FAILED STATES: HOW CAN WE USE DATA TO ANTICIPATE BETTER?

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Background on 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.

FAILED STATES: HOW CAN WE USE DATA TO ANTICIPATE BETTER?

1. Introductory remarks: *a country moving from* problems *to* failure *requires a systemic shock, with combinatorial approaches, threshold effects, and self-reinforcing mechanisms*

2. Endogenous shocks and the power of datamining: *systemic economic, financial, and to some extent domestic political failures can be assessed through intensive number-crunching*

3. Exogenous or global shocks are much harder to incorporate in risk metrics: *a different kind of uncertainty, but one that is rising in importance and requires complex scenario construction*

1. INTRODUCTORY REMARKS

- → The future is always uncertain, a challenge for the risk analyst
- → State failure is a comprehensive systemic break
- → A word on data and information consideration

The future is always uncertain

- ✓ A permanent paradox for the risk analyst:
  - ✓ Circumstances (e.g. country crises) are the result of an incredibly high number of different, though inter-related, factors, with substantial doses of human behavior having expected as well as unexpected consequences…
  - ✓ … but time-frequencies of development difficulties, waves of time-related crises, repetition of past episodes, strongly suggest that crises do follow identifiable patterns.
- ✓ Not aiming at predicting the future but assessing the closeness to patterns and logics that can lead to derailment.
- ✓ Implications for construction of Early Warning Signals (EWS): *circumstances* and *triggers*, *structural trends* and *short-term events*

State failure is a systemic break

- ✓ A **break** means a *much-larger-than-usual shock* in the development process, in magnitude, severity or time-length
- ✓ **Systemic** means that disruptions are large enough to *derail the normal functioning of many of the country's systems* (production, trade, finance, public services, security…)
- ✓ Systemic breaks are associated with **multi-faceted** origins, unfolding and implications (economic, social, political, behavioral, international relations…)

From systemic shock to methods and tools

Risks of systemic shocks in the lens of John Hicks

- ✓ Imbalances that can be subjected to large historical observations and where causal relations are explicit; combining causes with historical repetitions allows *statistical risk* analysis (e.g. financial crises) → *statistical techniques, datamining and AI tools are very powerful*
- ✓ Non-observable (limited number of historical occurrences) but known risks, i.e. events for which the probability of occurrence is high and causal relations can be explicit, but for which timing is unpredictable (e.g. geopolitics, climate or pandemic) → *resilience, reactive capabilities and scenario construction are at the core of methods*
- ✓ Black Swans → *impossible to incorporate in ex ante analysis, pointing to issues on endogenous* agility *of organizations*

Considerations on data and information

Data is both easily available and subject to questions and doubts

- IMF, World Bank, regional development banks, UN agencies (UNDP, UNIDO, UNCTAD), WTO, or specialized international / multilateral /plurilateral organizations (BIS, NGFS...) supply a lot of data which is freely available. Data is also available through academia and think tanks, but often without time-consistency or update
- Private providers (Datastream, CEIC, Macrobond, IHS, Ferri…)
- 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!

Considerations on data and information

Information and analyses are also available, but with questions on bias and purposes, usually with divergent views:

- International rating agencies (S&P's, Moody's, Fitch IBCA)
- Research groups (EIU, TAC ECONOMICS, ICRG/PRS, BCA…)
- 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 subsidiaries IFC / IDA, ADB / IADB / AfDB / EBRD, UNDP, UNCTAD…),

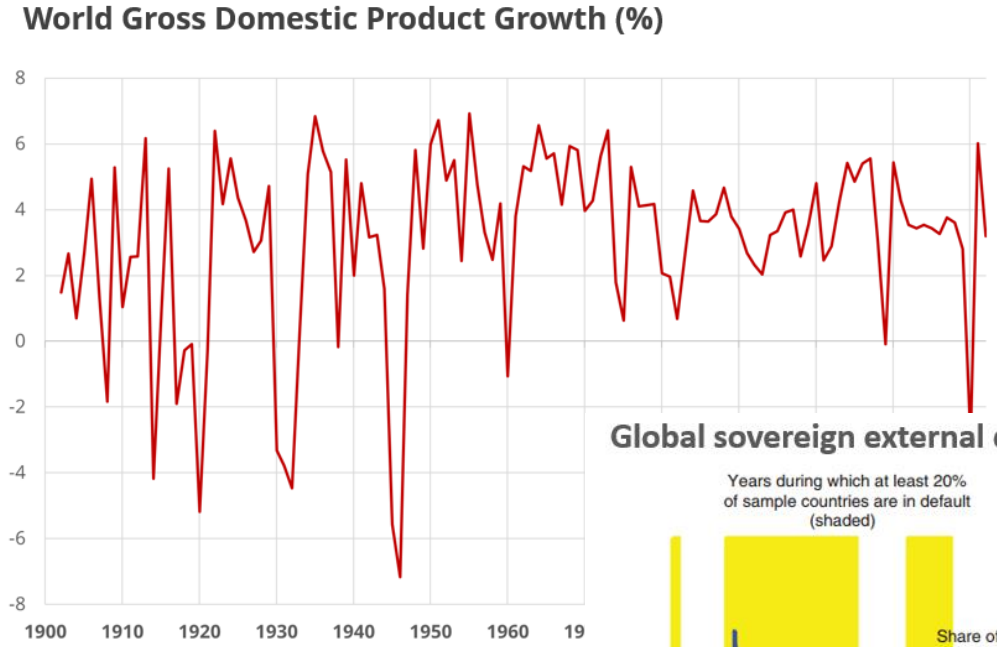
2. ENDOGENOUS SHOCKS AND THE POWER OF DATAMINING

