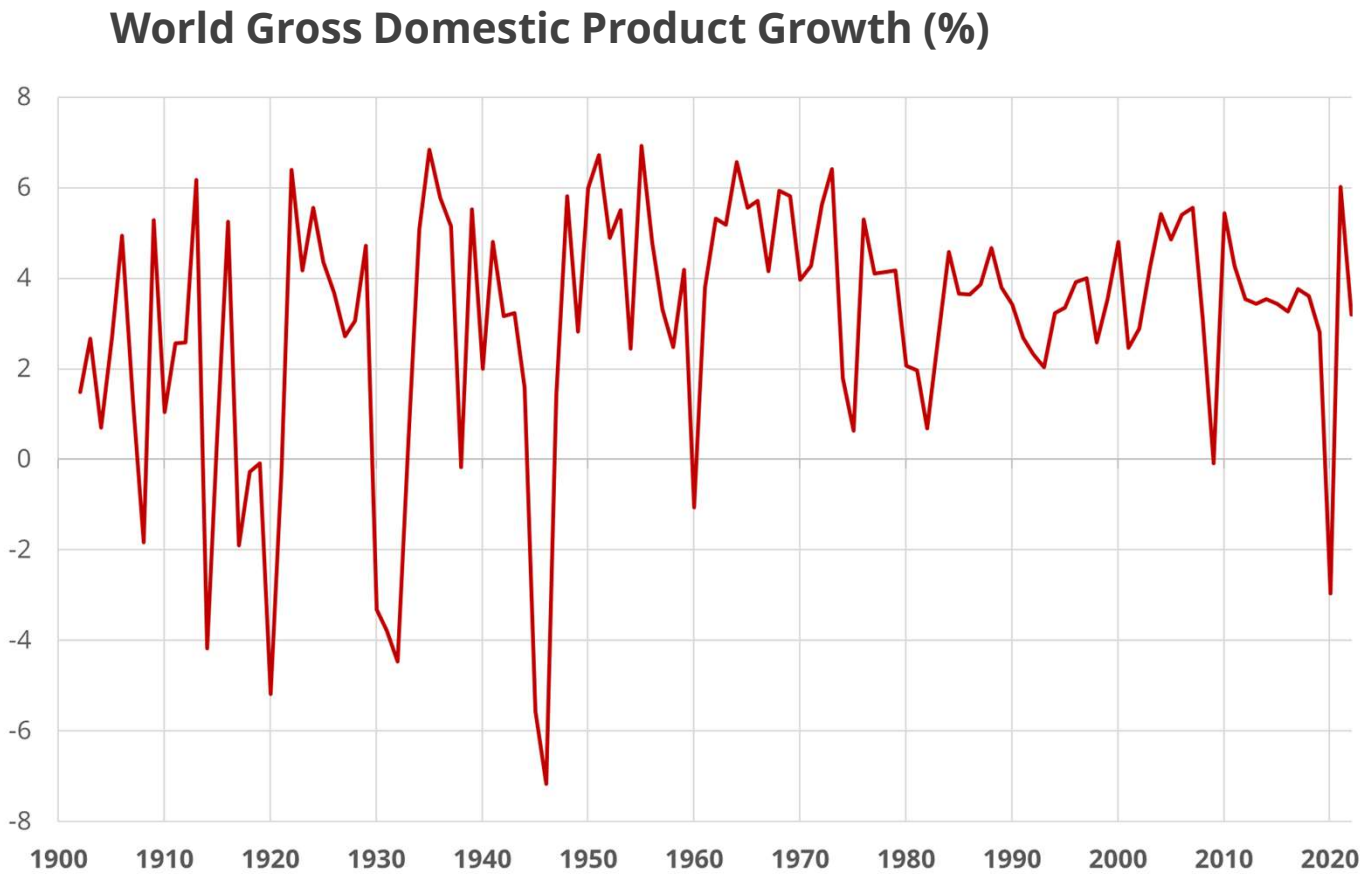


FIGURE 2. GLOBAL SOVEREIGN EXTERNAL DEFAULT CYCLES: 1800–2009
(*share of countries in default or restructuring*)

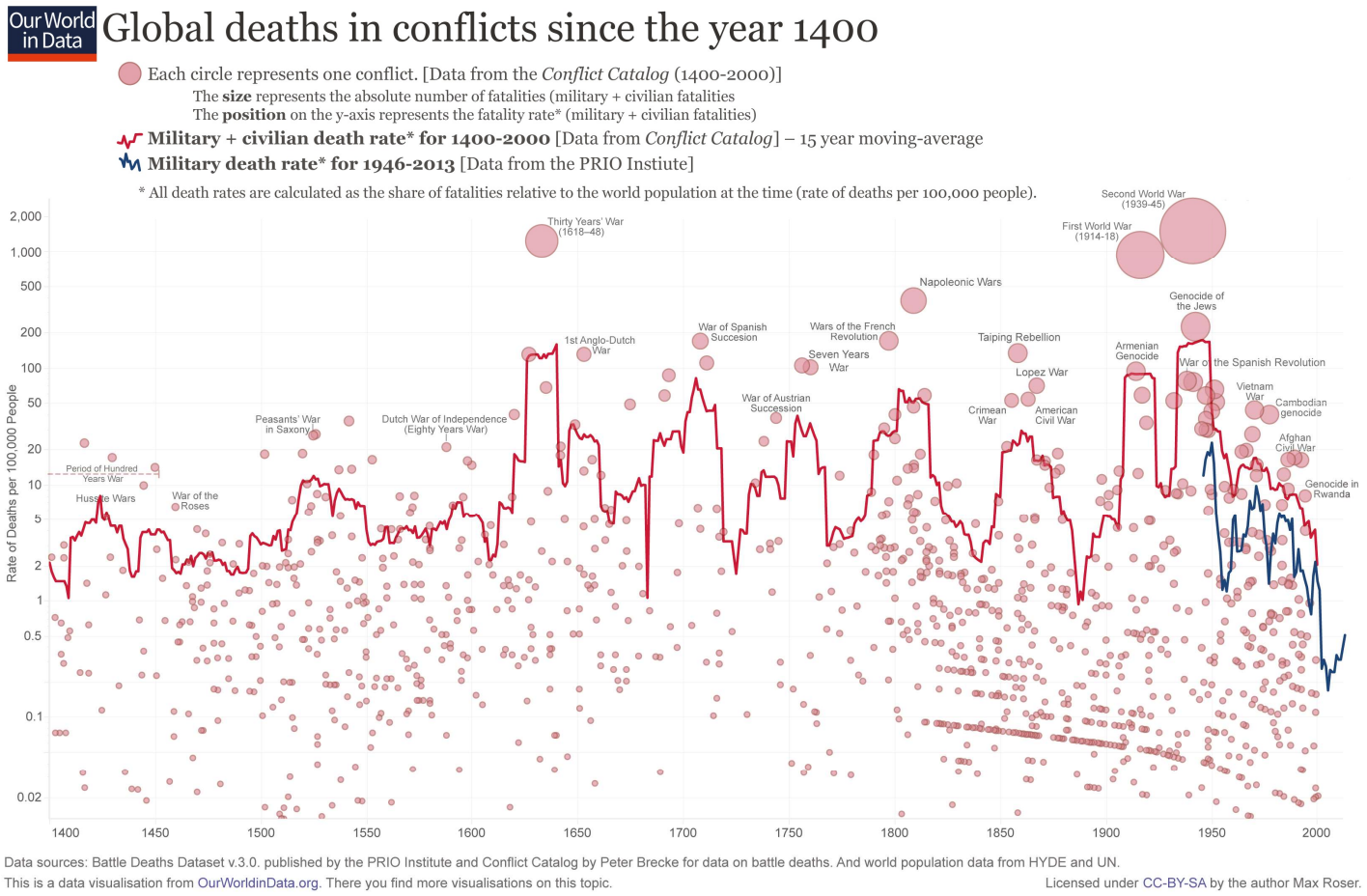
From concepts to methods: economic observations and data are plentiful



Source: Maddison, IMF/WEO

2. Measuring and assessing country-risk: uncertainties & risk, and impact on methods

From concepts to methods: history of wars but no explanatory dataset



from concepts to methods: 3 major types of uncertainties and risks

2. Non-observable but known event-risks

- events for which there is a probability of occurrence, but which are conditioned by too many inter-related factors
- causal relations are explicit or conceptualized, but often "more debated"
- data is insufficient, time of observations too specific (recent, war-times…) or too short,

→ The case for geopolitical transformation, for environmental events (especially extreme events) and for most transmission risks

→ In such cases, methods cannot be based on heavy datamining techniques; they must incorporate different approaches, usually…

a) Construction of alternative scenarios

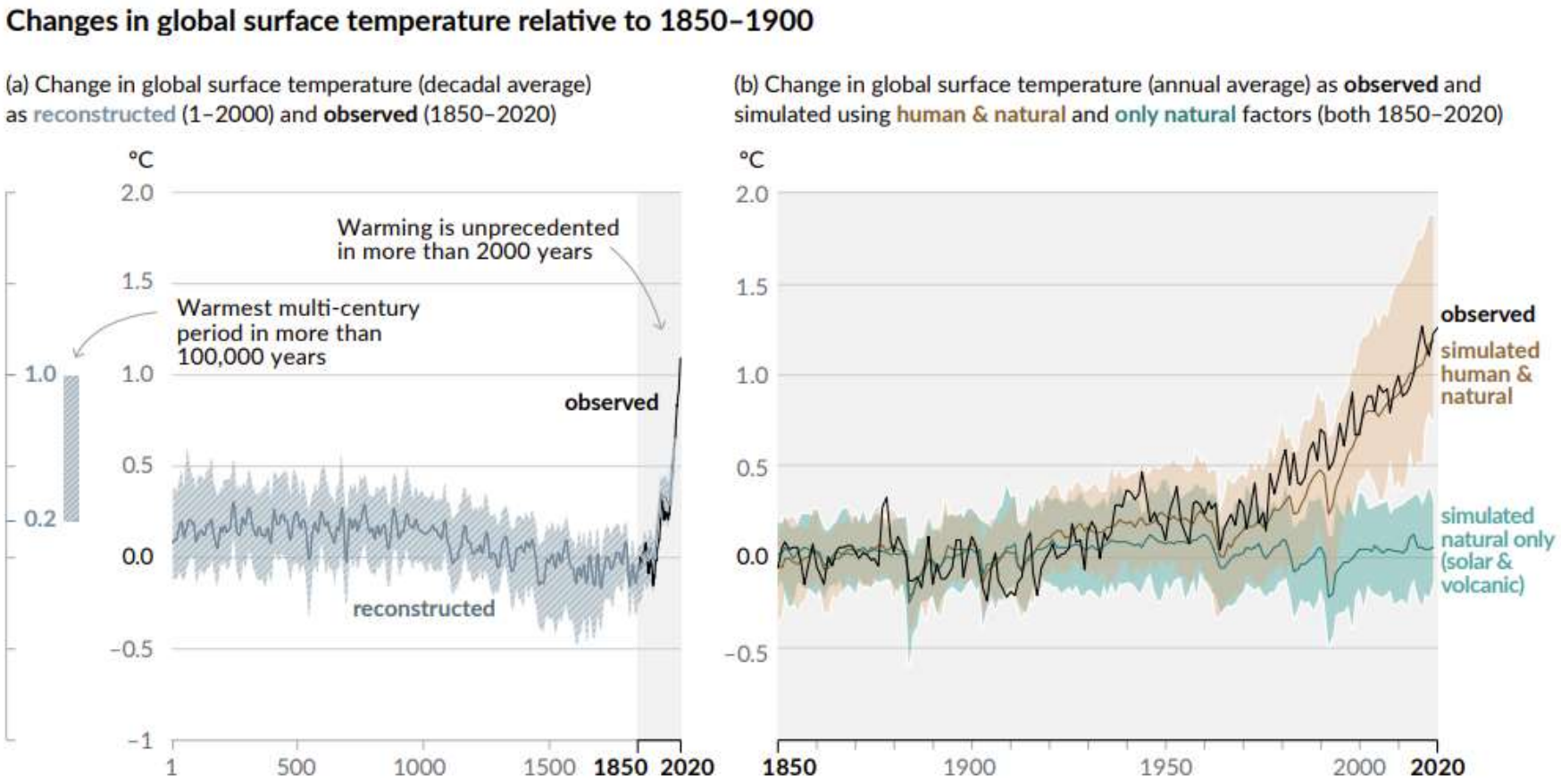
b) a combination of ex ante vulnerability and ability to cope in case of shock (ratings)

c) ex ante stress test exercises

d) short-term alert or early warning systems

2. Measuring and assessing country-risk: uncertainties & risk, and impact on methods

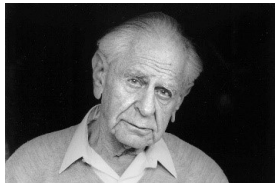
From concepts to methods: GCC risks with short and too-specific history



From concepts to methods: 3 major types of uncertainties and risks

3. Black Swans

- Concept brough forward by Karl Popper, initially on the absence of "ultimate scientific truth"
- Refers to events that we cannot even think of, or imagine, or for which the impact would so large that they are impossible to explicitly include in corporate or government strategies



Karl Popper, philosopher, 1902-1994

→ By definition hard to illustrate… think about nuclear war at massive scale or an earthquake cutting California in two…

→ There is nothing that can be done to assess the likelihood of such black swans; the only way to incorporate the notion at strategy-level is to ensure adaptability at corporate or policy level

From concepts to methods: a couple of critical difficulties → *non-linearity*

The nature of systemic shock potentially implies a heavy dose of non-linearity, with sudden acceleration and reversals, self-reinforcing mechanisms and questions on policy reactions

- Combinatorial approach, typically illustrated through if-then relations:

  → if country *X* is in such *xxx* situation, then any change in variable *Y* or situation *Z* has a major implication.

  The difficulty is in identifying the relevant combinations and their hierarchy

- Threshold effects, whereby a sudden transformation can / may occur if / when a specific indicator or a specific set of indicators crosses "sensitive thresholds"

  → Example of critical thresholds: Fx reserves, total public debt, level of political repression…).

  The difficulty is in properly calibrating the value of thresholds and constantly checking for plausible changes.

From concepts to methods: a couple of critical difficulties → *timing*

- You can never "give a date", and uncertainty mechanically increases with the time-horizon;
- Attention should be on more precise timing for short-term risks and broader horizons over medium-to long-term.
- A focus on potential 'triggers' is always useful, i.e. the events able to create non-linear disruptions, both domestic and international, and their specific lead-time monitoring.
- Identifying 'leading warning' or 'seismographs' for different time-horizons.

Quantitative methods: a short review

- Risk can be assessed by probabilistic combinations, statistically calibrated on large "learning" dataset; calibration ensures that quantitative models are less subjected to qualitative bias… though they are far from neutral; they can be applied to large sets of countries and deliver economies of scale;
- Advanced quantitative techniques (e.g. datamining and Artificial Intelligence) can unearth "difficult-to-see" elements;

✓ **Key benefits of quantitative tools**: clarity, ranking / comparisons, easiness to incorporate into other management tools;

✓ **Key limits of quantitative tools**: unable to seize countries' complexity and highly specific characteristics; estimated parameters still give a synthetic explanation of past difficulties; black-box phenomena; the past may not be able to predict the future.

Quantitative methods: a short review

Linear quantitative tools

- Scores, weighted indicators
- Standard econometrics
- Logit / Probit

Non-linear quantitative tools, Early Warning Signals (EWS)

- Signaling tools
- Datamining / AI techniques: neural networks and conditional trees (combinatorial processes), Pattern Recognition Tools

Combination AI/LLM

- Using text analysis on large samples of document and combining with targeted datamining techniques

Quantitative methods: constructing a simple rating or risk score

Practical steps to constructing a simple country-risk rating

1. Identify the broad risk factors or drivers, and the need / way to potentially break them down into different risk sub-components
2. Identify relevant variables / indicators and the sources of data
3. Transform the data across the entire set of countries and indicators into comparable values (data normalization → *see next slide*)
4. Assign weights to the relevant indicators
5. Compute a weighted average.

Quantitative methods: constructing a simple rating or risk score

Practical steps to normalize indicator so that they can be combined

- **Min-Max**
  - Formula: (X-min)/(max-min)
  - Normalized values range in [0,1]
- **Standard normal distribution**
  - Formula: (X-mean)/sd
  - Mean=0; standard deviation=1
- **Quantile**
  - Discrete values according to thresholds (given by decile or quartile for instance)
  - The number of observations is the same for each class

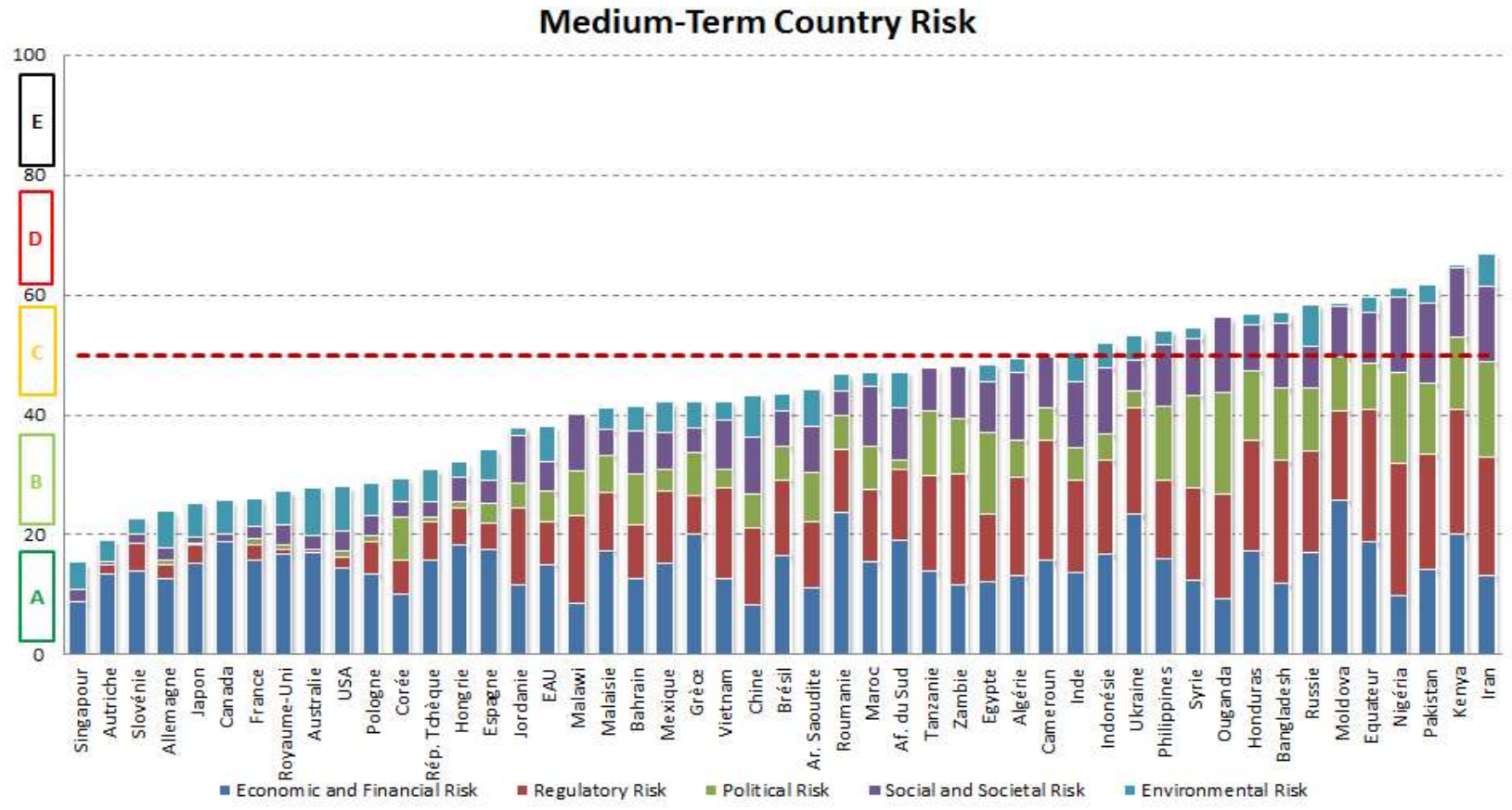
Quantitative methods: illustration of broad country risk rating

Illustration from TAC ECONOMICS research for a leading MNC. The objective is to build a global risk score with Russian Doll approach on a large number of countries

- 5 broad dimensions for risk: economic & financial, political, social / society, regulatory, environmental
- Each dimension is broken down into 3 to 5 chapters (22 in total) allowing the identification of the risk factors in each dimension
- Each chapter is constructed using elementary indicators or variables, with a statistical normalization to put them on a common scale
- Assigning weights at each level of computation : Unweighted averages of normalized values to compute chapters' values, and "expert based" weights for computing dimensions and the global risk score

2. Measuring and assessing country-risk: uncertainties & risk, and impact on methods

Quantitative methods: illustration of broad country risk rating



Quantitative methods: Signaling Tools

Based on the assumption that some critical variables have a particular role in triggering crises, for example:

- Economics: Foreign exchange reserves, public debt (to GDP), overall indebtedness / banking sector hypertrophy
- Politics: prices of basic necessities, corruption / change in leadership

→ Finding the values /range of values where self-fulfilling or self-reinforcing mechanisms starts to become much more likely (e.g. fx reserves and speculative attacks)

→ Closeness to the threshold values and volatility become major components of country risk measures.