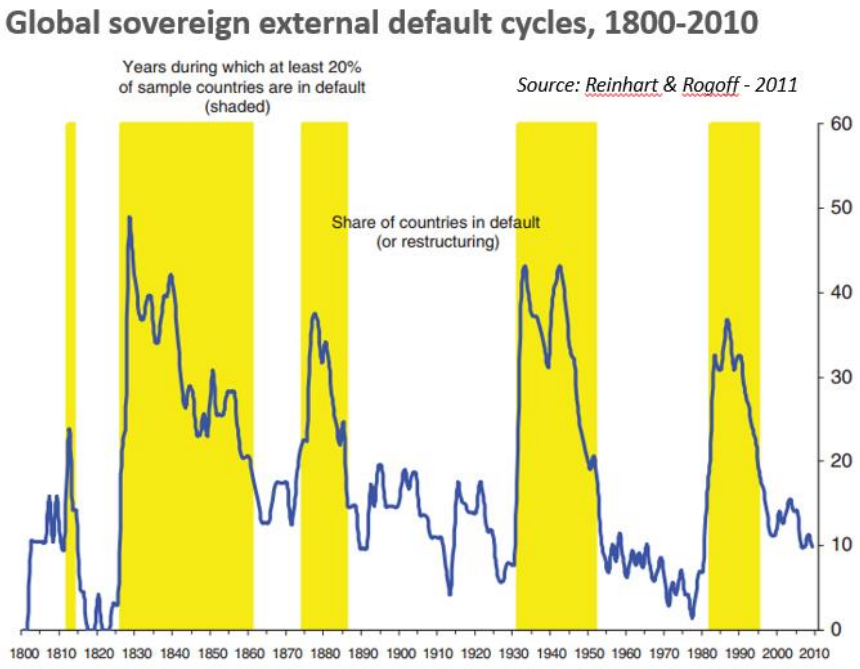
→ Financial and economic shocks, domestic political instability: large number of historical occurrences

→ Large sets of data and allow for multiple types of quantitative approaches for EWS, with key focus on combinations, patterns and signaling

2. Endogenous shocks and the power of datamining

Historical waves of occurrences of systemic breaks





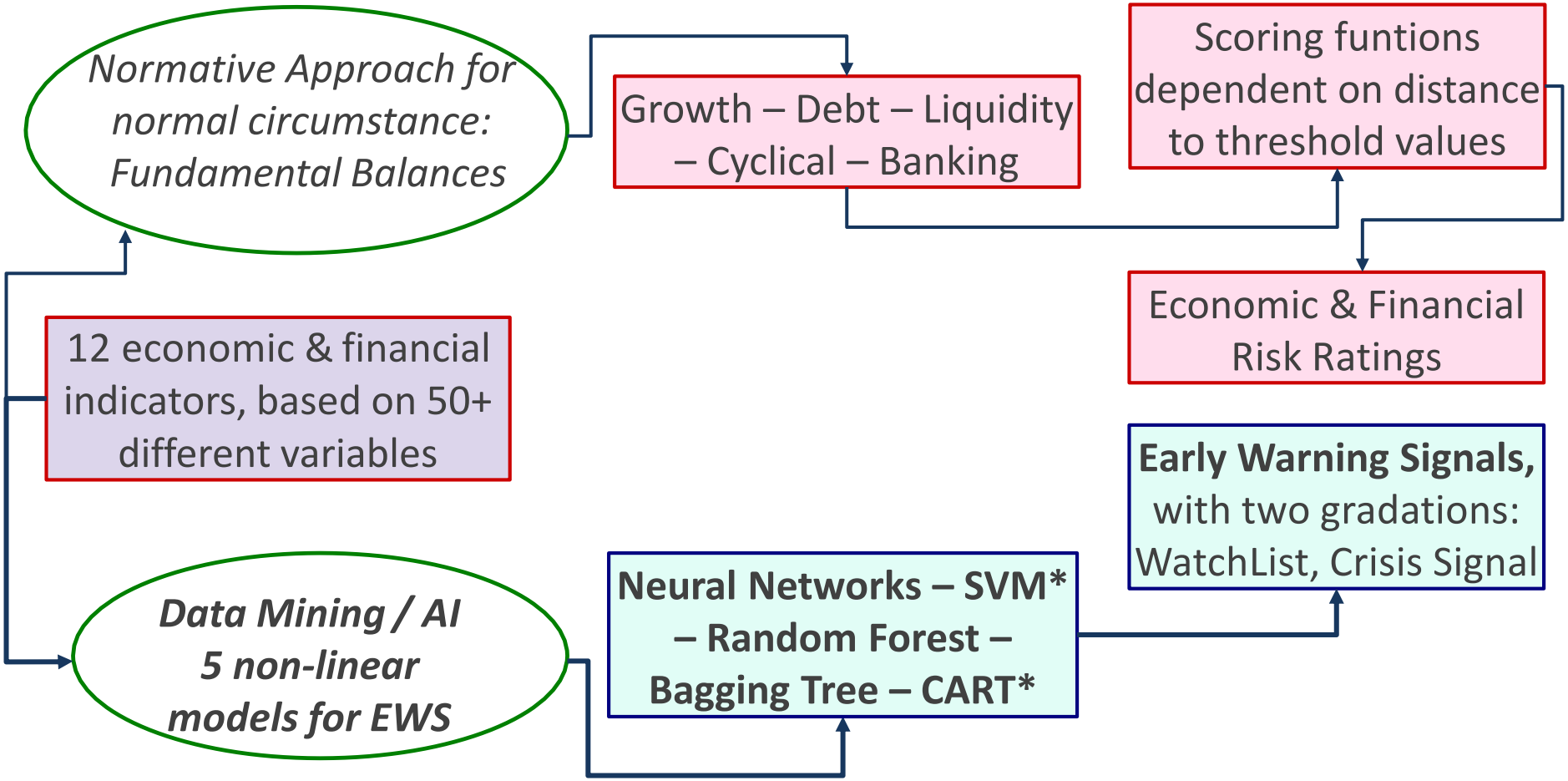
Large range of quantitative tools

I. ***Linear quantitative tools*** (not fit for EWS)
   - *Scores, weighted indicators / Russian Dolls*
   - *Standard econometrics*

II. **Non-linear quantitative models**
   - Signaling tools
   - Artificial Intelligence
     - Neural Networks / Conditional Trees
     - Pattern Recognition Tools
     - Machine-Learning techniques

III. **High-frequency datamining for short-term triggers**
   - Text-mining
   - Image / satellite information

Illustration: TAC ECONOMICS' method for Financial Risk

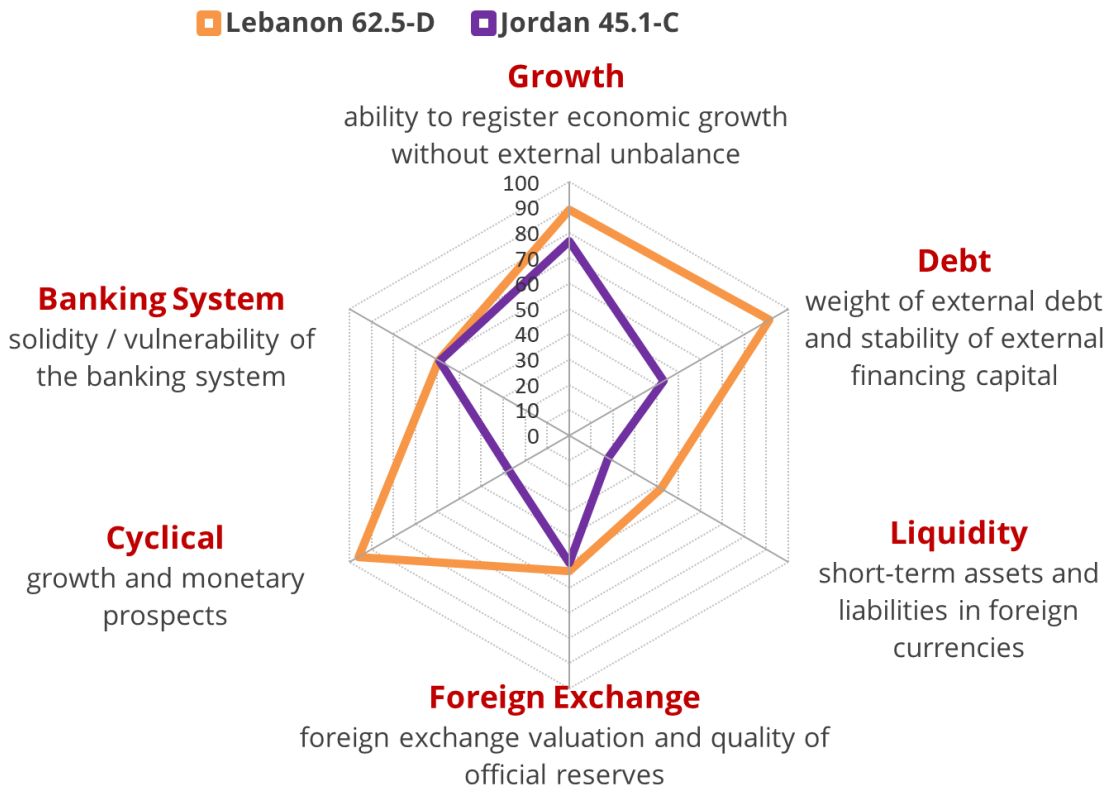


* SVM: Support Vector Machine : CART: Classification and Regression Trees

Illustration: TAC ECONOMICS' method for Financial Risk

Polygon of economic performances,

Lebanon *vs* Jordan – 2021Q1, 0=best, 100=worst



Source: TAC ECONOMICS

Sri Lanka, 2021Q2

Zambia, 2020Q4

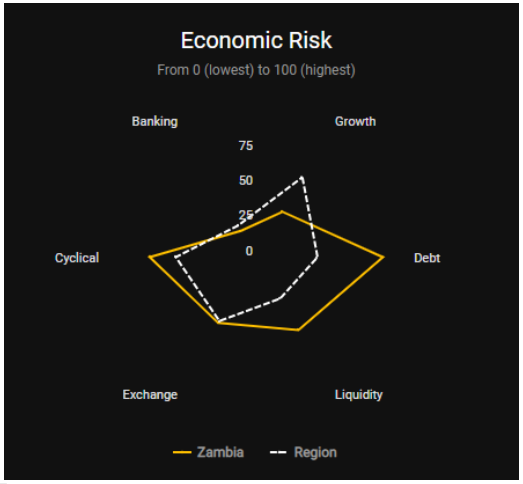


Illustration: simpler approach for Political & Governance Risk

KKZ indicators (World Bank) :

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

→ Simple and straightforward, available for almost all countries with historical data