→ Complex datamining techniques can be used with very strong performances for Early Warning Signals

Quantitative methods: measuring the performances of EWS

In and out-of-sample calibration work, with performances assessed mostly through *accuracy* and *noise-to-signal* ratio

	Crisis	No Crisis
Signal	**A** True Positive	**B** False Positive
No Signal	**C** False Negative	**D** True Negative

Accuracy

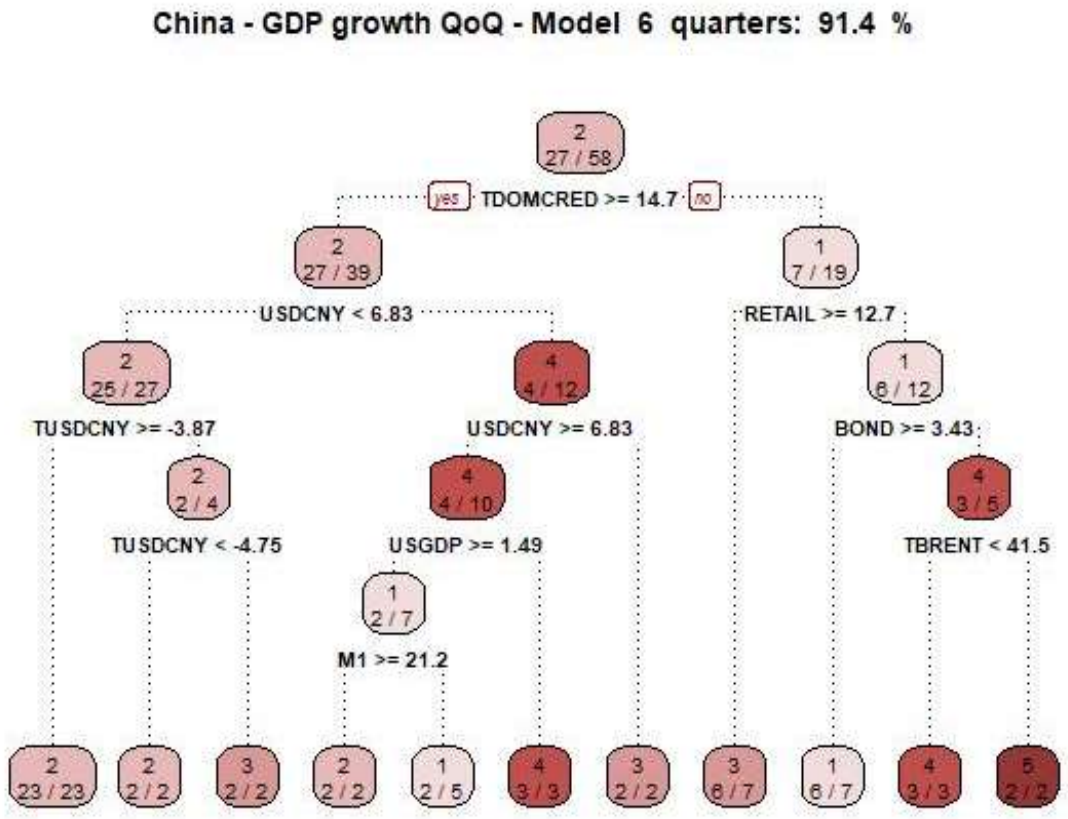
Accuracy = (A+D) / (A+B+C+D)

Noise to Signal Ratio

NSR = (B/(B+D)) / (A/(A+C))

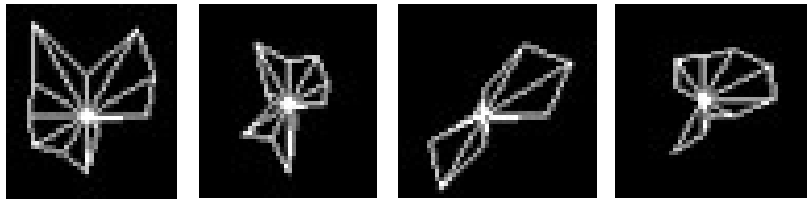
Quantitative methods: further illustrations

TAC ECONOMICS' Recursive Partitioning Model on China's GDP growth reversals



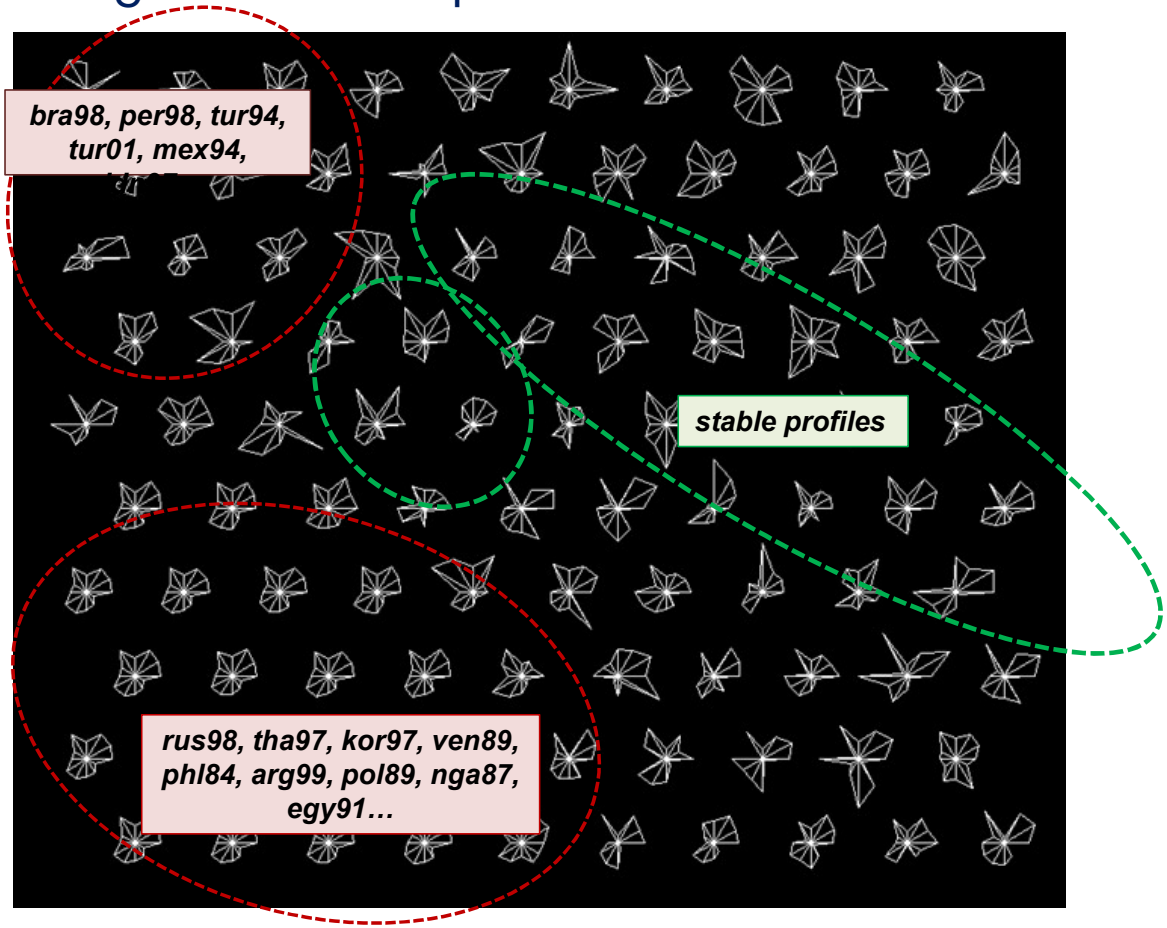
Quantitative methods: further illustrations

TAC ECONOMICS' Patter Recognition techniques for financial crisis



Each country, for each quarter, is represented by a spiderchart measuring performances on 12 different economic and financial indicators

100 countries x 40 years x 4 quarters per year
16,000 country web charts to analyze!



Scenario construction: advice from McKinsey…

Rules of thumb for efficient scenario construction

- → *Always develop at least four scenarios*
- → *"Crunch" the quadrants*
- → *There should always be a base or central case*
- → *Scenarios must have catchy names*
- → *Learn from being totally wrong*
- → *Listen to contrary voices*
- → *Even modest (global) environmental changes can have enormous impact*

Scenario construction: a step-by-step approach

I. Observation of risk factors

II. Identification of the key issues for the country's long-term development, analysis of the possible / plausible answers to such issues and definition of a couple of "archetypal" scenarios

III. Construction of quantitative instruments able to capture the relationship between the assumptions characterizing the archetypal scenarios and the fundamental economic variables needed for the strategic appraisal

IV. Identification and analysis of *Anchor Points* and *Risk Areas*

Scenario construction: illustration with a research conducted on Algeria

Reference for the illustration: a 2021 research made by TAC ECONOMICS for a locally-based subsidiary of a large international company

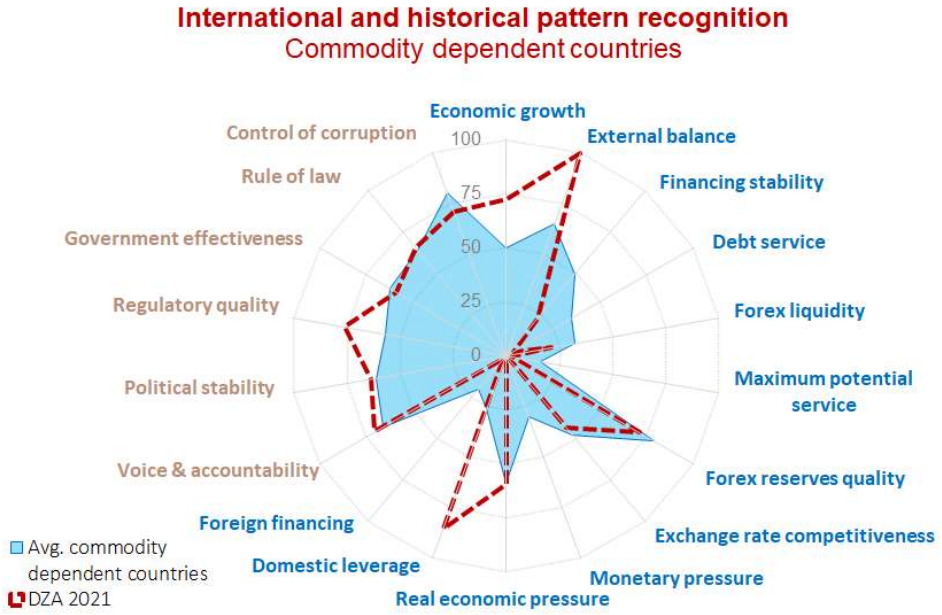
Background: strategic planning exercise for the **next 5 years**, where the mother company aims at (1) limiting any **financing** to its subsidiary and (2) **not being trapped in the obligation of recapitalizing** in case of negative developments, at a time of intense "macro uncertainty" for Algeria, (3) capturing maximum benefit related to their local presence

Issue and question: the analysis should help reducing the uncertainty on future macro development while assessing the risk of systemic shock.

2. Measuring and assessing country-risk: uncertainties & risk, and impact on methods

Scenario construction: illustration with a research conducted on Algeria

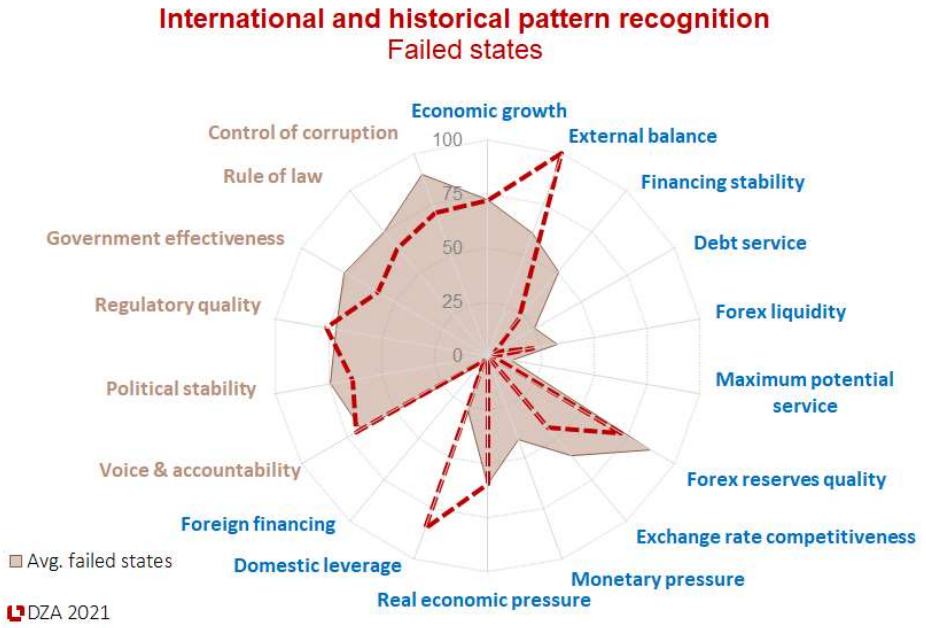
Use of number crunching to highlight countries with a pattern like Algeria's current shape, among 100 countries and the past 20 years (*technique: ascending hierarchical classification + K-Mean*



Detected analogous patterns or combinations of performances icnlude mostly commodity / oil dependent countries:

Oil = **Russia 2015, Azerbaïjan 2017, Cameroon 2010, Nigeria 2016,**

Gold **= Uganda 2004, Tanzania 2007**



But also: **Libya 2015, Yemen 2011, Venezuela 2008**, three countries that have entered vicous spiral of systemic disfunctioning

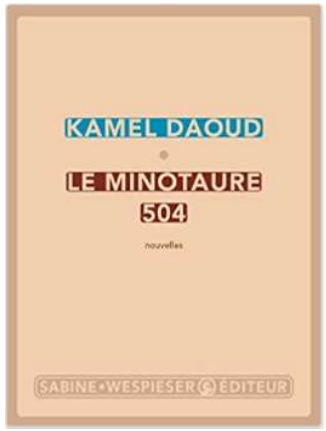
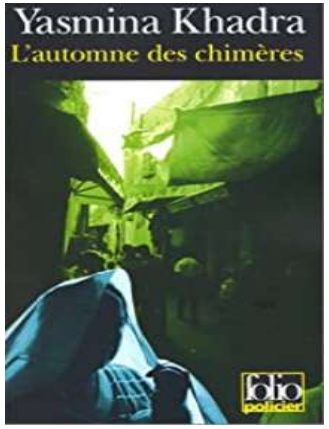
Scenario construction: illustration with a research conducted on Algeria

Reforms / Oil prices	***A Minima*** *Adapt by Necessity*	***Ambition with Control*** *Enhanced Strategic Consistency*
Base Structural decline	Constrained, modest and progressive changes in governance, permanent timidity on reforms: opening up to the private sector, real but contained, use of import controls, exchange rates and, at worst, external debt to allow the maintenance of a slightly more efficient clientelist system.	Changes in governance driven by the objective of accelerating growth, with continued strong control: improvement of business operating conditions modest tax reforms, opening to imports and external financing.
Spike Rapid rise at least once in the period	Minimal / cosmetic changes in governance but greater budgetary and external margins: short-term management dictated by the intensity or the relaxation of oil revenue constraints	More dichotomous changes in governance, with control facilitated by oil revenues: clear improvement for the private sector but protection of the public sector, less fiscal reforms, trade openness and FDI, but less need for recourse to external debt.

Sources : TAC ECONOMICS

2. Measuring and assessing country-risk: uncertainties & risk, and impact on methods

Scenario construction: illustration with a research conducted on Algeria

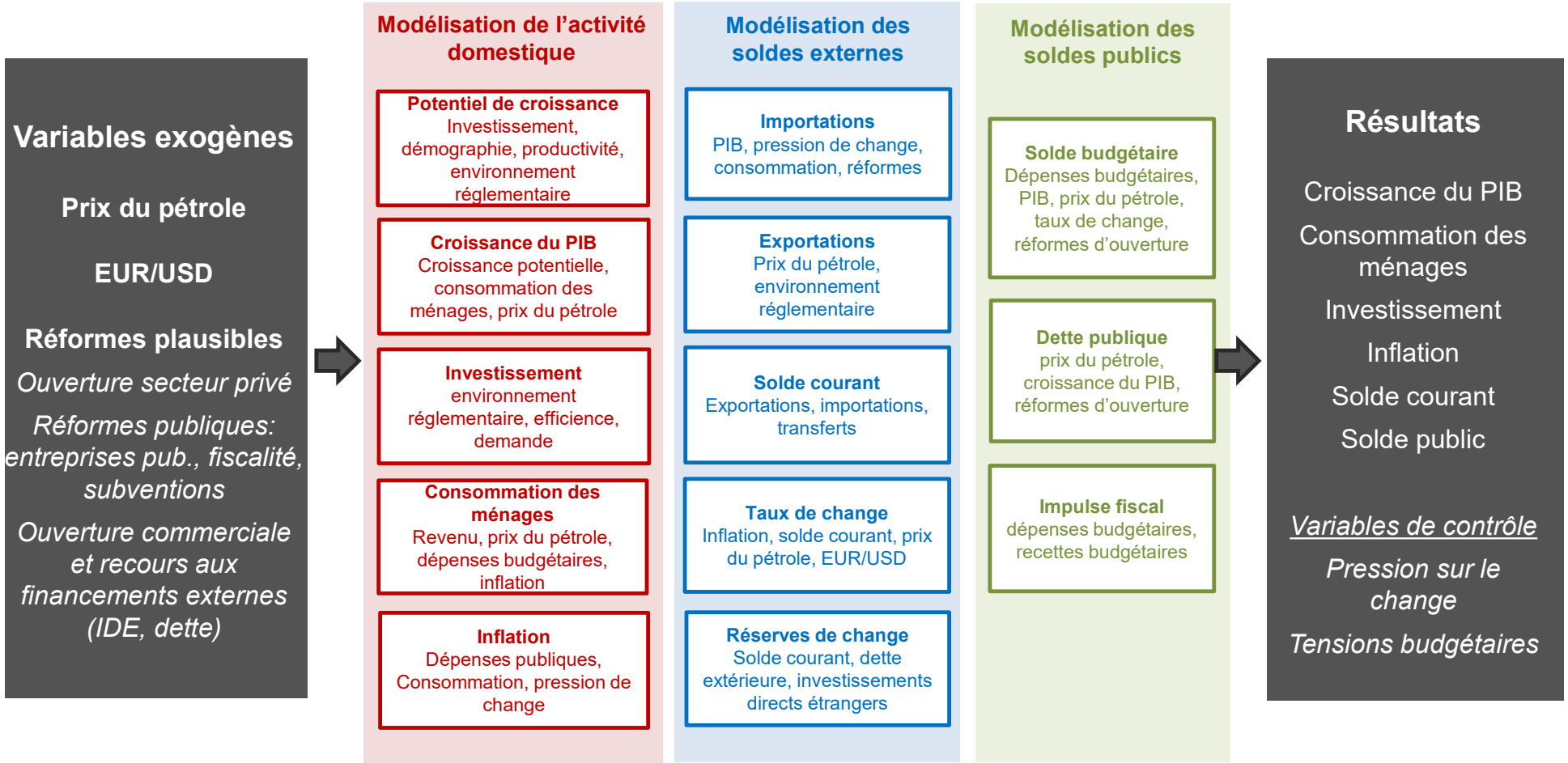
	A Minima	*Ambition with Control*
Base		
Spike		

Réformes / Pétrole	*A Minima*	*Ambition with Control*
Base	**Minotaure**	**Séisme**
Spike	**Chimères**	**Paix**

Sources : TAC ECONOMICS

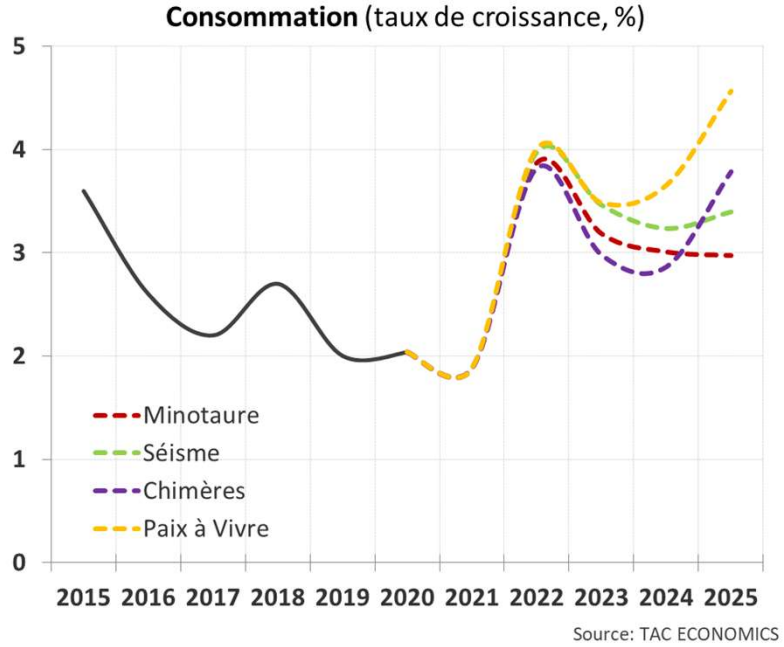
2. Measuring and assessing country-risk: uncertainties & risk, and impact on methods

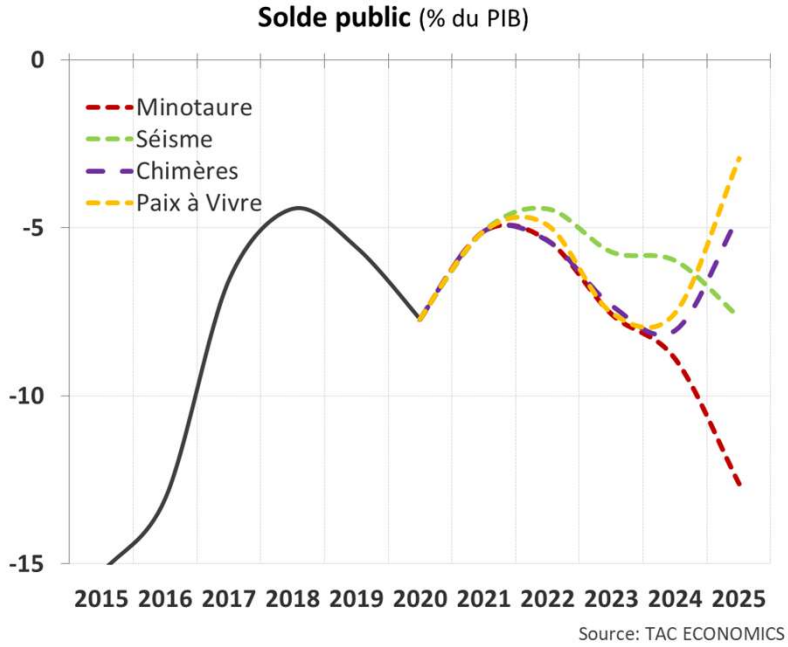
Scenario construction: illustration with a research conducted on Algeria



Source : TAC ECONOMICS

Scenario construction: illustration with a research conducted on Algeria





Scenario construction: illustration with a research conducted on Algeria

A couple of important *Anchor Points*:

- GDP growth through 2025 faster than in past years, with a stronger role of the private sector encouraged by improving regulatory quality (starting from a very poor starting point).
- Domestic consumption above + 3% per year (excluding inflation), a central objective to be able to manage social tensions that would make political questions insoluble.
- Public debt in continuous deterioration, above 80% of GDP in 2025, with a risk situation which then becomes very sensitive to potential growth; this also implies persistent crowding-out effects and questions about available (bank) liquidity.
- Frequent use of currency devaluation, associated with higher inflation.
- Controlled external balances allowing to keep a correct "cushion" in foreign exchange reserves, whatever the scenario.