→ Based on surveys, not on hard data

→ Lot of things are missing, from geopolitics to social tensions

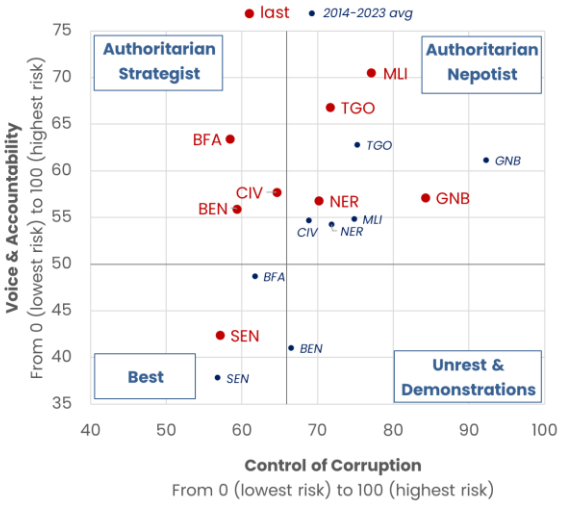
Illustration: simpler approach for Political & Governance Risk

→ Combining these indicators is more powerful, especially if threshold can be defined

→ Illustration on Western African countries

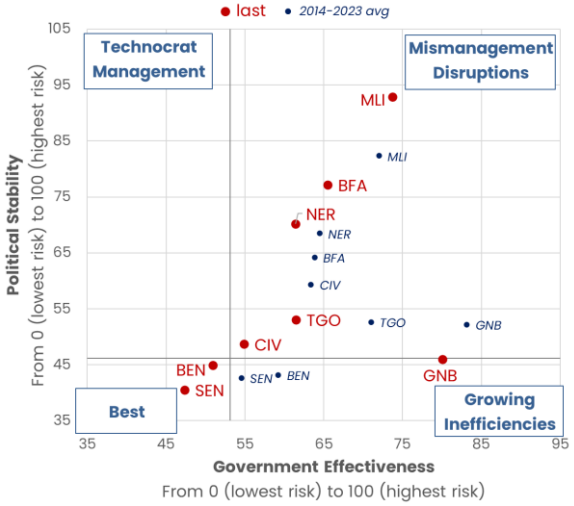
Institutional Setting

Control of Corruption *vs* Voice and Accountability
Indicators are from 0 (lowest risk) to 100 (highest risk)



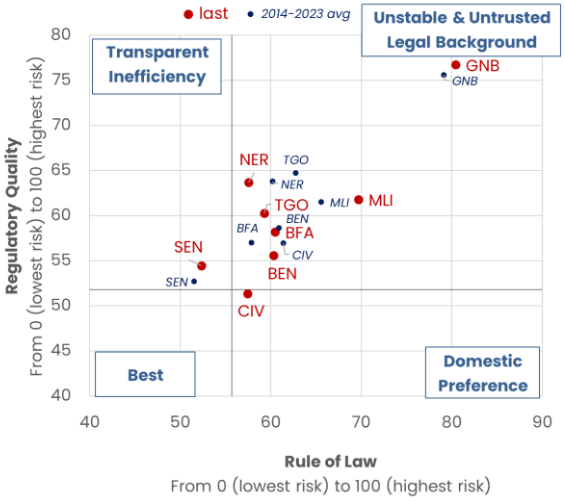
Government Management Setting

Government Effectiveness vs Political Stability
Indicators are from 0 (lowest risk) to 100 (highest risk)



Operational Setting

Rule of Law *vs* Regulatory Quality
Indicators are from 0 (best) to 100 (worst)

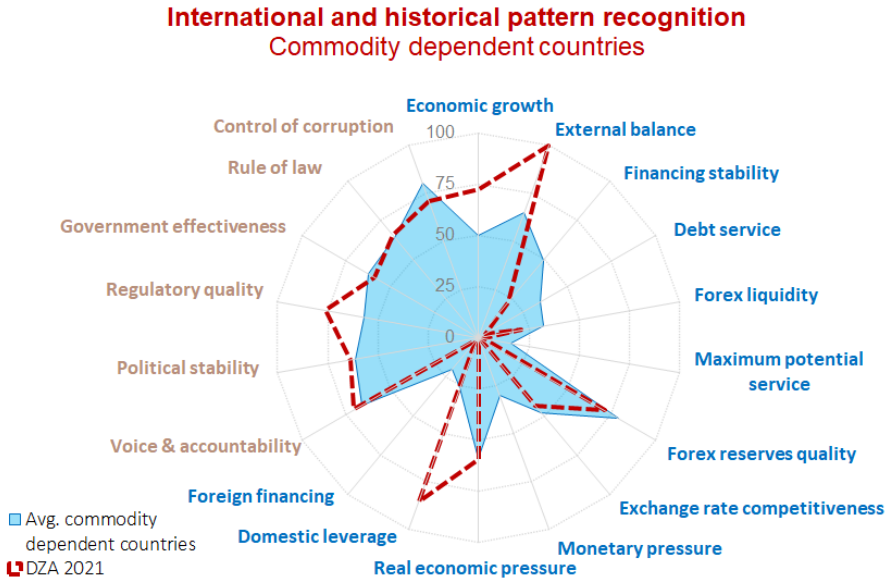


Source: TAC ECONOMICS, World Bank

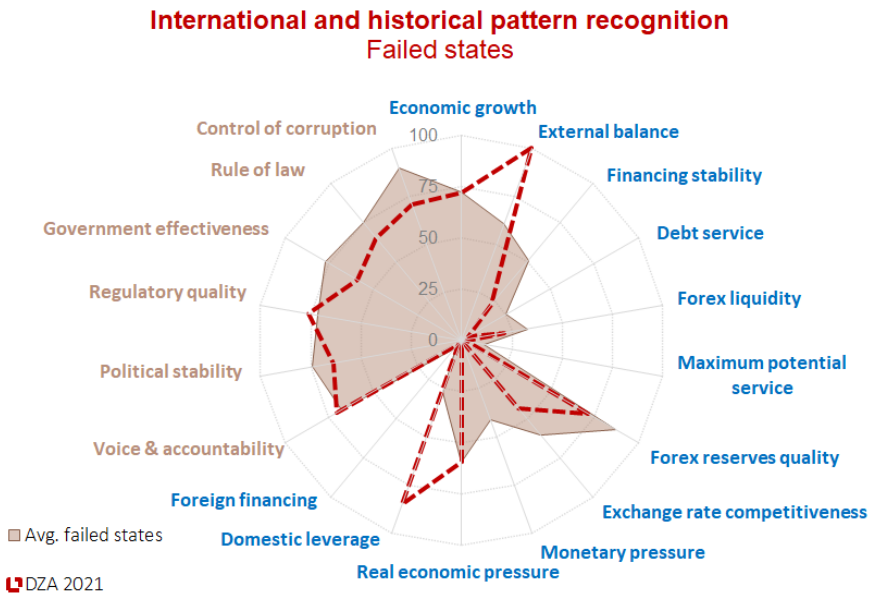
2. Endogenous shocks and the power of datamining

Illustration: pattern-recognition tools

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:
Russia 2015, Azerbaïjan 2017, Cameroon 2010, Nigeria 2016, Uganda 2004, Tanzania 2007



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

2. Endogenous shocks and the power of datamining

Illustration: new data sets and techniques

IMF, Feb. 2024

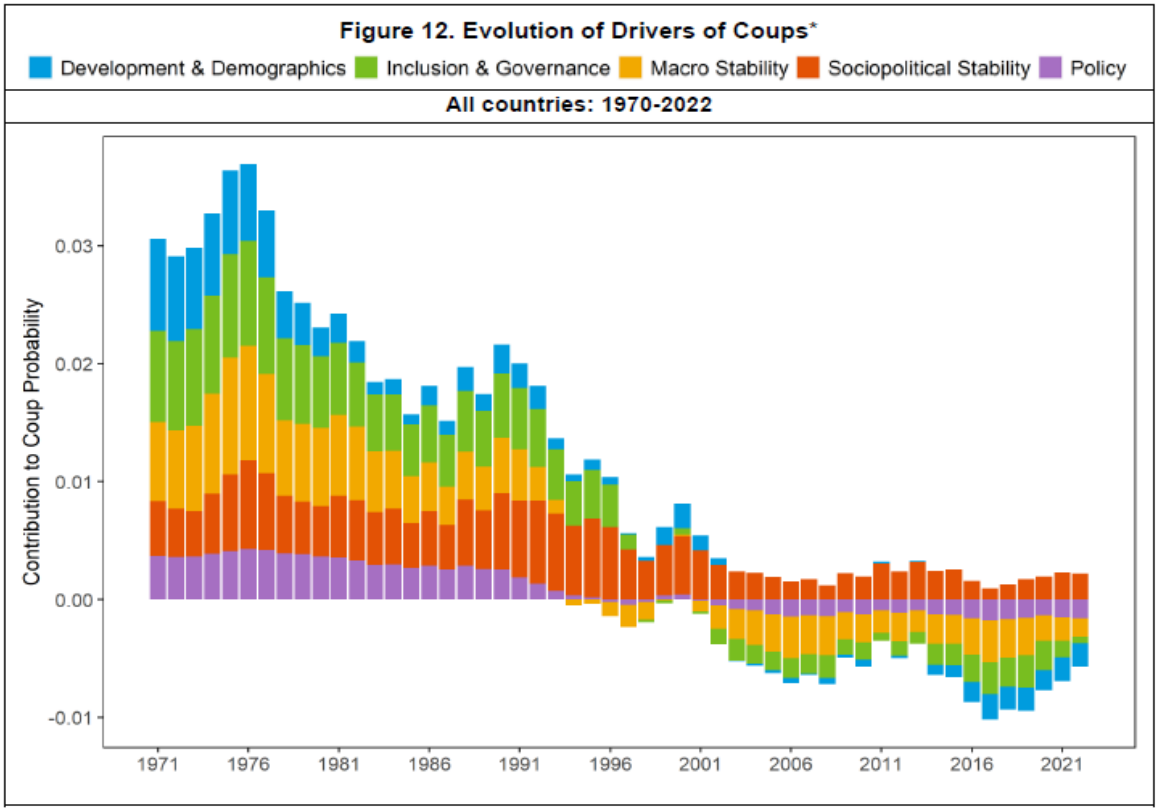
Political Fragility

Coups d'État and Their Drivers

Aliona Cebotari, Enrique Chueca-Montuenga, Yoro Diallo, Yunsheng Ma, Rima Turk, Weining Xin and Harold Zavarce

WP/24/34

Using machine-learning techniques to detect non-linearities in prediction of Coups d'Etat



[9] Because the number of coups was relatively high in the 1970s, the Shapley values in early years are positive (adding to the sample-average probability) and in the recent years are negative (subtracting from the sample average probability).

3. EXOGENOUS OR GLOBAL SHOCKS ARE MUCH HARDER TO INCORPORATE IN RISK METRICS

→ The rising importance of *Expected But Unpredictable* events: four tectonic changes creating new risks of country-level systemic disruptions

→ Impact on risk assessment and methods

3. Exogenous or global shocks are much harder to incorporate in risk metrics

Four tectonic disruptions converging now

- **Climate change and environmental challenges** *(50-100y)*
  warming, number of extreme weather events, adaptation strategies and costs, reputational issues
- **Global economic and geopolitical order** *(20-50y)*
  a period of systemic challenge to post WW2 order, with hierarchized multi-polarity leading to higher likelihood of breaks
- **Technology** *(10-30y)*
  wave of upcoming disruptions related to new fields of innovation affecting simultaneously consumption, production, distribution, finance and politics
- **Structural shift in economic policy paradigm** *(5-10y)*
  exhaustion of post-2008 monetary policies and reassessment of both objectives and instruments