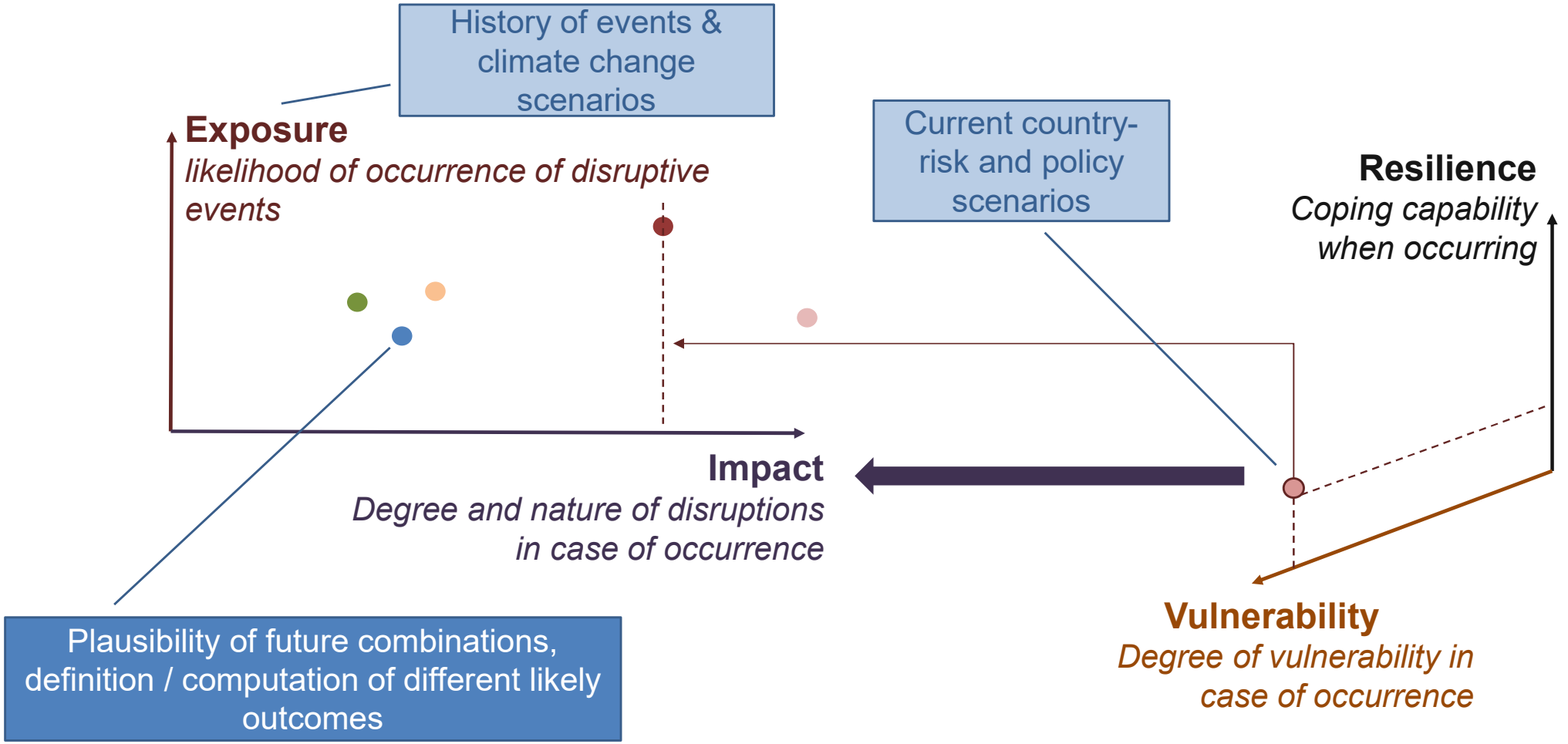
Scenario construction: illustration with a research conducted on Algeria

A couple of critical *Risk Areas*:

- Highly different GDP growth regimes:
  - → In more **ambitious reform** scenarios, the acceleration of growth is stronger, with joint dynamics on supply (private sector, relative external openness), on demand and on productivity. Improving growth potential makes it possible to absorb the time lags of these dynamics on foreign trade.
  - → Conversely, the **a-minima** reform scenarios cannot allow anything other than a very slight improvement in growth potential, and the achievement of the economic objectives necessary for political stability leads to spiraling "blind-runs" in terms of policy management for growth, inflation and the exchange rate.

- Different degrees of systemic risk at the end of the period, with ***Minotaure*** scenario putting Algeria much closer to a systemic break post-2025:
  - → The combination of public debt (97% of GDP in this scenario, in 2025), fiscal deficit (13% of GDP) and inflation (10%) reduces the following dynamic to two options: uncontrolled acceleration of an inflation spiral and devaluation, or unsustainability of public debt and the need for restructuring, both creating conditions for disruption.
  - → This tipping point, compared to 2020, simply indicates that Algeria will then have consumed all that its oil rent and control model achieves, implying the plausibility of more systemic political instability as well.

Dealing with EBUs: combination of exposure to risk and impact in case of materialization



3. Key drivers of risks at country-level

→ A review of the most important drivers of difficulties / imbalances that can lead to large disruptions in development paths

→ Data, sources and metrics

Going back to the four broad origins / families of country-risk

We look at each of them in a sequential way, keeping in mind that they are heavily inter-related / interdependent, pointing partly to focus "weakest point".

- **Economic & Financial Risks** (activity, inflation, currency, banking system, sovereign problems…)
- **Political, Governance & Social Risks** (political and social disruptions, coup d'états, geopolitics, international relations…)
- **Environmental Risks** (climate, biodiversity, industrial pollution…)
- **Transmission Risks** (exogenous shock, e.g. problems in your neighbor country, collapse of major trade flows, US monetary policies, pandemics)

Two sets of inter-related questions for economic and financial factors

Economic and financial drivers of country-risk disruptions can be looked at with two different angles:

1. Is the country able to develop ?

- A structural inability to engineer / deliver improvement in standard of living and better prospects creates underlying tensions that accumulate over time and usually create conditions for sudden breaks.
- A first step in risk-assessment is therefore to check the situation for structural development.

2. Is the development balanced ?

- Here we focus on the characteristics of development and the likelihood of sudden breaks because of deepening / unchecked economic and financial imbalances

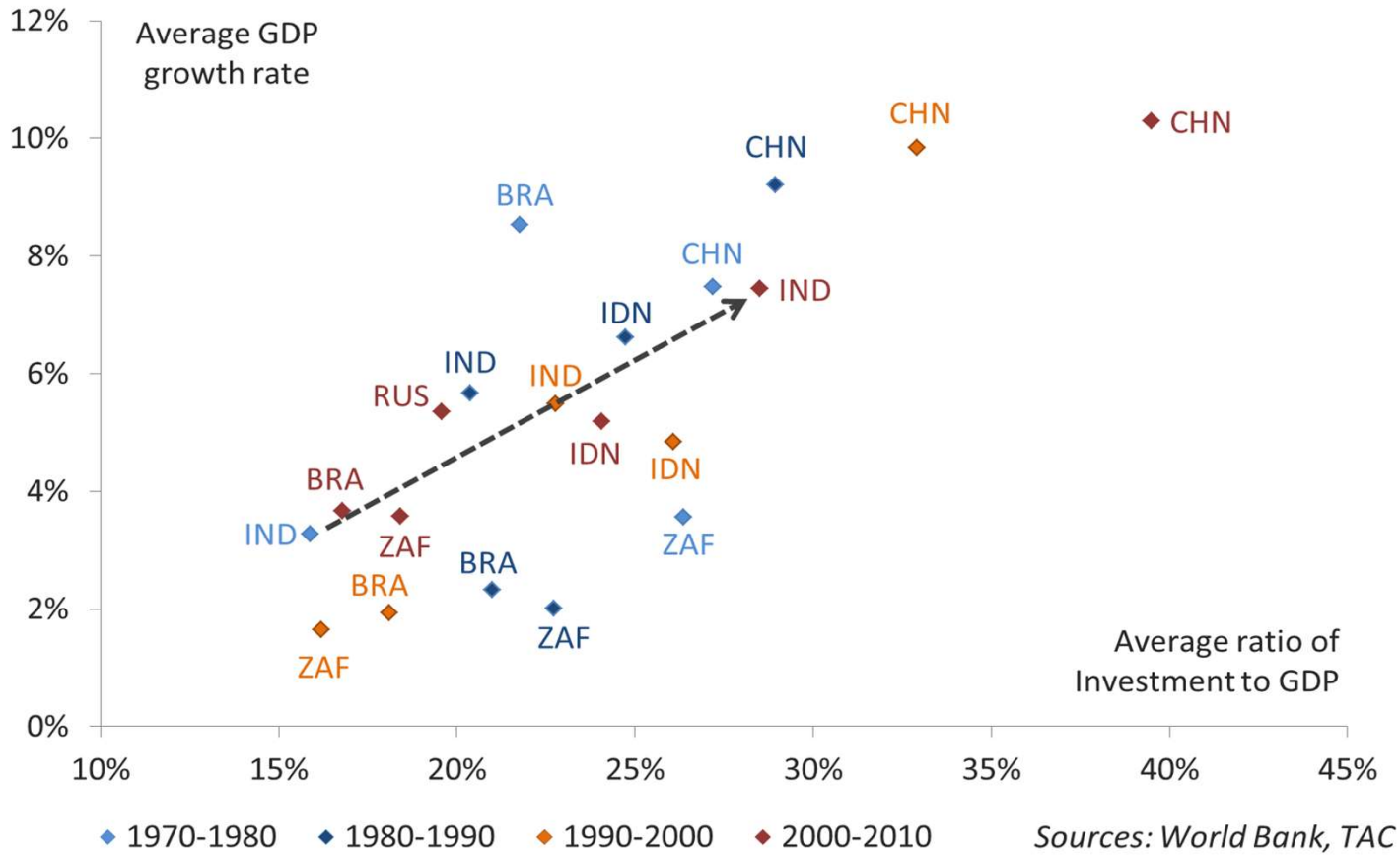
Fundamentals for long-term development

Simplification: a standard Cobb-Douglas production function allows the estimation of the relationship between real GDP growth (LT trends) as the output (Y), and capital (K), labor (L), and total factor productivity (A) as the inputs

$$Y=AK^{\alpha} L^{(1-\alpha)}$$

1. **Investment or accumulation of "physical and technical capital"**
   - Relations with savings, and with external balances
   - Relation with resource / energy consumption
2. **Demography and "human capital"**
   - Age structure and dynamics, health issues
   - Skills and training / education
3. **Productivity**
   - Much harder to describe / measure adequately
   - Related to broader governance factors as well as skills, investment and innovation

Fundamentals for long-term development: investment



Fundamentals for long-term development: investment

Investment or capital accumulation:

- Need to "fund" or finance (equipment, plant, etc.) before the production from the investment can be monetized.
- Funding is either from previously accumulated surpluses ("own savings") or from borrowed money (others' savings).
- If total domestic saving is not enough for total domestic investment, economic agents need to find external funding.
- External funding is a counterpart of export / import balance.

demand and supply balance

$$Y + M = C + I + G + X$$

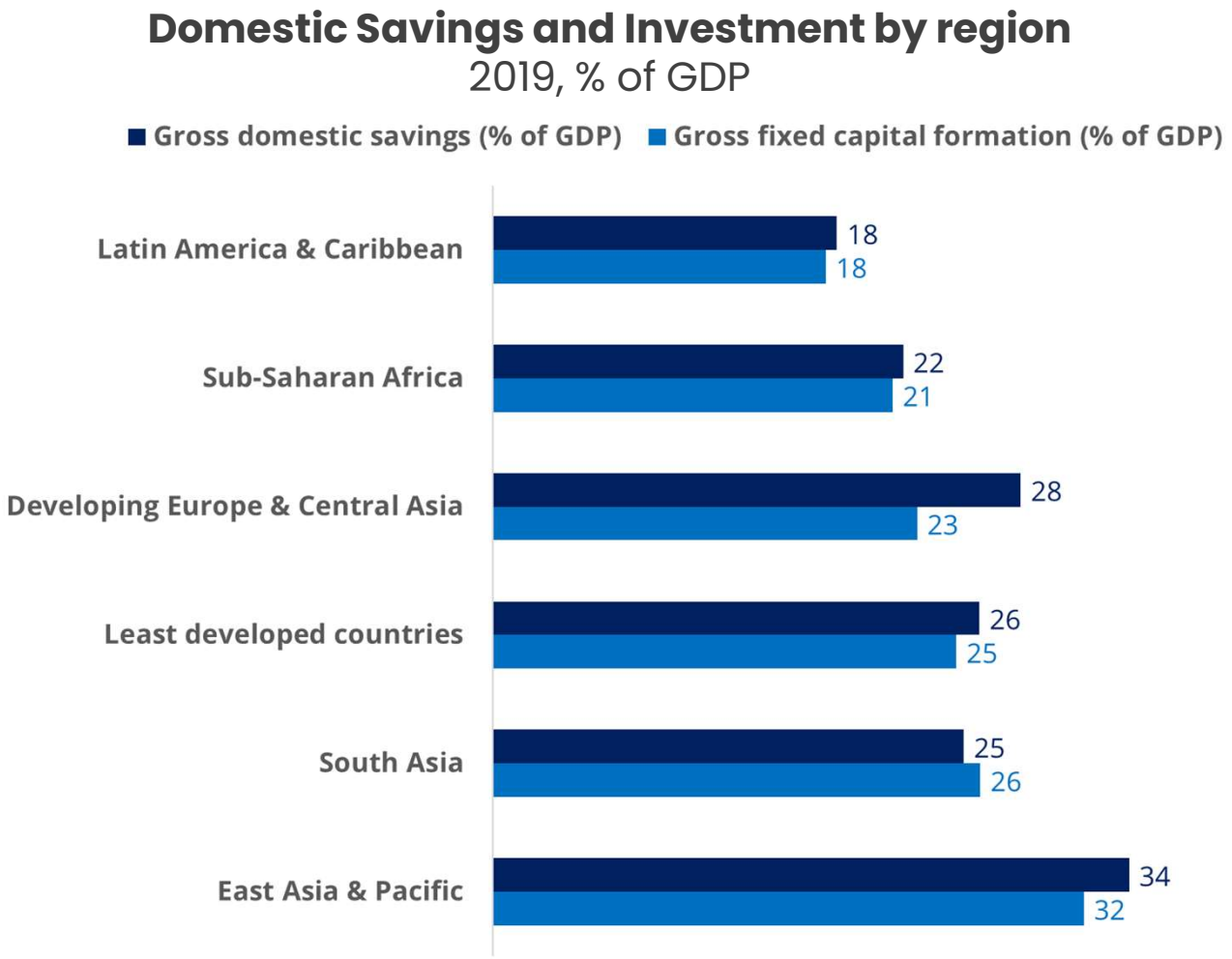
Income repartition

$$Y = W + P + T$$

Investment, saving and external balances

$$[(W - C) + P + (T - G)] - I = X - M$$

Fundamentals for long-term development: investment

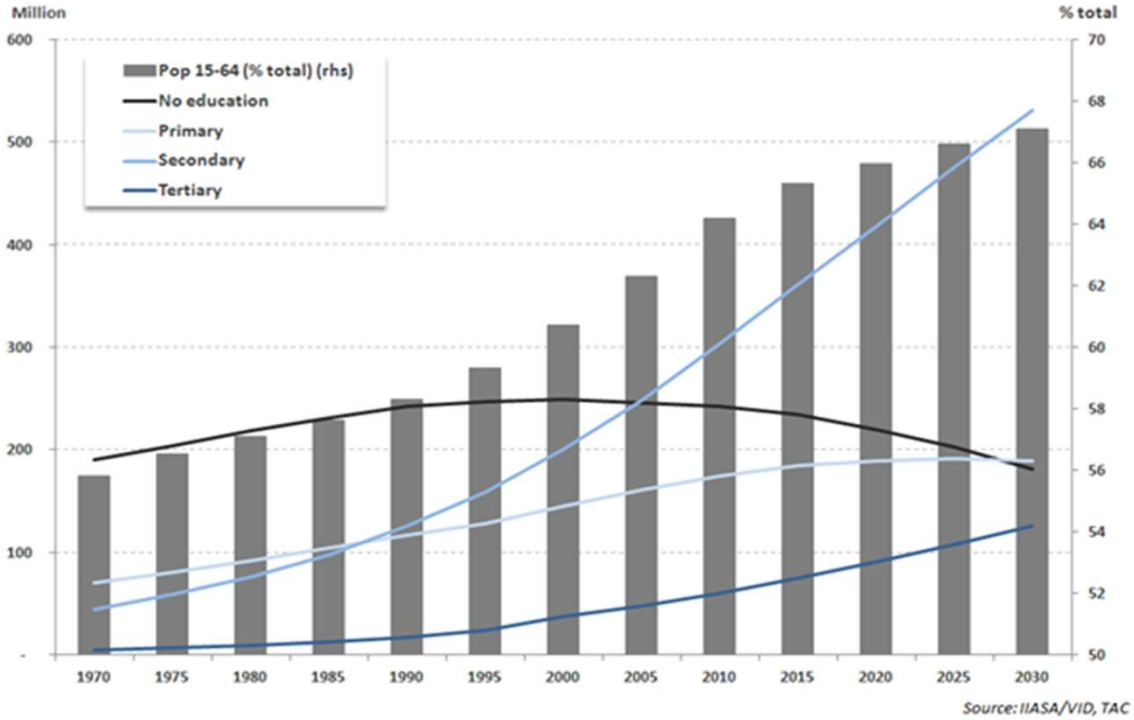


Fundamentals for long-term development: demographics

Demographics:

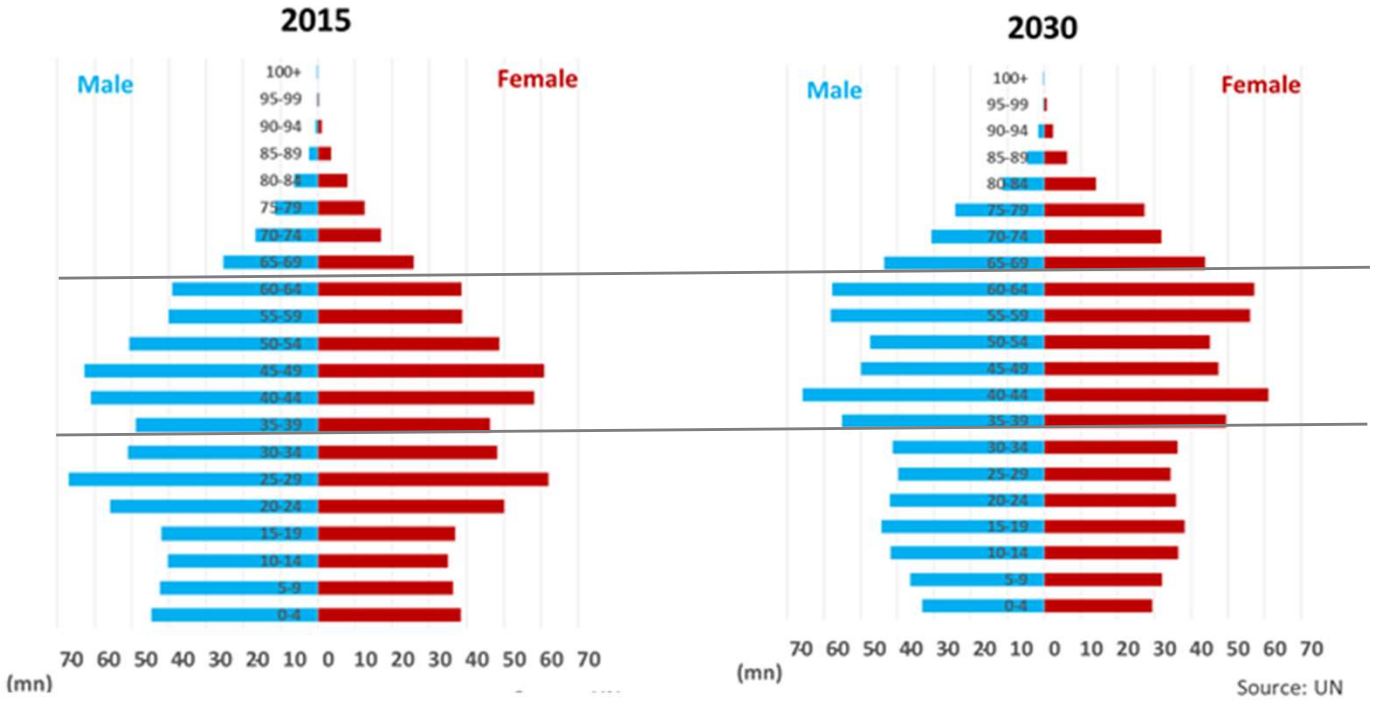
- Critical role of 15-64 age bracket: rationale from a macro as well as micro / household perspective
- Shapes of age pyramids: implications for long-term developmental issues, including public finance
- Key element for productivity growth related to education and skills

Age structure and education levels in India



Fundamentals for long-term development: demographics

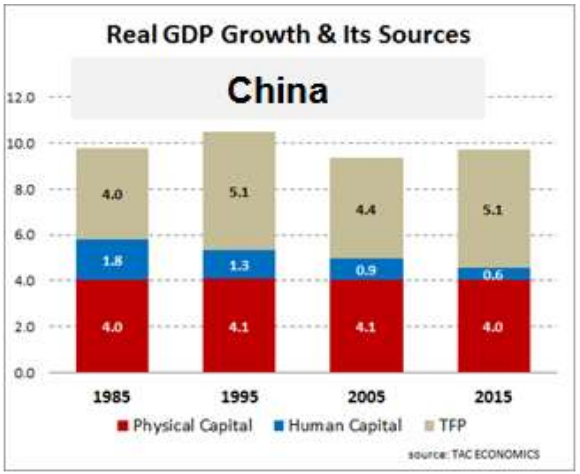
China – Population pyramids, 2015 and 2030

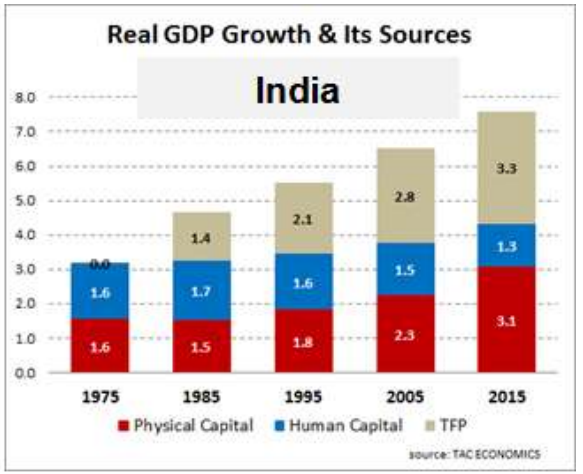


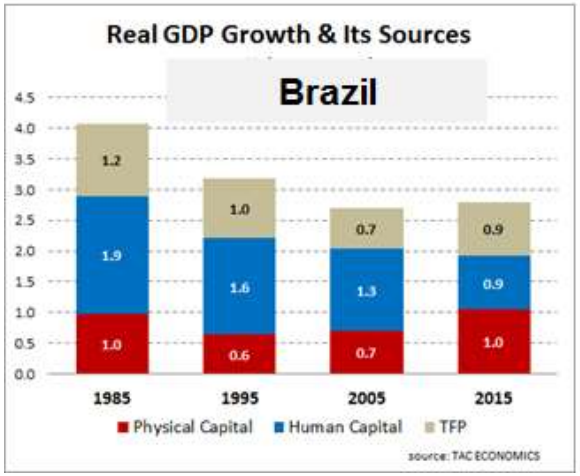
Fundamentals for long-term development: productivity

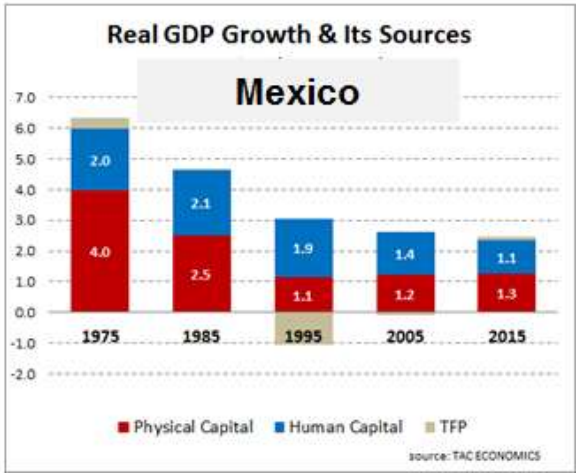
- Productivity is the amount of output per unit of input (labor, capital, natural resources); an increase in productivity is a better use of overall resources.
- TFP (total factor productivity) has strong relation with skills, governance, institutional and business environment;
- Major "development losses" related to corruption (with highly different forms of corruption).
- Convergence is not a mechanic trend for developing countries
- Technology catch-up

Fundamentals for long-term development: illustrations









Fundamentals for long-term development: Key debates and issues

Current debates on LT development and sustainability have much in common with tectonic changes affecting the world today.

→ The link between development and international integration

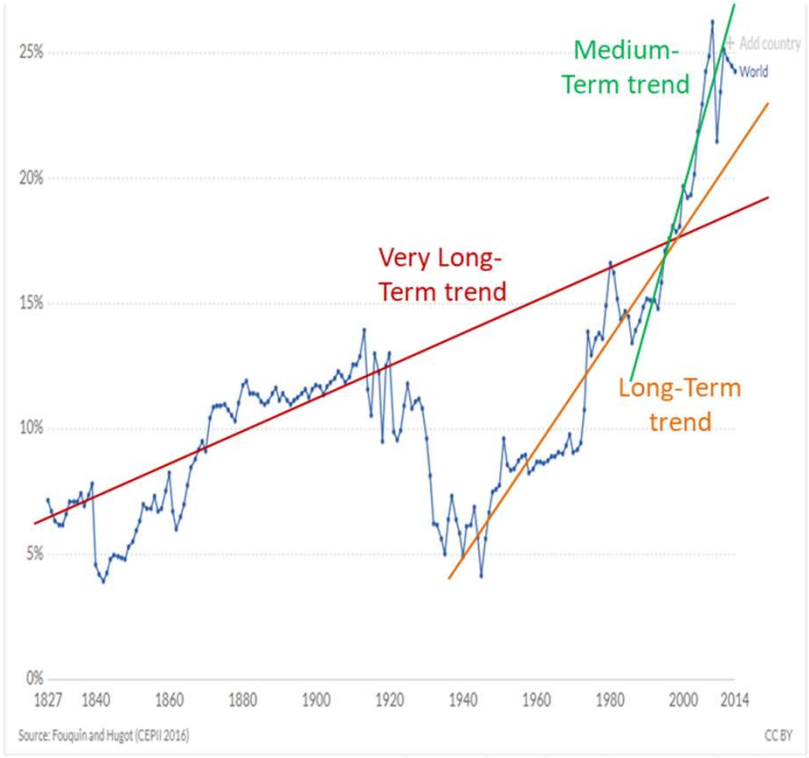
→ The issue of income distribution and income or wealth inequalities

→ The cost of adaptation to climate change and distribution of efforts

→ Best domestic political architecture

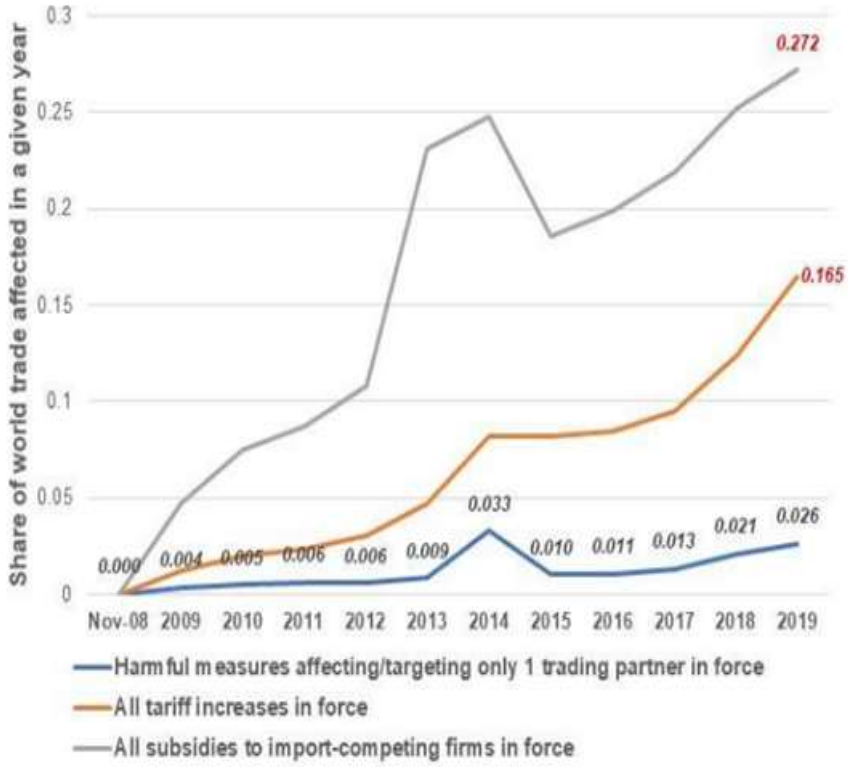
Fundamentals for long-term development: Key debates and issues

World Exports as a percentage of GDP: Long-Term Evolution



Source: TAC ECONOMICS, CPB

Restrictions started far before 2016



Fundamentals for long-term development: Key debates and issues

The issue of inequalities

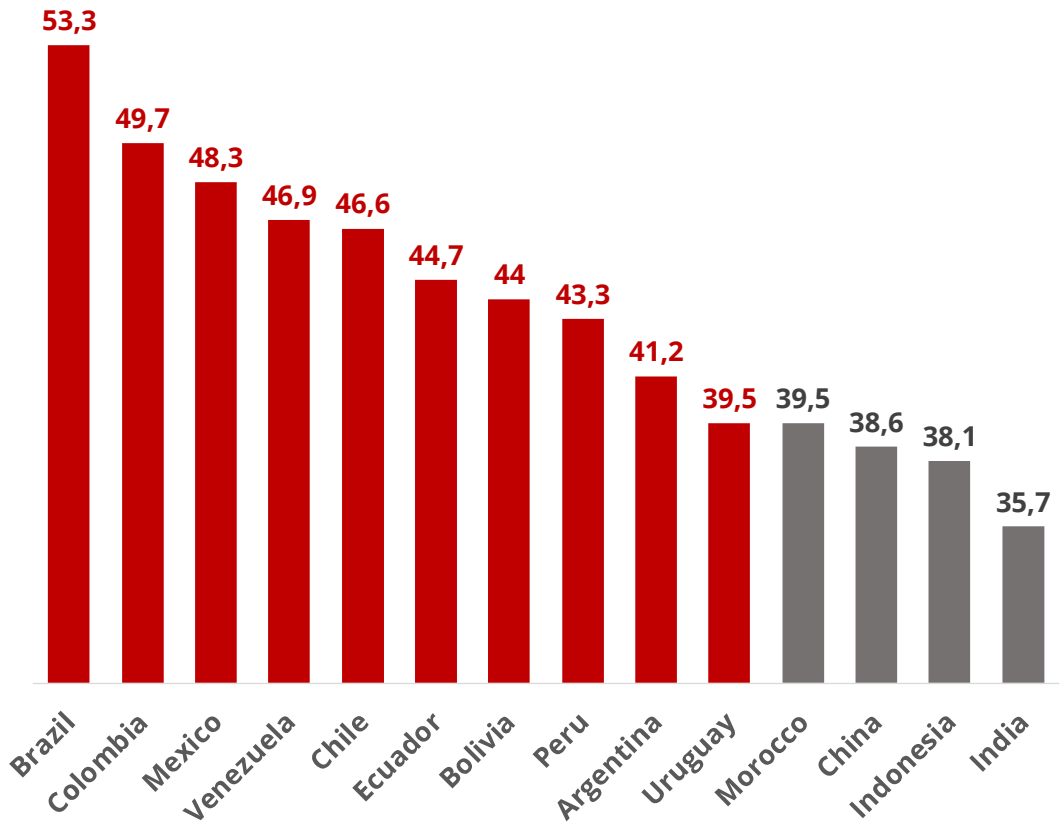
- Increasing inequalities, but measurement problems abound
- Inequalities and technology breaks
- Is it a moral or an economic issue?

Inequalities, slowdown and higher volatility in LT growth

- *Propensity to spend and to save according to income level: a high concentration of national income on a small proportion of the population reduces aggregate demand and growth, and increases excess savings*
- *Excess savings induces low interest rates, higher risk-taking in financial markets, and a further reduction in long-term growth as capital is spent on low-yielding investment. This increases the risk of financial instability.*
- *Implications for political polarization and risks of social and political shocks.*
- *Difficulties in managing complex structural transitions because of perceived absence of common interest.*

Fundamentals for long-term development: Key debates and issues

Gini index of household income inequality by country, 2018 or latest estimate



Fundamentals for long-term development: Key debates and issues

Political architecture and cultural factors

- Market equilibrium or public regulation
- Long-term views, market mechanisms and political direction: debate on democracy, risk and characteristics of populism
- Cultural factors: an example through the question of savings

Economic & Financial imbalances: types of economic and financial shocks

What are the types of imbalance that we would need to check for assessing the risks of macroeconomic shocks and volatility that derail the normal functioning of the country, i.e. crises related to or characterized by…

- → Exchange rate crisis, hyperinflation
- → Brutal reversal in economic activity, jump in unemployment and poverty
- → Systemic banking crisis, collapse in financial markets, contagion
- → Sovereign default, fiscal balance and funding, links to banking and external sectors

Complex interdependence between domestic cyclical / development paths, global trends and policy choices

Economic & Financial imbalances: drivers of shocks

Economic growth

→ GDP growth (average LT, volatility, reliance on consulmoption versus investment versus international trade)

External balances, international financing, external debt

→ Total trade/GDP, concentration or diversification by partners and products vulnerability

→ Trade and current account balances

→ Capital / funding flows (FDI, debt, portfolio capital, own reserves in Fx)

→ External debt (total, ST/MT, by type of creditors), external debt service (% exports or reserves)

Economic & Financial imbalances: drivers of shocks

- Exports / Imports
  - Goods
  - Services
- Income on assets / payments on liabilities
- Unrequited transfers (e.g. workers' remittances)

Current Account Balance

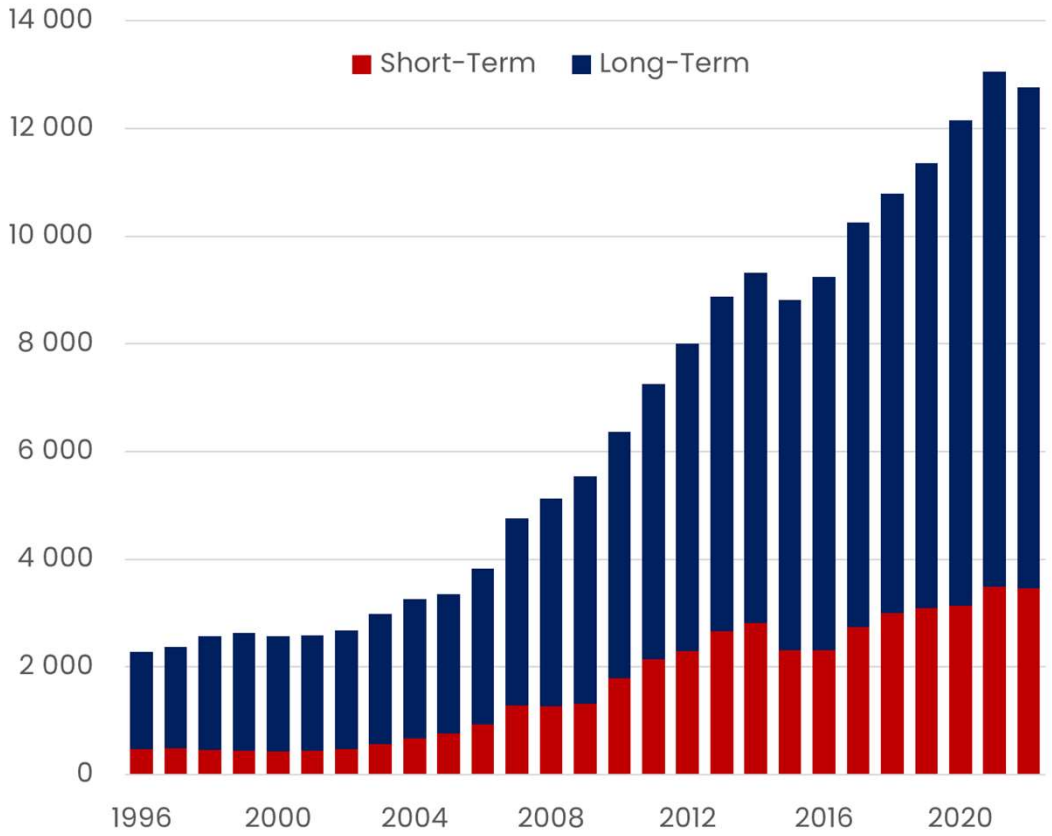
- Non-debt creating flows (FDI, Equity purchase)
- Debt (banks, securities, inter-company)
- Errors & omissions (capital flight)

Capital account Balance

- Changes in official foreign currency reserves

Economic & Financial imbalances: drivers of shocks

External Debt of Emerging Markets and Developing Economies (EMDE)
Total for 100 countries in bn$



Economic & Financial imbalances: drivers of shocks

Economic, fiscal and monetary policies, exchange rates, foreign currency reserves

- → Inflation, interest rates (policy, market), monetary aggregates (M2, M3)
- → Fiscal policies : cf. the specific angle of Sovereign Risk
- → XR (stability, volatility, trend, competitiveness), FX reserves (%M2, %imports), FX borrowing requirements (%reserves)

Banking system, financial markets

- → Overall credit leverage, role of banks vs markets
- → Volatility of domestic capital markets, role in international arbitrage

Economic & Financial imbalances: drivers of shocks

Sovereign risk – Core focus of financial investors

- → Sovereign risk is usually defined as the risk of the State being unable or unwilling to meet its debt servicing obligation (LC and / or FX)
- → Countries with more developed domestic financial markets can raise debt in LC but constraints are acute for poorer countries, which have limited capabilities to raise domestic resources (low saving, weak institutions, confidence issues…) and cannot tap foreign savings by issuing in their own local currency (original sin).
- → Sovereign risk is also the risk of a government not being able to function properly (inability to pay for required spending, inability to exert political control…), but materialization of such risks is most often associated with sovereign default on its debt.
- → Key factors or drivers of risk are therefore related to political factors, to ability to service its debt and on macro-linkages from overall situation to these factors.

Economic & Financial imbalances: drivers of shocks

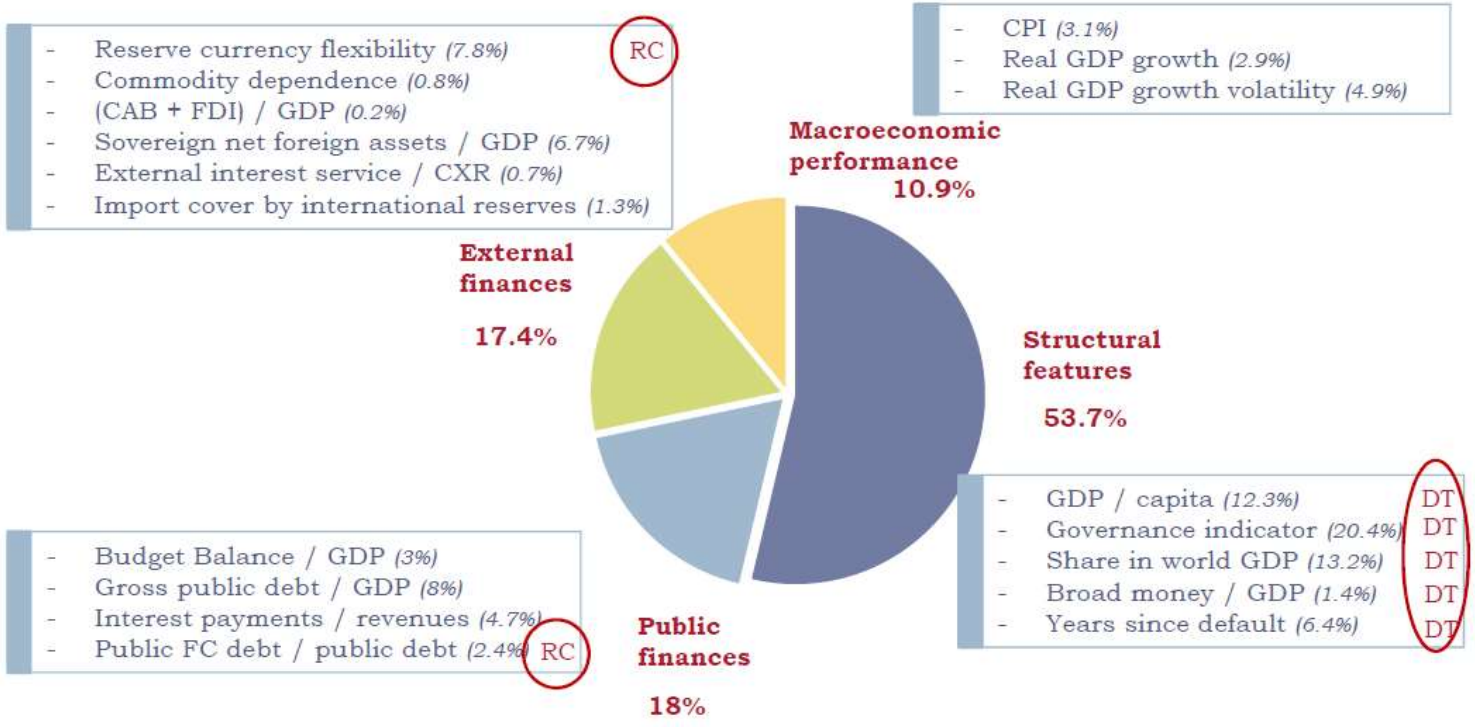
Sovereign risk – The specific variables or indicators to be looked at for assessing sovereign's debt servicing capabilities include…

- → budget balance (%GDP, primary balance) and structure (spending / income in %GDP, share of investment, share of social spending)
- → budget finance and public debt (debt/GDP, FX debt, maturity, types of creditors or instruments)
- → Measures of sustainability, using the existing level of debt, primary balance, GDP growth and real interest rates

The three dominant international rating agencies (Standard & Poor's, Moody's, Fitch) concentrate on sovereign risk (technically: debt-issuer's risk).