3. Exogenous or global shocks are much harder to incorporate in risk metrics

Implications when thinking about risk assessment

- Describing the implication of a disruptive event, as well as clarifying the causal links able to lead there
- Thinking in terms of alternative scenarios
  including construction of quantitative models to relate assumptions to outputs, and focusing on “anchor points and risk areas
- Assessing exposure, vulnerability and coping capabilities
- Identifying low-intensity / advanced signals providing clues on potential timing and magnitude

3. Exogenous or global shocks are much harder to incorporate in risk metrics

Illustration: environmental risks – Notre Dame University

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:

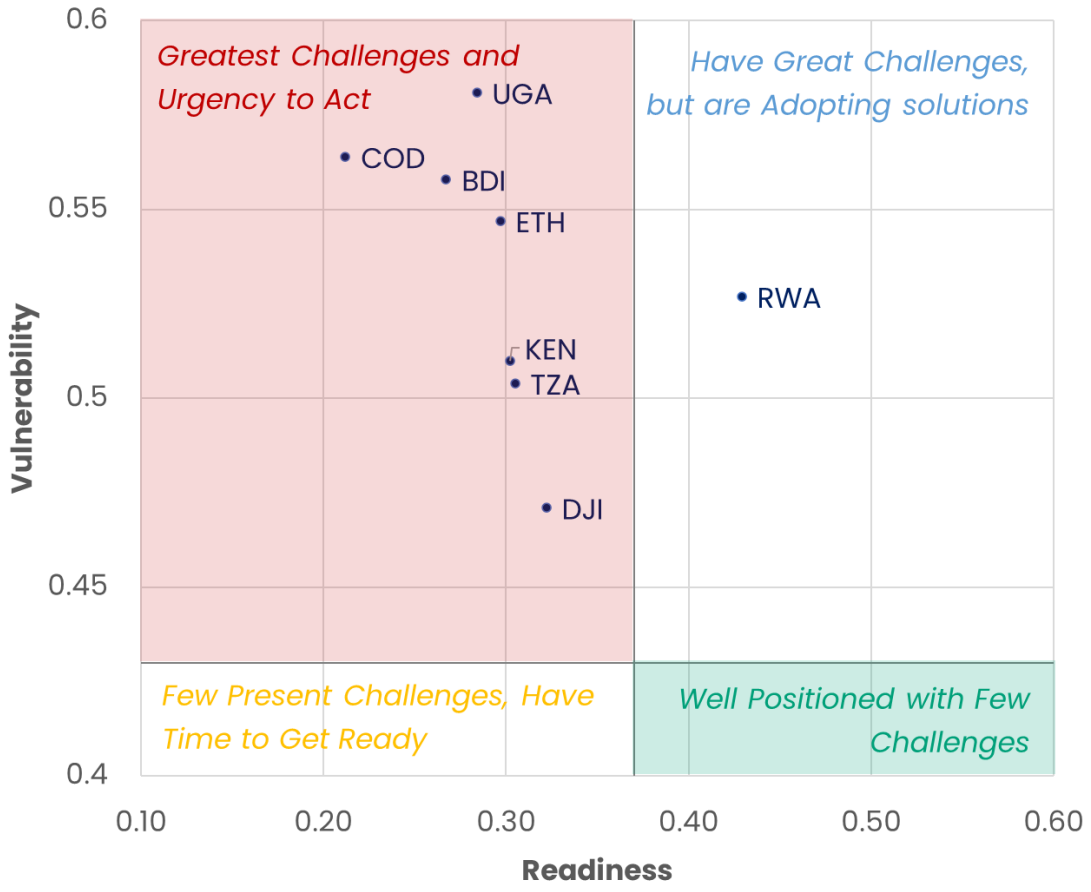
- economic readiness,
- governance readiness,
- social readiness.

3. Exogenous or global shocks are much harder to incorporate in risk metrics

Illustration: environmental risks – Notre Dame University

Notre Dame Global Adaptation Initiative:

Vulnerability *versus* Readiness Index for a sample of African countries



3. Exogenous or global shocks are much harder to incorporate in risk metrics

Illustration: environmental risks – EC-INFORM

EC INFORM– DRMKC - Disaster Risk Management Knowledge Centre

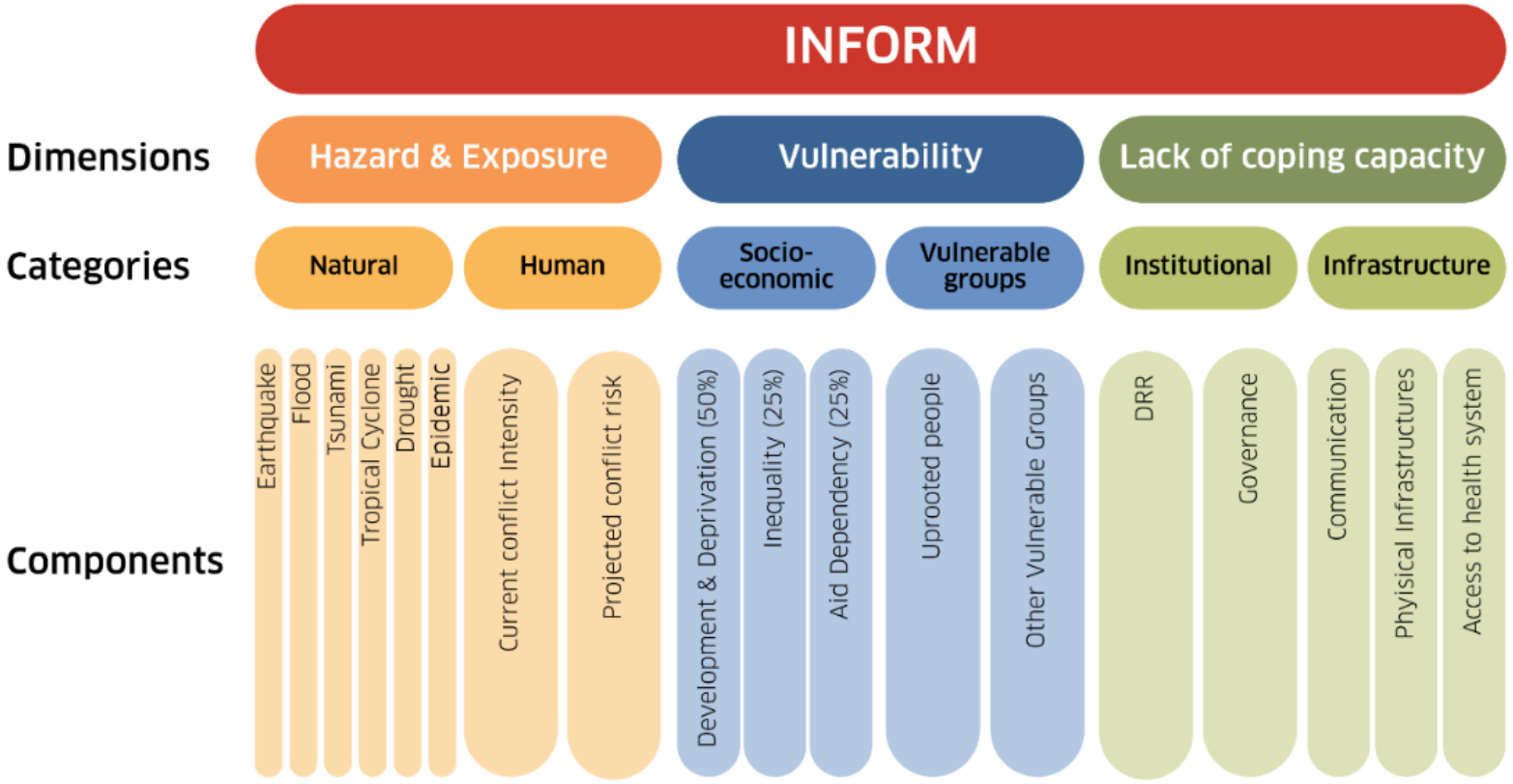


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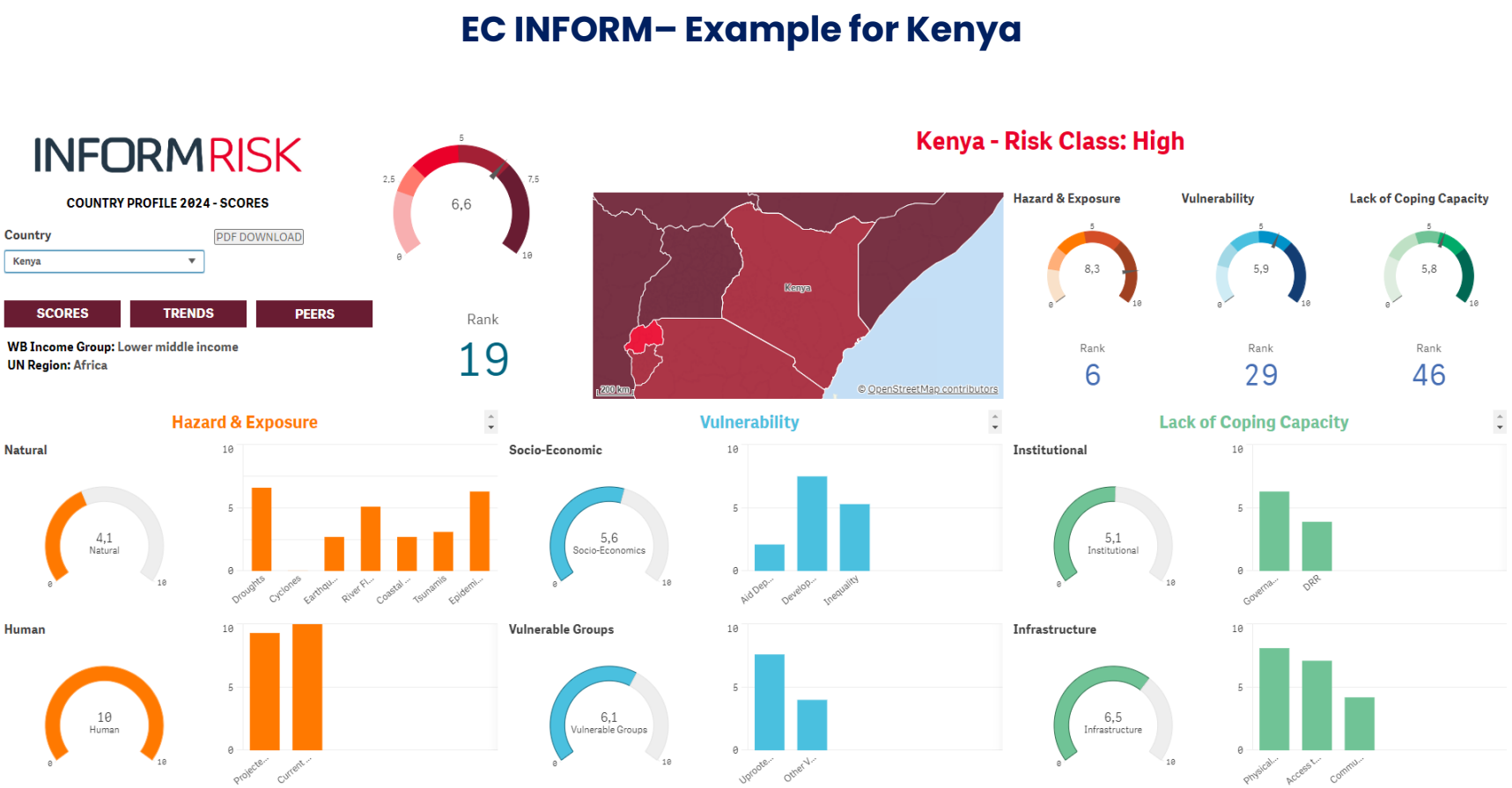
Illustration: environmental risks – EC-INFORM