Economic & Financial imbalances: drivers of shocks

Sovereign risk – illustration with Fitch methodology

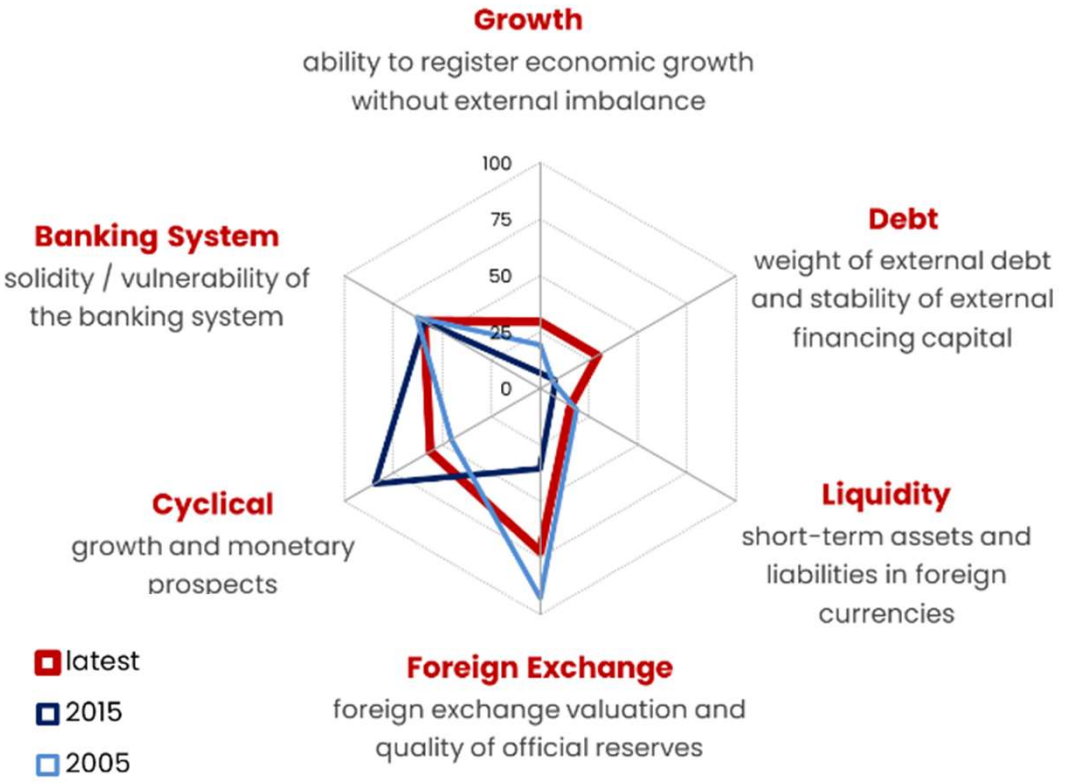


CAB = Current Account Balance *FDI = Foreign Direct Investment* *CXR= Current Account Receipts*

RC = Reserve Currency DT = Debt Tolerance

Economic & Financial imbalances: illustration with RiskMonitor

Economic & Financial Risk Scores on Fundamental Balances for China
From 0 (lowest risk) to 100 (highest risk)



Questions / measures are harder for political, social and governance risks

Political and geopolitical risks on the rise

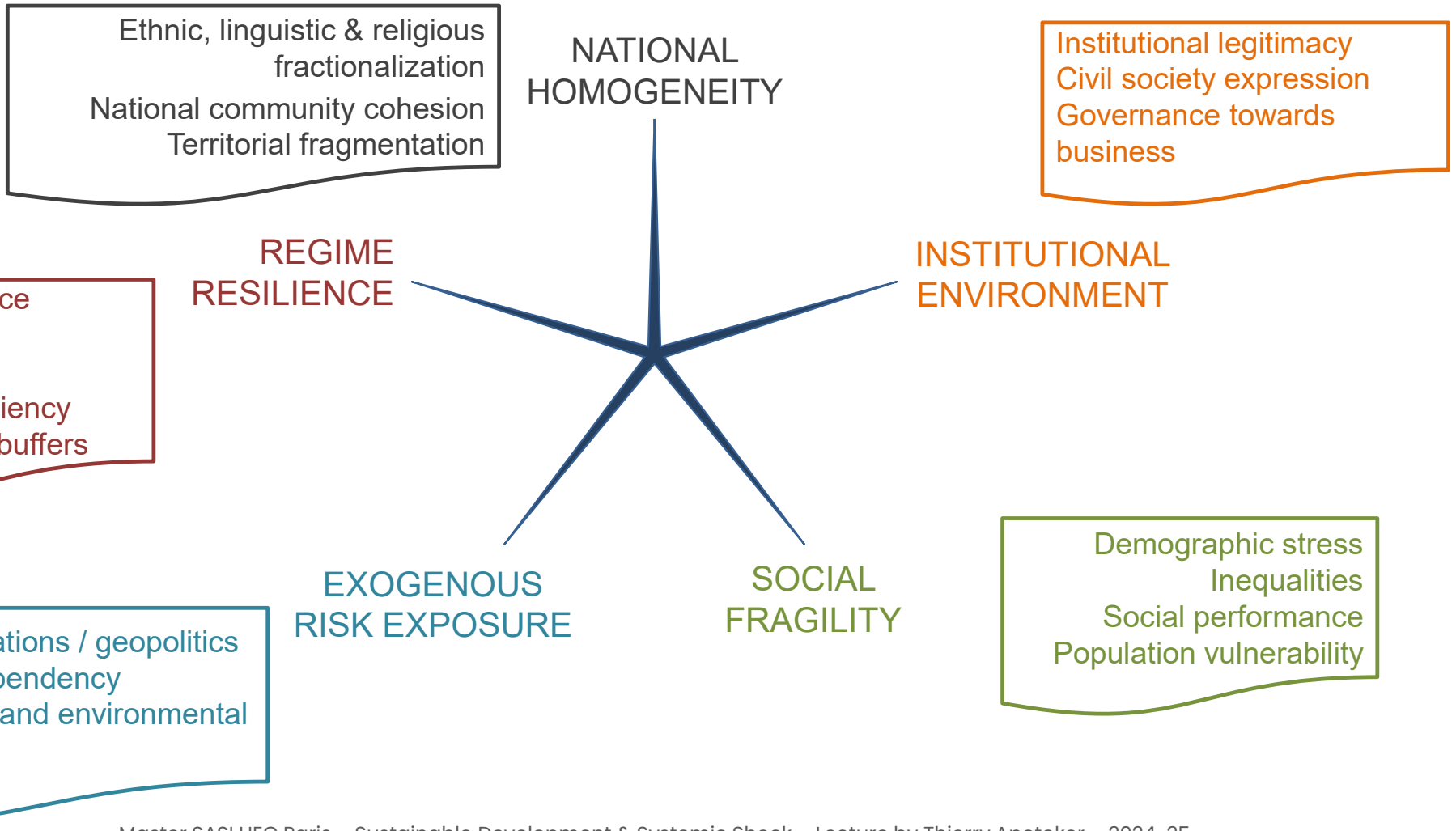
- → ST political noises, amplification by social media, non-linearity
- → Political cycles, timed by elections or structural features
- → International order and relations, geopolitics
- → Long-term integration and disintegration phases
- → Impact of exogenous: environment, pandemics, transmission from neighbors or allies, impact of technology and demography

Country features / history are critical in the diagnostic

- → Ideally, we should use a taxonomy of political regimes and identify the specific triggers for political instability in each type of political regime

3. Key drivers of risks at country-level – Political & Governance Risks

Taxonomy of political regimes: work in progress…



Complexity for timing: what are the triggers of political disruptions

Next step: key factors or triggers of political shocks

- → Governance, efficiency of policy makers
- → Political regime and institutional setting (successions, elections, check & balances)
- → Unemployment, social tensions / wages / working conditions, income distribution
- → Safety nets, access to basic public services
- → Ethnic / religious tensions
- → International support, geo-strategy

A simpler approach using World Bank's KKZ indicators

Six indicators provided annually by the World Bank (KKZ method*), an incomplete though comprehensive assessment of overall political and social situations.

- → Voice and accountability
- → Political stability
- → Government effectiveness
- → Regulatory quality
- → Rule of law
- → Control of corruption

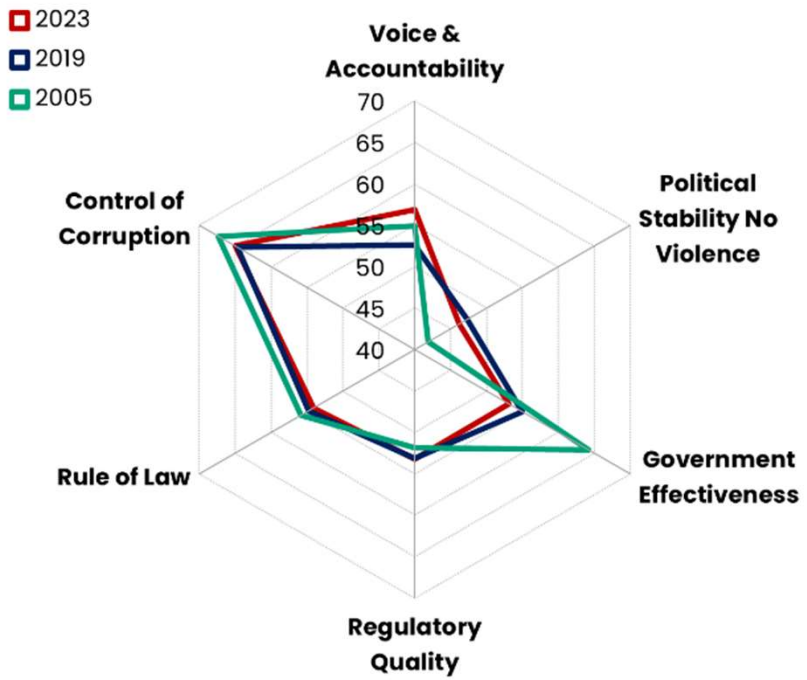
*: Acronym for names of three analysts at the World Bank Institute: Kaufmann, Kraay and Zoibo-Lobaton

A simpler approach using World Bank's KKZ indicators: illustration

Average values for components of aggregate Political & Governance Risk ratings, 2005, 2019 and 2023

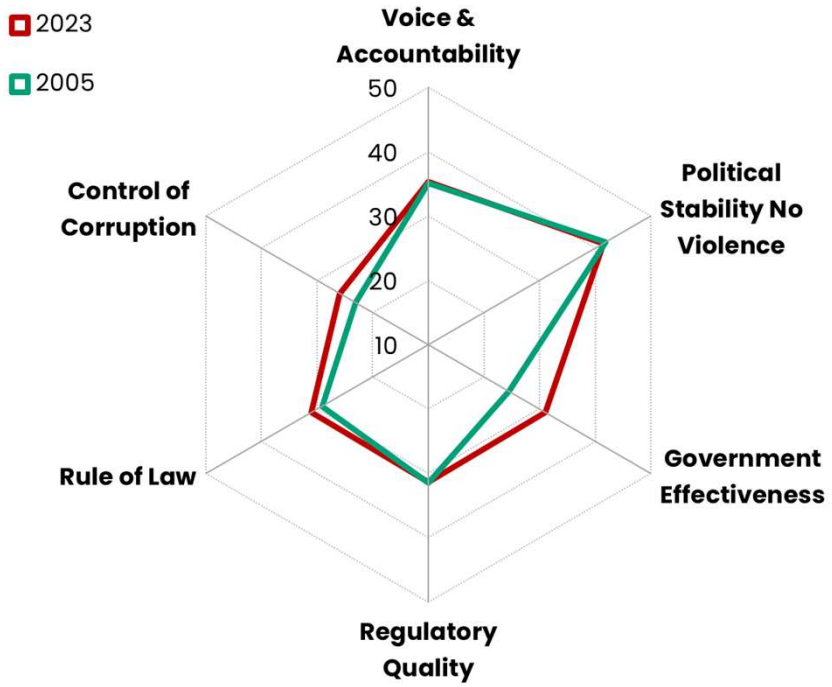
Unweighted averages

From 0 (lowest risk) to 100 (highest risk)



Dispersion of components of aggregate Political & Governance Risk ratings, 2005 and 2023

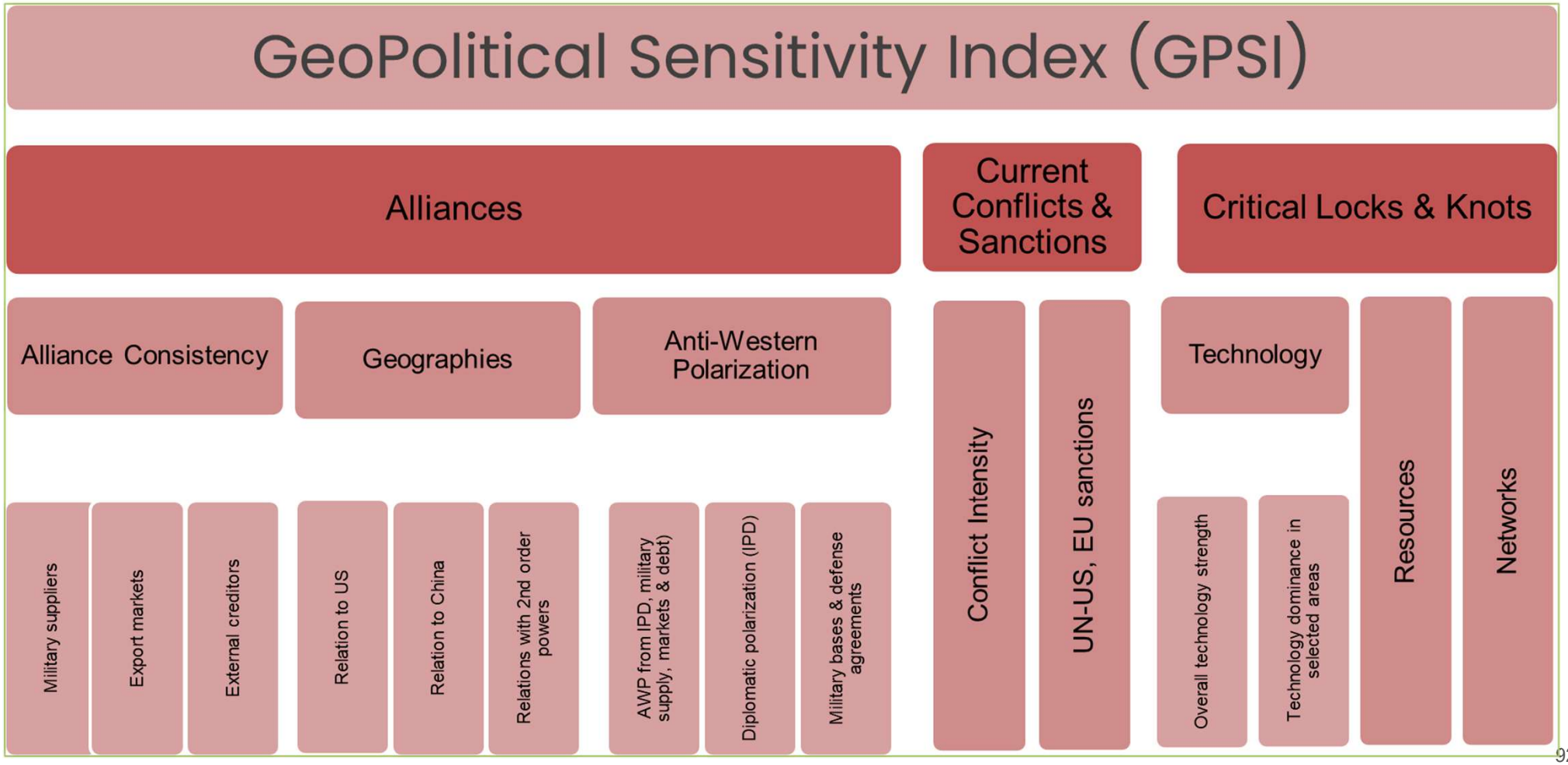
Standard deviations as % of average values



Source: TAC ECONOMICS Datalab

3. Key drivers of risks at country-level – Political & Governance Risks

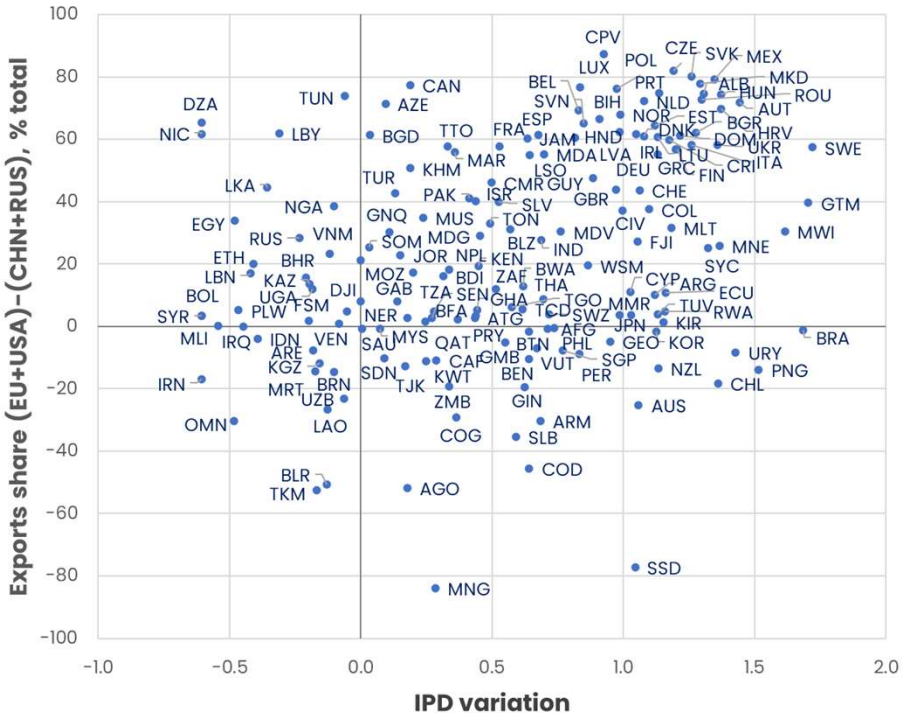
Trying to crunch the numbers for geopolitics – GPSI from TAC ECONOMICS

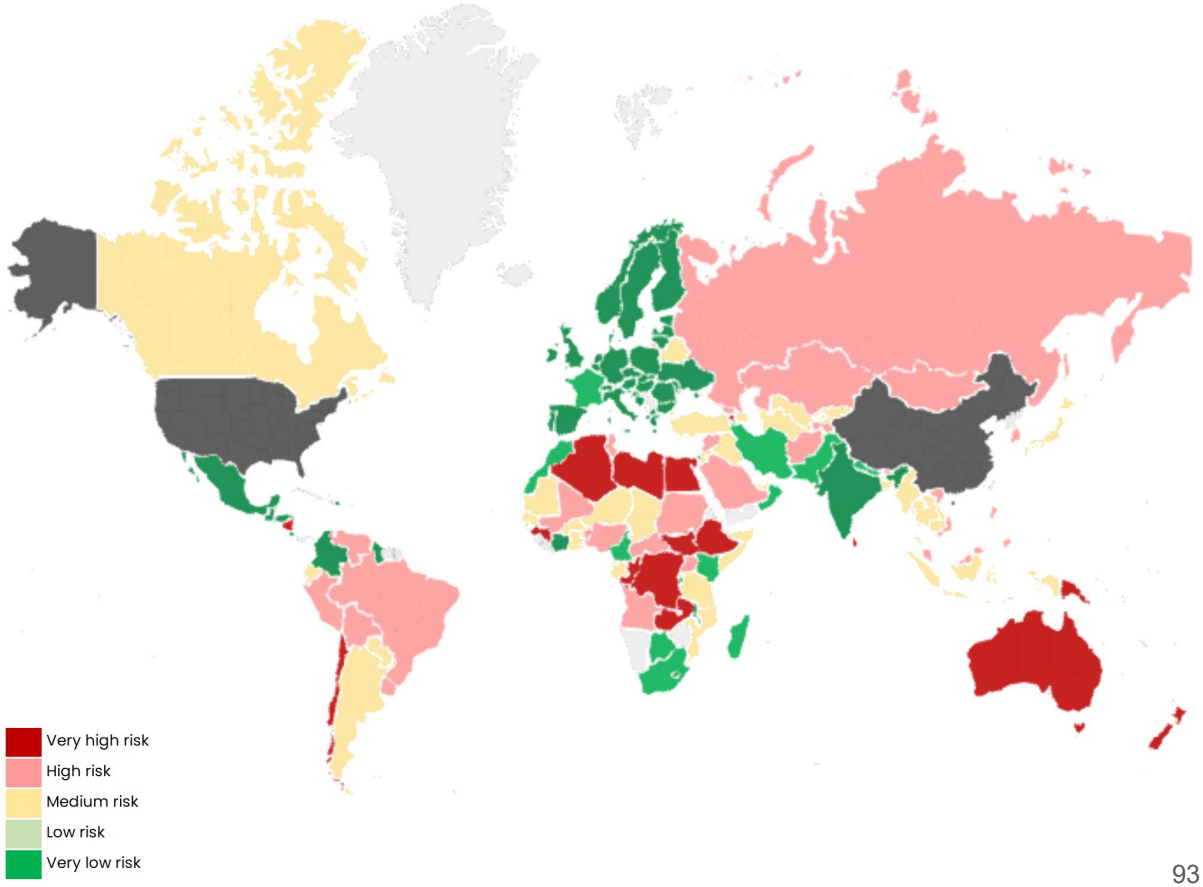


3. Key drivers of risks at country-level – Political & Governance Risks

Trying to crunch the numbers for geopolitics – GPSI from TAC ECONOMICS

Alliance Consistency-Exports





3. Key drivers of risks at country-level – Political & Governance Risks

A short-term alert based on text-mining techniques: social unrest

IMF Working Paper

Measuring Social Unrest Using Media Reports

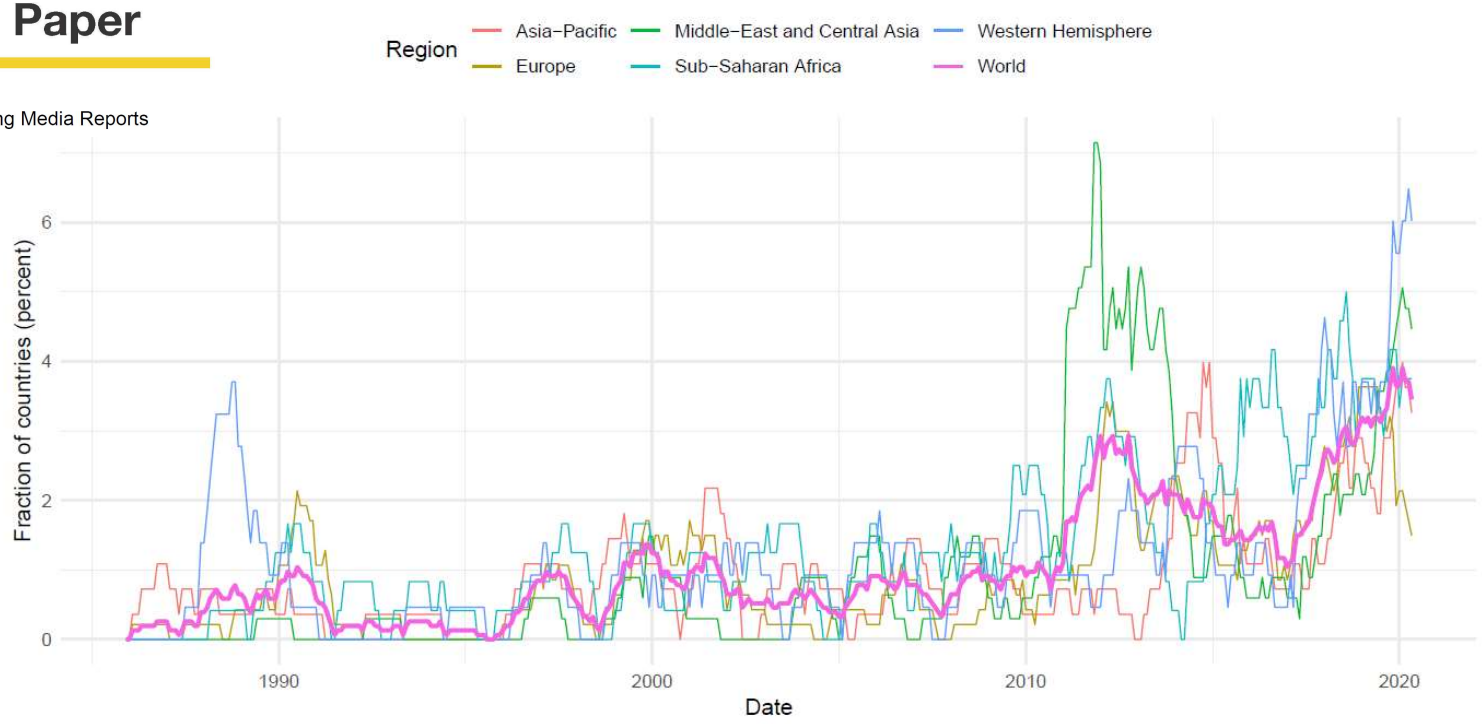
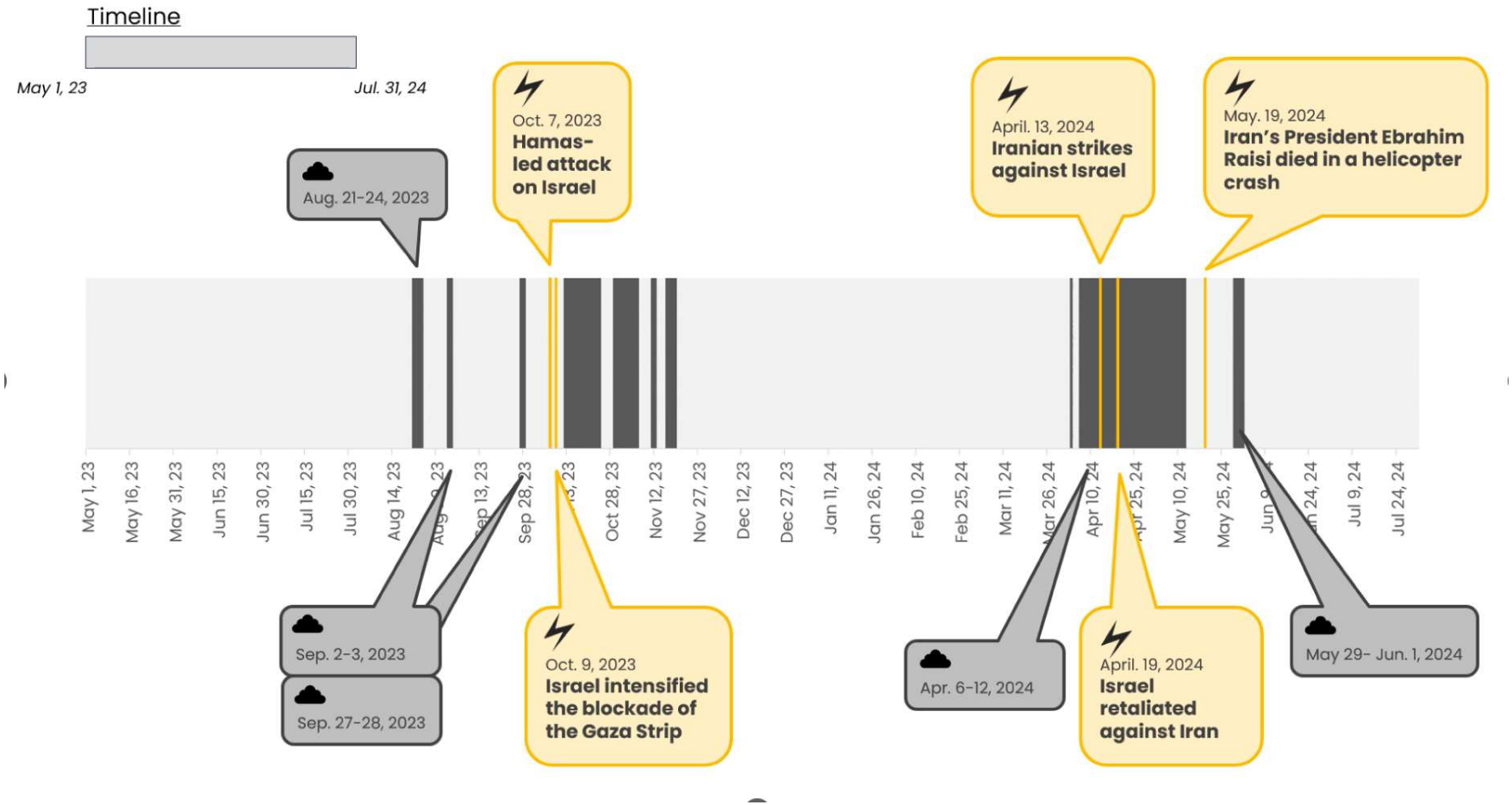


Figure 4: Fraction of countries with social unrest events, 12 month moving average

3. Key drivers of risks at country-level – Political & Governance Risks

A similar approach developed for geopolitical disruptions: Israel / Iran



Environmental risks encompass a large range of diverse drivers

Large range of environmentally-driven sources of country disruptions

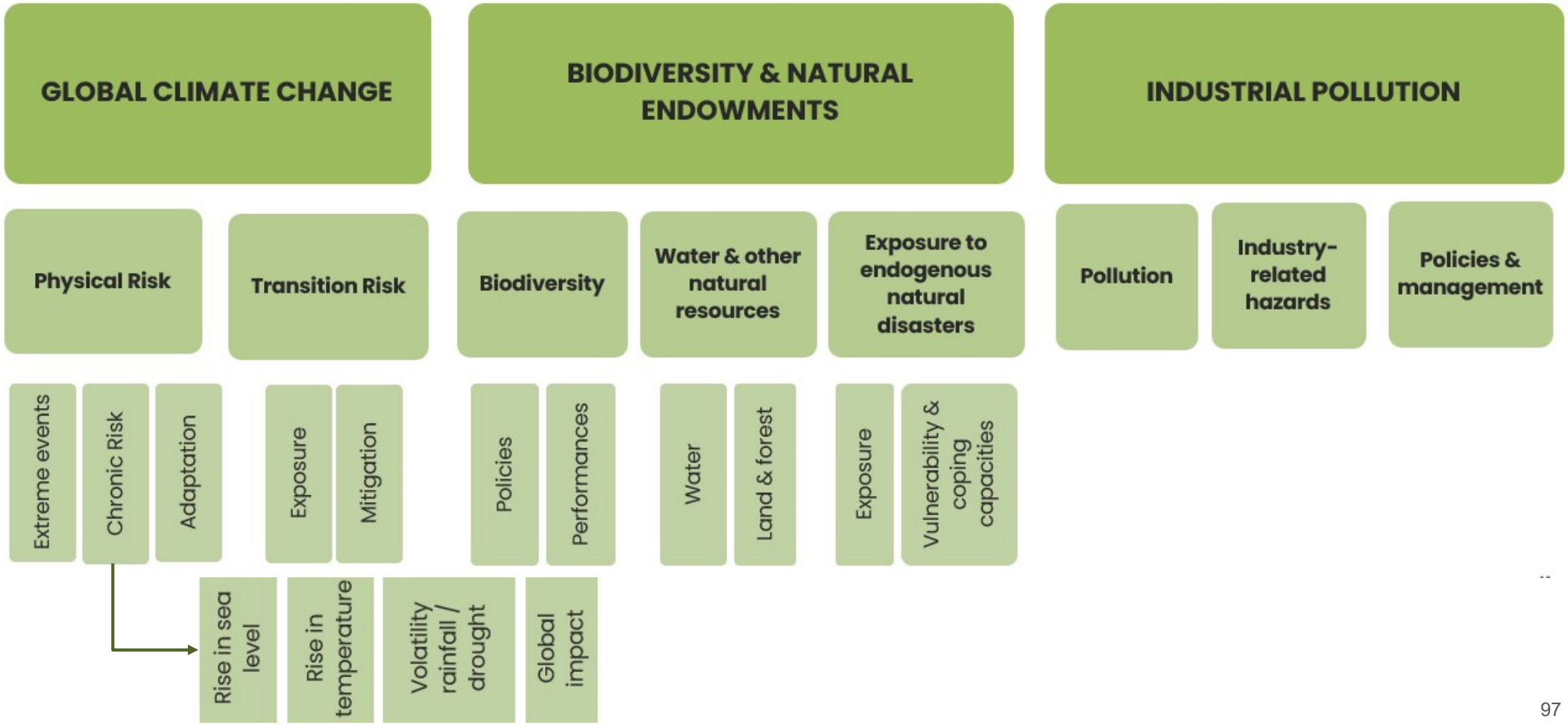
- → Trends in, and sensitivity to, global changes (climate, water scarcity, extreme events, biodiversity) and ability to influence or/and adapt
- → Risks derived from industrial / agricultural activities
- → Commitments and reputational risk, and implications for international relations
- → Major difference between chronic and extreme risks

For a large part of such disruptive risks, events are expected but unpredictable, hence the focus on awareness, resilience capabilities and adaptability

They are highly interconnected with political and economic risks

3. Key drivers of risks at country-level – Environmental Risks

Assessment of environmental risks through a "Russian Doll" construction



3. Key drivers of risks at country-level – Environmental Risks

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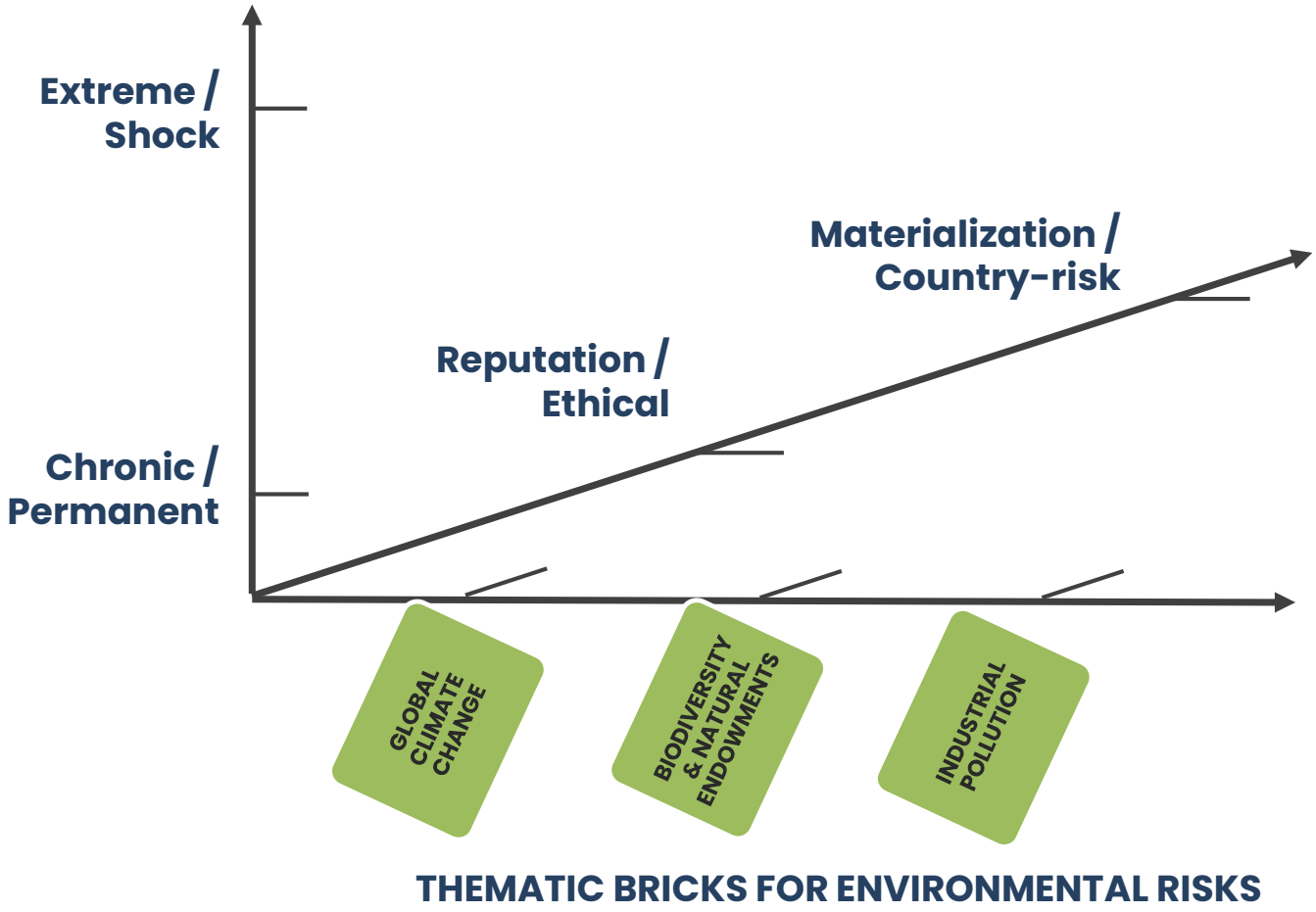


3. Key drivers of risks at country-level – Environmental Risks

Assessment of environmental risks through a "Russian Doll" construction

[Total number of indicators **/**
Rep- number of indicators relevant for Reputational Risk **/**
Mat- number of indicators relevant for materialization of Environment-related country-risk **/**
Ext- number of indicators related to extreme events**]**

ENVIRONMENTAL RISKS [163 /Rep-80/Mat-153/Ext-38]

GLOBAL CLIMATE CHANGE
[73 /Rep-24/Mat-71/Ext-19]

- **Physical Risk** [43/Rep-1/ Mat-43/Ext-19]
- **Transition Risk** [30/Rep-23/ Mat-28/Ext-0]

BIODIVERSITY & NATURAL ENDOWMENTS
[50 /Rep-30/Mat-42/Ext-9]

- **Biodiversity** [21/Rep-21/ Mat-13/Ext-0]
- **Water & other natural resources** [20/Rep-9/ Mat-20/Ext-0]
- **Exposure to endogenous natural disasters** [9/Rep-0/ Mat-9/Ext-9]

INDUSTRIAL POLLUTION
[40 /Rep-26/Mat-40/Ext-10]

- **Pollution** [14/Rep-6/ Mat-14/Ext-0]
- **Industry-related hazards** [15/Rep-13/ Mat-15/Ext-10]
- **Policies & management** [11/Rep-7/ Mat-11/Ext-0]

Assessment of environmental risks through exposure and preparedness

Notre Dame University – ND GAIN

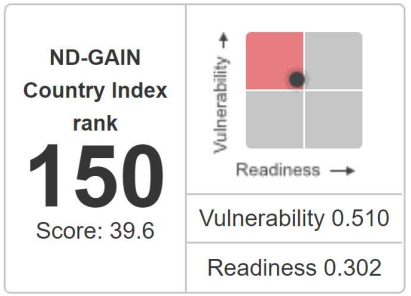
Vulnerability = Propensity to be negatively impacted by climate hazards.

- 6 life-supporting sectors:
  Food, water, health, ecosystem services, human habitat and infrastructure.
- Each represented on 3 components:
  - exposure to climate-related hazards;
  - sensitivity to impacts of the hazard
  - adaptive capacity to the impacts.

Readiness = Readiness to adapt thanks to a safe and efficient business environment:

- economic readiness,
- governance readiness,
- social readiness.

Example for Kenya



The high vulnerability score and low readiness score of **Kenya** places it in the upper-left quadrant of the ND-GAIN Matrix. It has both a great need for investment and innovations to improve readiness and a great urgency for action. Kenya is the 41st most vulnerable country and the 152nd most ready country.