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Short-term EWS: illustration on social tensions

IMF Working Paper

Measuring Social Unrest Using Media Reports

Using media information flows to construct a short-term EWS of heightened social tensions

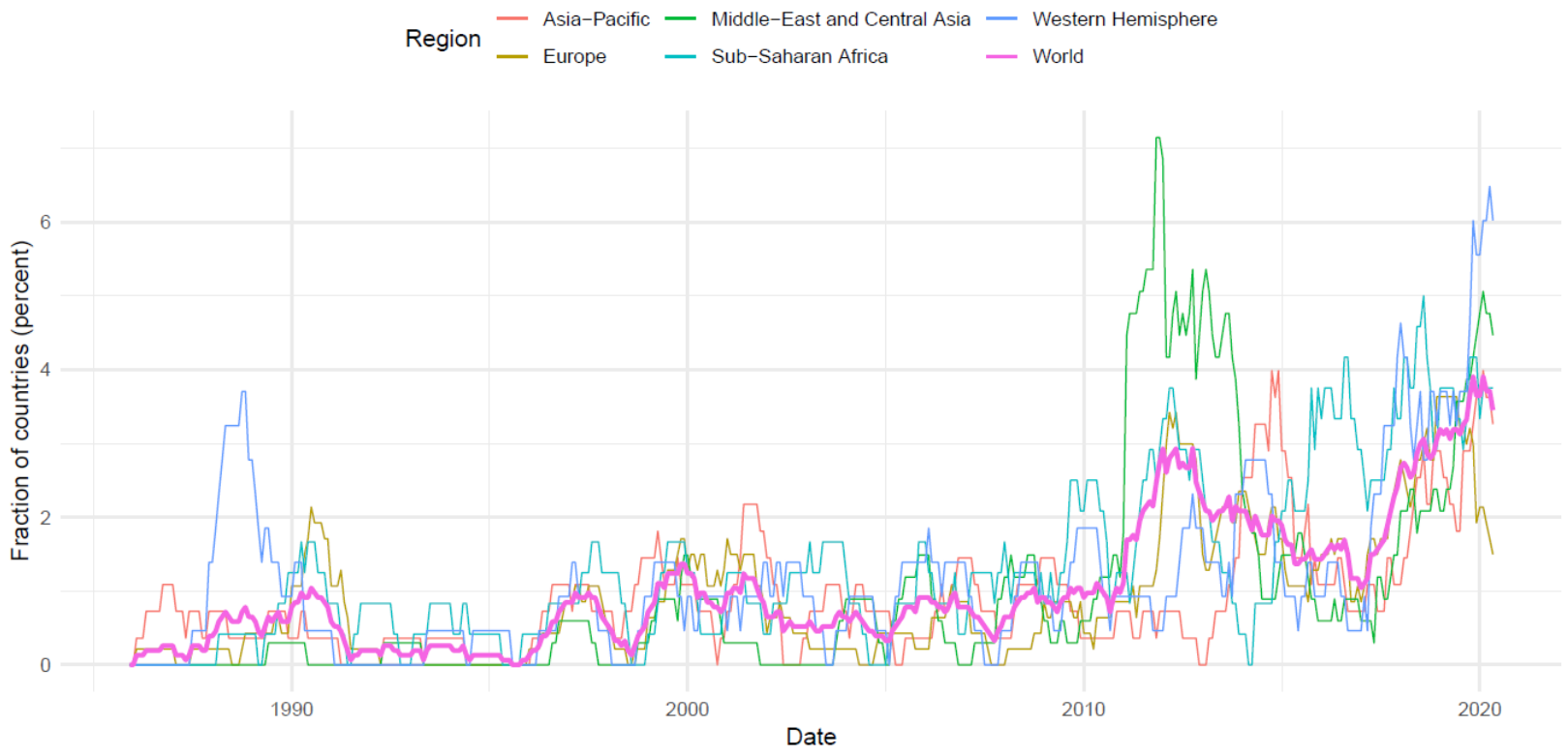

Figure 4: Fraction of countries with social unrest events, 12 month moving average

Questions, Remaining Issues & Points for Discussion

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Tips on on data and 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

Tips on on data and information

- **Regional Development Banks –** Research, data and development projects for specific regions of the world.

For a detailed description: https://www.odi.org/publications/11149-guide-multilateral-development-banks

Global development banks

European Investment Bank (EIB)

International Fund for Agricultural Development (IFAD)

New Development Bank (NDB)

OPEC Fund for International Development (OFID)

World Bank Group:

a) International Bank for Reconstruction and Development (IBRD)

b) International Development Association (IDA)

Regional development banks

European Bank for Reconstruction and Development (EBRD)

Inter-American Development Bank (IADB)

Islamic Development Bank (IsDB)

African Development Bank (AfDB)

Asian Development Bank (AsDB)

Asian Infrastructure Investment Bank (AIIB)

Tips on on data and 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/