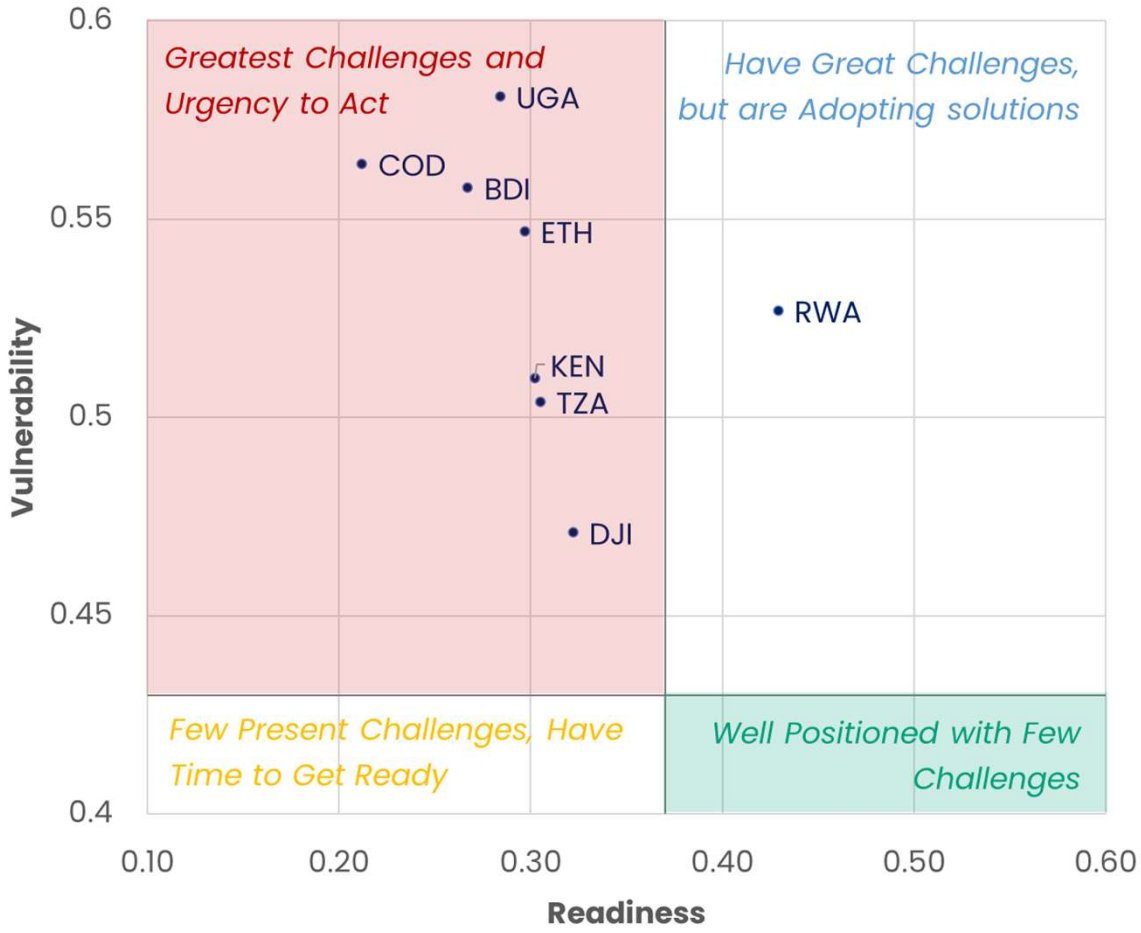
Ranking for Vulnerability

143	Samoa	Lower middle	0.507
144	Angola	Lower middle	0.510
144	Kenya	Low	0.510
146	Haiti	Low	0.514
146	Sao Tome & Principe	Low	0.514
148	Bhutan	Lower middle	0.515

3. Key drivers of risks at country-level – Environmental Risks

Assessment of environmental risks through exposure and preparedness

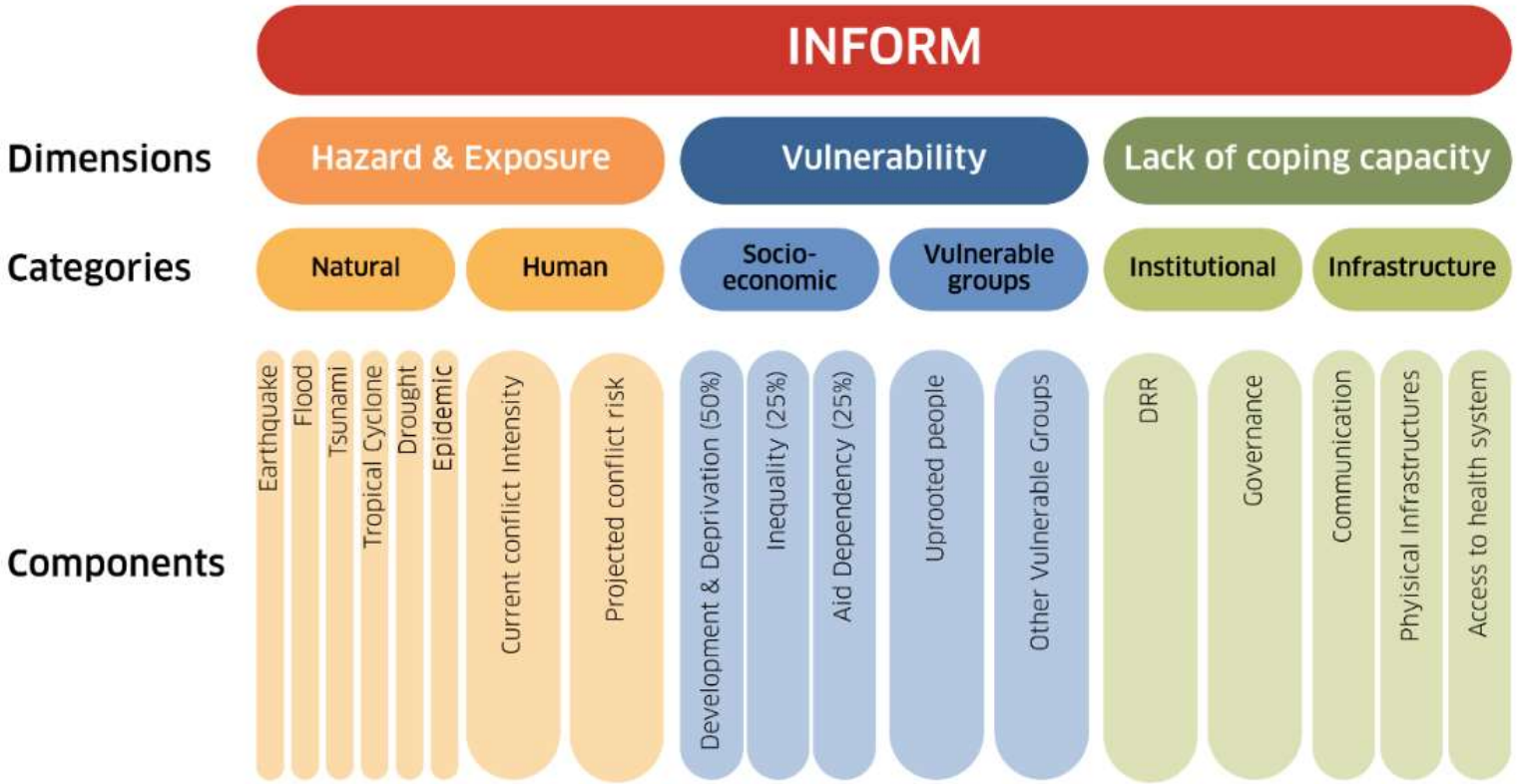
Notre Dame Global Adaptation Initiative Vulnerability *versus* Readiness Index for a sample of African countries



3. Key drivers of risks at country-level – Environmental Risks

Assessment of environmental risks through exposure and preparedness

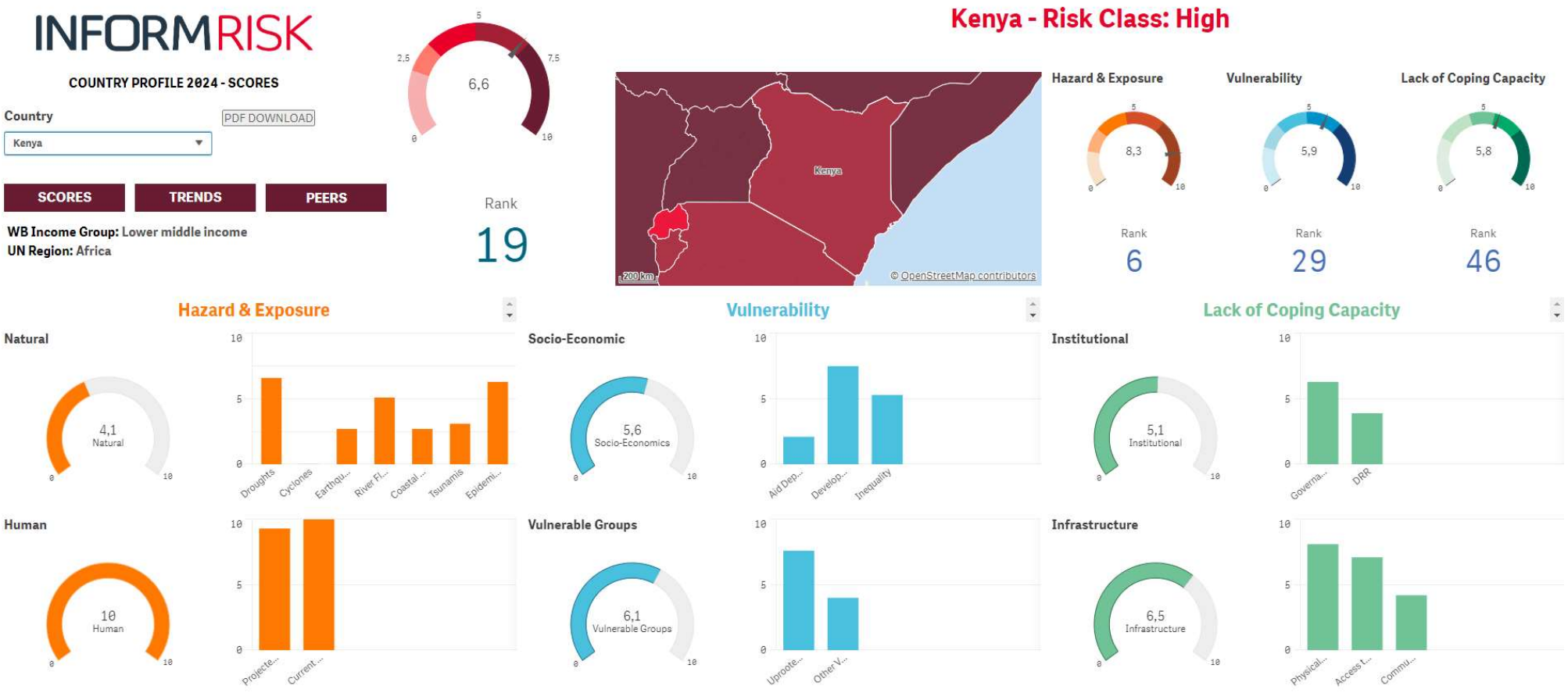
EC INFORM– DRMKC - Disaster Risk Management Knowledge Centre



3. Key drivers of risks at country-level – Environmental Risks

Assessment of environmental risks through exposure and preparedness

EC INFORM– Example for Kenya



Assessment of environmental risks: economic taxonomy

		Gradual warming	Extreme events	Transition risks
Supply shocks	**Labour supply**	Loss of hours worked due to extreme temperatures. Increased international migration.	Destruction of workplaces, need to migrate (even if temporarily).	Changes in sectoral composition of labour market could lead to higher structural unemployment.
	Food, energy and other input supply	Decline in agriculture productivity and yields.	Disruption to transport and production chains.	
	Capital stock	Diversion of resources from productive investment to adaptation capital.	Destruction due to extreme events.	Rise in stranded assets.
	Technology	Diversion of resources to reconstruction activity.	Diversion of resources to reconstruction activity.	Climate policies as a potential driver of innovation.
	Productivity	Lower labour productivity due to extreme heatwaves and lower human capital accumulation (increased health issues and mortality).	Lower capital productivity due to (possibly permanent) capital and infrastructure destruction.	Uncertain effect on productivity, as technological progress could offset underinvestment resulting from transition policies.

Source: ECB, Occasional Paper Series, Sep.2021

Assessment of environmental risks: economic taxonomy

		Gradual warming	Extreme events	Transition risks
Demand shocks	**Energy demand**	Increased demand for electricity in summer exceeds decreased demand in winter. Policy-induced shift to renewable energy reduces demand for fossil fuels.		Higher carbon tax leading to lower demand for fossil fuels.
	Investment	Change in preferences towards more sustainable goods and services.	Uncertainty about climate events could delay investment. Investment in reconstruction increases following events.	Shift in the mix of activity towards more investment (in climate mitigation technologies) Uncertainty about climate policy may reduce investment
	Consumption	Change in preferences towards more sustainable goods and services.	If no insurance of households or firms, destruction could cause a permanent decrease in wealth and affect consumption.	Increased sustainability awareness and shift toward greener consumption.
	Trade	Disruption to trade routes due to geophysical changes (such as rising sea levels).	Change in food prices and disruption to trade flows.	Taxes, regulations and restrictions could unsettle trade routes. Risks of distortion from asymmetric or unilateral climate policies.

Assessment of environmental risks: economic taxonomy

		Gradual warming	Extreme events	Transition risks
Aggregate impact on output and nominal variables	**Output**	Lower labour productivity, investment being diverted to mitigation and arable land loss.	Physical destruction (crop failures, destruction of facilities and infrastructure, disruption of supply chains).	Frictions resulting from distortive (fiscal) transition policies and/or (fiscal) transition policy uncertainty. Mitigated impact depends on the use of proceeds from (fiscal) transition policies.
	Wages	Downward pressures on wages from lower productivity.	Unequal effects across sectors and economies.	Unequal effects across sectors and economies (reallocation of workers from one sector to another, increased training needs).
	Inflation	Relative price changes due to shifting consumer demand or preferences and changes in comparative cost advantages.	Increased inflation volatility, particularly in food, housing and energy prices.	Prices affected by climate-related transition policies, policy uncertainty, technological changes and shifts in consumer preferences.
	Inflation expectations	Climate-related shocks, e.g. to food and energy prices, could affect inflation expectations.	Inducing more homogenous, sudden and frequent revisions to expectations.	Formation of inflation expectations affected by policies.

Transmission Risks are a large set of ad hoc sensitivity analyses

Transmission risks: disruptions from "exogenous" patterns or developments

- → Trade and industrial inter-dependence, cyclical transmission
- → International finance / funding with exogenous changes in financial market or banking conditions, correlation of market movements, international arbitrages
- → Crisis in neighboring countries (refugees, markets, border tensions…), global or geopolitical shocks
- → Global environmental pressures and transmission of potential disasters

Unless the project / perspective is highly sensitive to a plausible and specific exogenous shock, the analysis of transmission risks is dictated by on-going events.

Transmission Risks: illustration / election of D. Trump

Rank	ISO3	Country	Overall Trade	Overall Security	Overall Immigration	Overall vulnerability
1	MEX	Mexico	74.9	48.2	63.4	62.1
2	JAM	Jamaica	43.2	43.2	66.5	50.9
3	CHN	China	56.1	41.2	50.2	49.2
4	IND	India	37.8	36.4	51.7	41.9
5	HTI	Haiti	50.5	30.5	43.2	41.4
6	VNM	Vietnam	51.4	39.8	31.5	40.9
7	JPN	Japan	65.0	42.5	4.3	37.3
8	SLV	El Salvador	11.2	18.4	80.9	36.8
9	HND	Honduras	14.3	26.8	67.1	36.0
10	DOM	Dominican Republic	16.9	21.1	68.2	35.4
11	EGY	Egypt	26.6	68.3	9.8	34.9
12	PHL	Philippines	30.6	25.6	46.9	34.3
13	SOM	Somalia	26.1	67.9	8.2	34.1
14	GTM	Guatemala	10.0	23.8	67.0	33.6
15	DEU	Germany	55.0	40.5	4.3	33.3
16	GMB	The Gambia	25.2	47.1	27.2	33.2
17	BLZ	Belize	30.5	48.8	16.5	31.9
18	IRL	Ireland	44.6	49.0	1.4	31.6
19	MDA	Moldova	25.5	63.7	4.0	31.0
20	NPL	Nepal	28.7	44.4	18.2	30.4

3. Key drivers of risks at country-level – Transmission Risks

Transmission Risks: illustration / war in Ukraine

Trade with Ukr&Rus
Supply Chains
Net Commo imports
Purchasing Power
Growth transmission
Cereals
Energy
Inflation transmission
Cereals Import Dependency
Energy Import Dependency
FX transmission
Neighboring index
Alliance index
Geopolitical transmission
Overall Index adjusted

10 worst

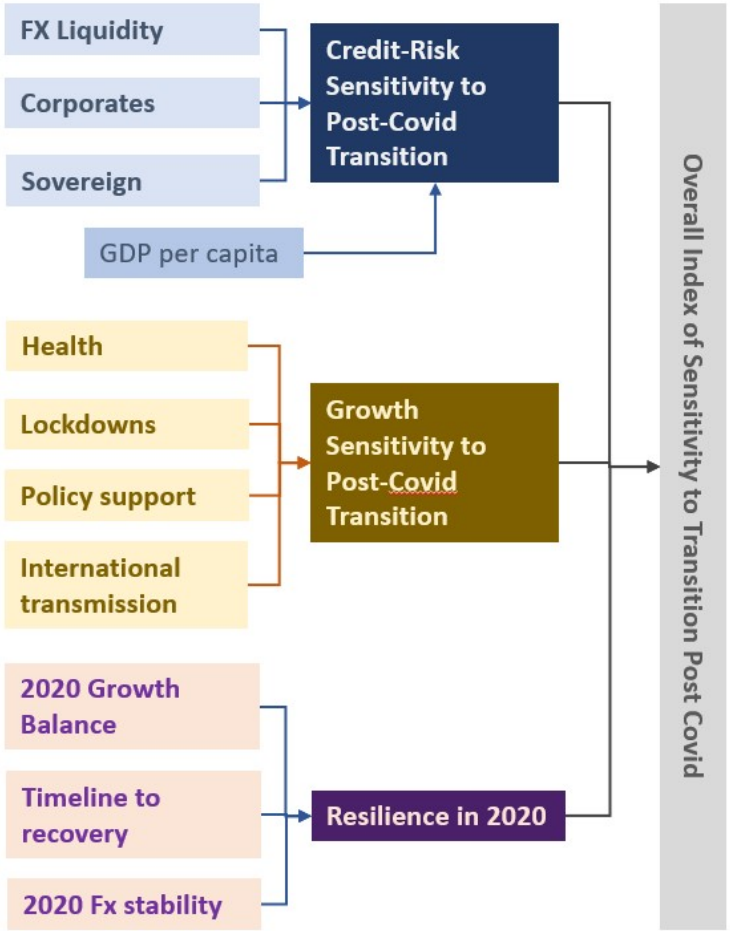
10 best

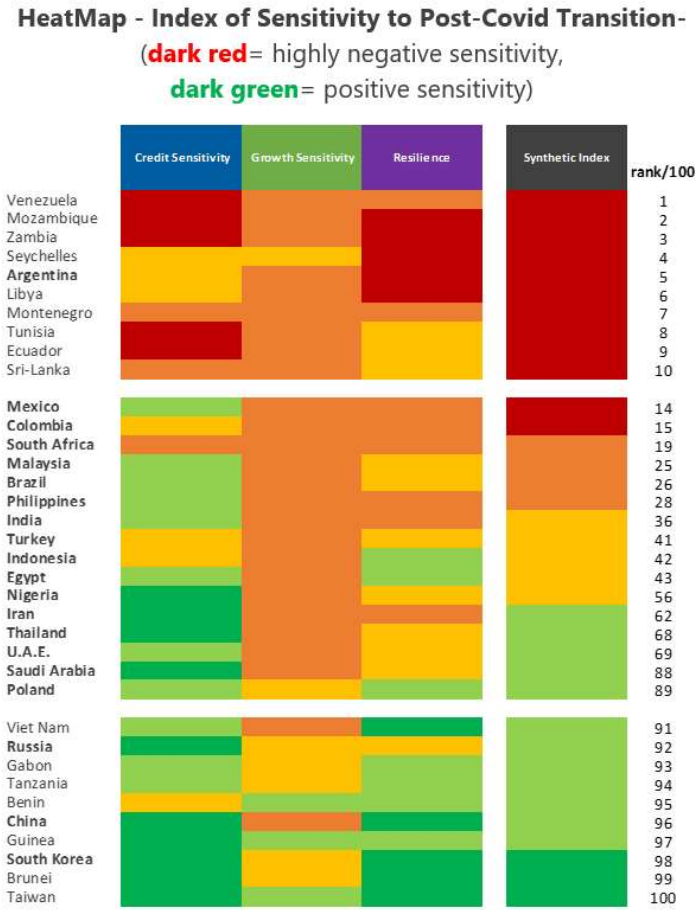
		Growth Channel					Inflation Channel			External Balance Channel			Geopolitics Channel			
Rank	Country	Trade with Ukr&Rus	Supply Chains	Net Commo imports	Purchasing Power	Growth transmission	Cereals	Energy	Inflation transmission	Cereals Import Dependency	Energy Import Dependency	FX transmission	Neighboring index	Alliance index	Geopolitical transmission	Overall Index adjusted
1	BLR	10.0	10.0	1.6	5.7	6.4	5.6	5.8	5.7	0.7	10.0	5.3	10.0	10.0	10.0	7.5
2	MLI	0.8	3.7	4.7	10.0	5.7	10.0	1.0	6.4	2.6	10.0	6.3	0.0	5.2	2.6	7.2
3	YEM	2.3	0.8	9.4	10.0	6.4	10.0	2.0	6.8	10.0	0.9	5.5	0.0	0.0	0.0	6.9
4	TGO	1.4	1.1	5.1	10.0	5.2	10.0	1.1	6.4	1.6	10.0	5.8	0.0	5.4	2.7	6.8
5	GEO	10.0	10.0	4.2	3.8	6.4	3.1	4.7	3.8	2.6	10.0	6.3	10.0	0.0	5.0	6.8
6	ARM	10.0	10.0	-0.1	2.9	5.0	2.3	3.8	2.9	2.1	10.0	6.1	10.0	10.0	10.0	6.5
7	MOZ	0.6	0.8	-0.1	10.0	3.8	10.0	7.2	8.9	5.7	1.1	3.4	0.0	5.2	2.6	6.0
8	MAR	1.9	4.2	3.7	8.3	5.1	8.3	2.9	6.1	2.7	10.0	6.4	0.0	5.5	2.8	5.9
9	TUN	1.6	4.4	5.0	8.6	5.6	8.6	3.0	6.4	3.1	10.0	6.6	0.0	0.0	0.0	5.8
10	SRB	4.0	9.7	0.0	9.7	6.4	9.7	5.9	8.2	-3.1	5.6	1.2	6.5	0.0	3.3	5.2
89	OMN	0.0	1.5	-8.3	4.8	0.0	1.3	10.0	4.8	0.5	-10.0	-4.8	0.0	0.0	0.0	0.3
90	SAU	0.3	3.5	-4.4	3.5	1.0	1.0	7.2	3.5	1.2	-10.0	-4.4	0.0	0.0	0.0	0.3
91	GHA	0.8	3.1	-2.9	3.5	1.4	3.5	1.2	2.6	1.9	-10.0	-4.1	0.0	0.0	0.0	0.2
92	MMR	0.2	3.4	-1.8	1.1	0.8	0.9	1.5	1.1	-2.1	-1.7	-1.9	0.0	0.0	0.0	0.1
93	COL	0.4	1.7	-1.4	2.1	0.9	2.1	1.7	1.9	1.4	-7.9	-3.2	0.0	0.0	0.0	0.0
94	KWT	0.2	2.1	-8.8	4.0	-0.3	0.6	9.0	4.0	1.2	-10.0	-4.4	0.0	0.0	0.0	0.0
95	ARE	0.5	4.8	-9.0	3.2	0.1	0.0	8.0	3.2	0.4	-10.0	-4.8	0.0	2.6	1.3	0.0
96	NGA	0.9	2.8	-1.3	2.6	1.4	2.6	0.7	1.8	1.3	-10.0	-4.4	0.0	0.0	0.0	-0.1
97	AGO	0.2	1.6	-10.0	3.4	-0.9	3.4	0.8	2.4	2.2	-10.0	-3.9	0.0	5.0	2.5	-0.1
98	GAB	0.5	0.5	-7.8	0.7	-1.5	0.6	0.9	0.7	1.3	-10.0	-4.3	0.0	0.0	0.0	-1.3

Net Positive impact
Neutral impact
Low Negative impact
Intermediate Negative impact
High Negative impact
Very High Negative impact

3. Key drivers of risks at country-level – Transmission Risks

Transmission Risks: illustration / Covid-19





Data & Sources of information

Data is both easily available and subject to questions and doubts

- → IMF, World Bank, regional development banks (IADB, ADB, AfDB, EBRD), UN agencies (UNDP, UNIDO, UNCTAD), WTO… supply a lot of data which is freely available. Data may be available also through academia (Notre Dame University, Yale…) and think tanks, but often without time consistency or update
- → Private providers (Datastream, CEIC, Macrobond, IHS, Ferri…)
- → Political data (CIA, think tanks, but also multilateral institutions through "business environment" surveys).
- → High frequency and new types of datasets: textual analysis, satellite imagery, social media / use of platforms… (e.g. GDELT)

Comparability and quality of the data is always an issue

Data & Sources of information

Many institutions provide "ready-made" country-risk analyses or in-depth investigations into specific aspects of country risk:

- → International rating agencies (S&P's, Moody's, Fitch IBCA)
- → Private Research groups (EIU, TAC ECONOMICS, ICRG/PRS, BCA, DragonFly / FiscalNote…)
- → Credit insurance companies (Coface, EulerHermes, Credendo, Altradius…)
- → International banks
- → Think tanks (Peterson, Brookings, CFR, IFRI, CEPII, IISS, SIPRI…), Universities, Government Agencies (Treasury, USAID, DFID, KfWn, AFD…), Multilateral development institutions (WB and susbsidiaries IFC / IDA, ADB / IADB / AfDB / EBRD, UNDP, UNCTAD…),

Data & Sources of information

- **World Bank Open Data**

World Development Indicators, Worldwide Governance Indicators, Global Economic Monitor, Doing Business, International Debt Statistics, Sustainable Development Goals …
https://datacatalog.worldbank.org

- **International Monetary Fund Databases**

World Economic Outlook, International Financial Statistics, Balance of Payments Statistics, Direction of Trade Statistics, Government Finance Statistics…
https://www.imf.org/en/Data

- **United Nations**

World Population Prospects, Human Development Data, Environmental Statistics Database, UNCTADStat, UN Comtrade, UN Economic Commissions (by region)…
http://data.un.org/Explorer.aspx

- **Regional Development Banks**

Research, data and development projects for specific regions of the world.
https://www.odi.org/publications/11149-guide-multilateral-development-banks

Data & Sources of information

- **Multi-donor and NGO Open Source Portal INFORM**

Dedicated database focusing on humanitarian risks / disasters and including hazards, vulnerability and coping capabilities
https://drmkc.jrc.ec.europa.eu/inform-index

- **List of most important think-tanks worldwide**

Yearly document published by the University of Pennsylvania (2019 Global Go To Think Tank Index Report) listing think-tanks according to country of localization and areas of expertise, including economic, environmental, political and strategic subjects
https://repository.upenn.edu/cgi/viewcontent.cgi?article=1018&context=think_tanks

- **CIA World Factbook**

The World Factbook provides information on the history, people and society, government, economy, energy, geography, communications, transportation, military, and transnational issues for 267 world entities.
https://www.cia.gov/library/publications/the-world-factbook/

4. Impact of crises on development paths and corporate performances

→ Path for exiting crisis situation

→ Transmission of systemic shocks to development strategies and corporate situations

Analyzing the consequences of crises and recovery path

Country-risk materialization is most often associated with…

→ Sharp devaluation of the currency

→ Tensions with foreign providers of capital

→ Major decline / reversal in economic growth, destruction of assets

The impact of country-risk materialization will depend on critical factors, including…

→ Time duration and acuteness of shock

→ External support / external tensions

→ Ex ante preparedness and cohesion of society

Analyzing the consequences of crises and recovery path

The “standard” crisis alphabet: V-U-L

→ Mostly short-term imbalances, rapid and efficient policy measures, international support: a V-shape

→ Deeper imbalances, late or ill-suited policy reactions, poor international support or lack of attention: a U-shape

→ Deep and structural imbalances, political tensions or institutional paralysis, international/regional tensions: an L-shape

→ Presence of a more complex S-shape, as well as a “D-shape” for “doomed” recovery.

Analyzing the consequences of crises and recovery path

Shape / Crises	V	U	L	S	D	Other
Banking	31%	3%	37%	17%	9%	3%
Currency	35%	7%	19%	26%	7%	4%
Default	23%	0%	27%	31%	12%	8%

Source: Barthélémy, Pentecôte, 'Forecasting Financial Crises and Recoveries', Forecasting Financial Markets 2012.

Impact on development paths

Impact on sustainable development

→ **Development**: standard of living, poverty, infrastructures

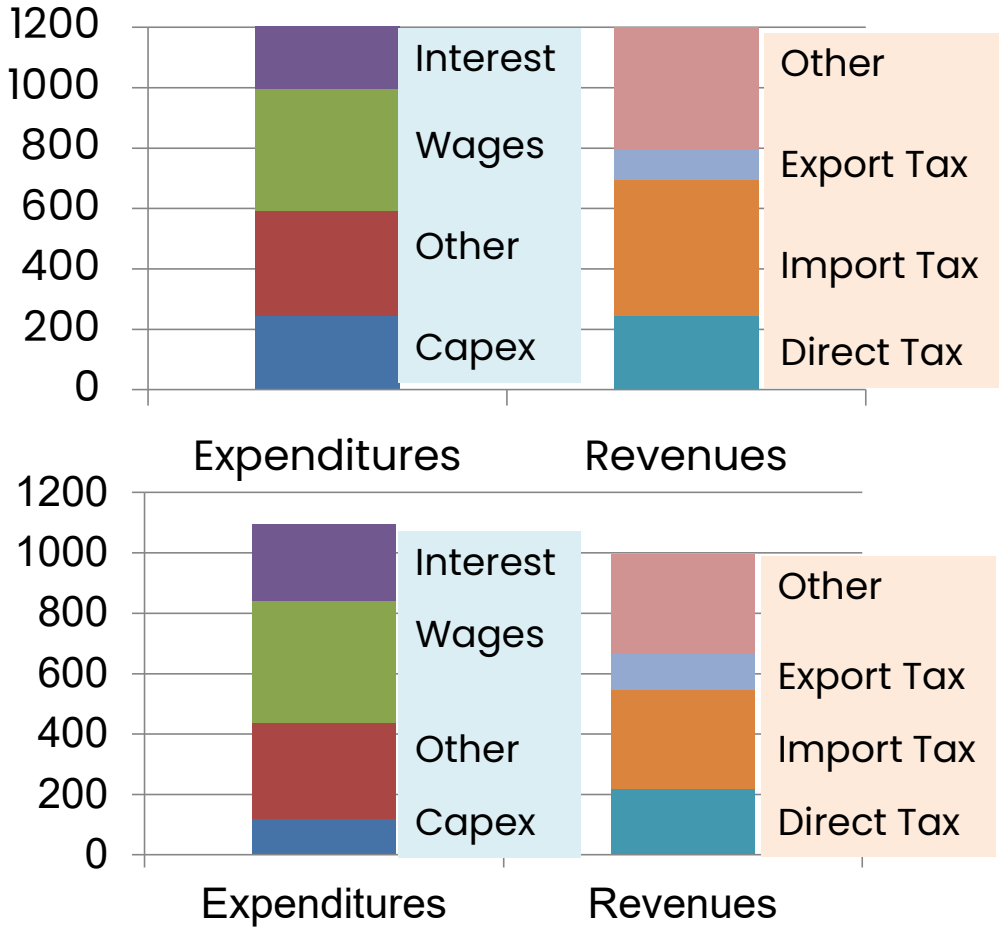
→ **Sustainable** : major / immediate cuts on environmental spending, disruptions in basic public services, deterioration in social / health / education conditions

Impact on development paths

Major fiscal impact:

- → Foreign debt management
- → Reversal in economic growth and decline in public revenues
- → Decline in imports and lower tariff revenues
- → Cuts in spending, the easiest being capital spending and infrastructure, with a ‘multiplier effect”
- → Fiscal adjustment can create a self-reinforcing mechanism

Impact on development paths



BUDGET BALANCE AND STRUCTURE

Typical budget structure in a commodity-dependent developing country, with limited deficit but high reliance on import taxes

A 10% contraction in activity, with amplification through imports and expenditure rigidities can lead to a doubling of deficit while cutting capex by more than 50%

Impact on corporate strategies and performances

A systemic shock has major implications at corporate level

→ Bankruptcies, lay-offs, decline in wages

→ Spill-over / transmission chains (suppliers, administrations, banks…)

→ Interruption of on-going projects, losses in capital and skills

Impact on corporate strategies and performances

Cross-border investment implies assets / productive capacities on the ground

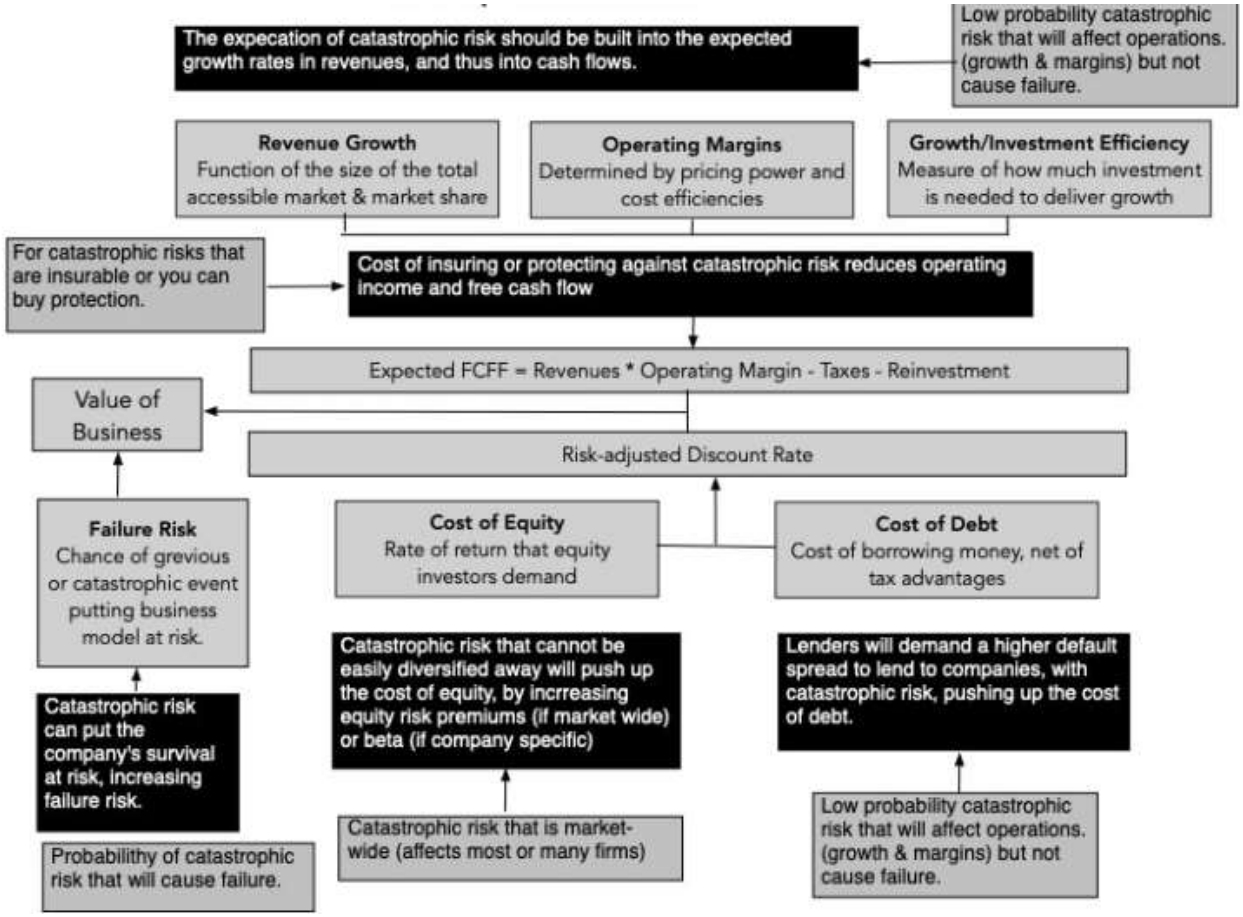
Risks on market development	Risks on assets	Risks on operations	Risks on exit
Economic growth	Currency valuation	Social stability / tensions	Dividends / taxation
Regulation on competition	Ownership / expropriation	Supply-chains / logistics	Capital controls / closure costs
		Regulatory / legal / fiscal	
		Environmental risk	

Assessment of impact of corporate financial metrics and hedging

Catastrophic events and corporate finance

Source: Damodoran, NYU Stern School of Business

https://pages.stern.nyu.edu/~adamodar/pdfiles/blog/CatRisk.pdf



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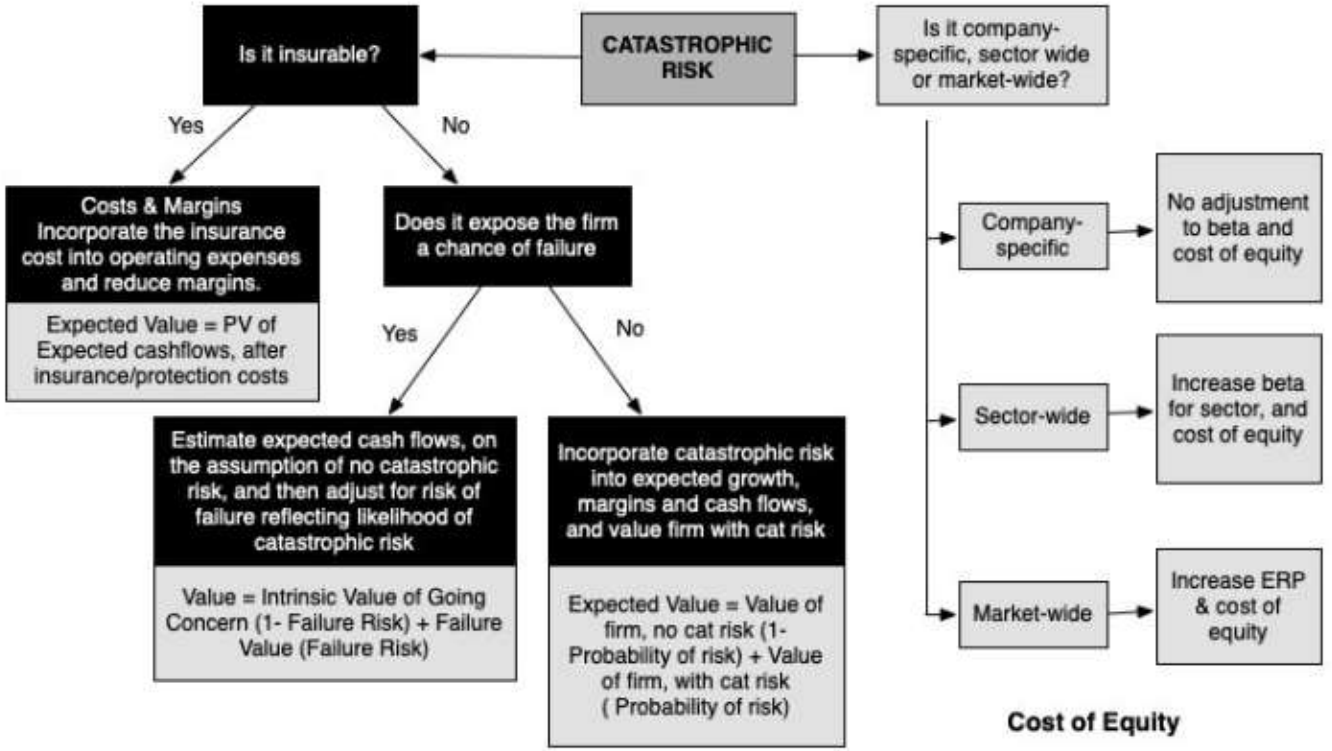
https://pages.stern.nyu.edu/~adamodar/pdfiles/blog/CatRisk.pdf



Incorporating the risks of shocks in long-term strategies

Macroeconomic risk mitigation policies:

→ Diversification vs. concentration

→ Choices in public/private partnerships,

→ Importance of domestic financial structures and supervision

→ Fiscal and liquidity buffers

Microeconomic risk mitigation strategies:

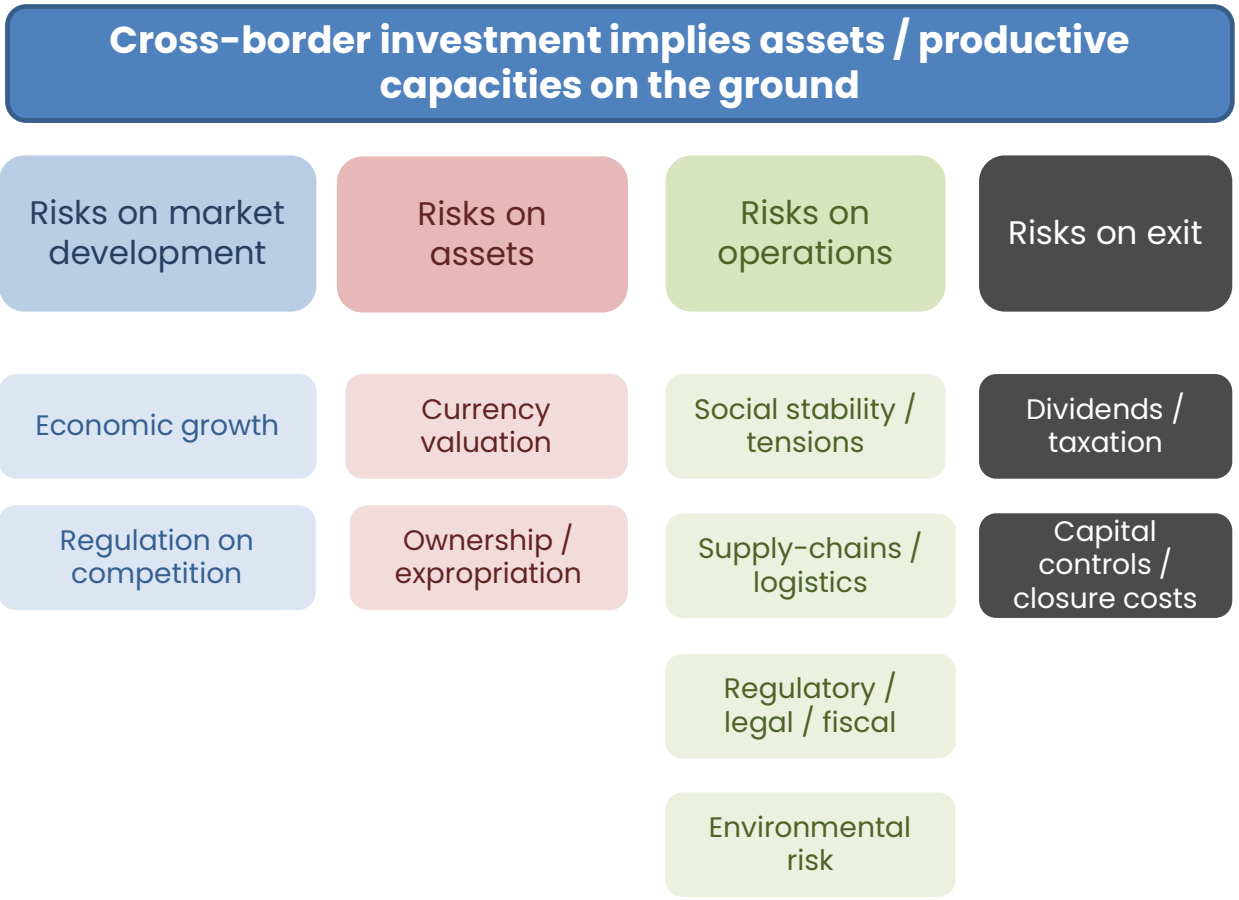
→ Financial FX hedging (creating natural hedges or buying FX protection)

→ Insurance policies (credit / payment / political…)

→ Local partners and structures

4. Impact of crises on development paths and corporate performances

Wrap-up



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5. Working as a team on a *Case Example*

- → Operational focus on a couple of countries
- → Defining a specific / operational “perspective”
- → Gathering relevant data and information, combining them and aiming at assessing the risk of shocks
- → Coming to a conclusion / recommendation

SUSTAINABLE DEVELOPMENT & SYSTEMIC SHOCKS

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