

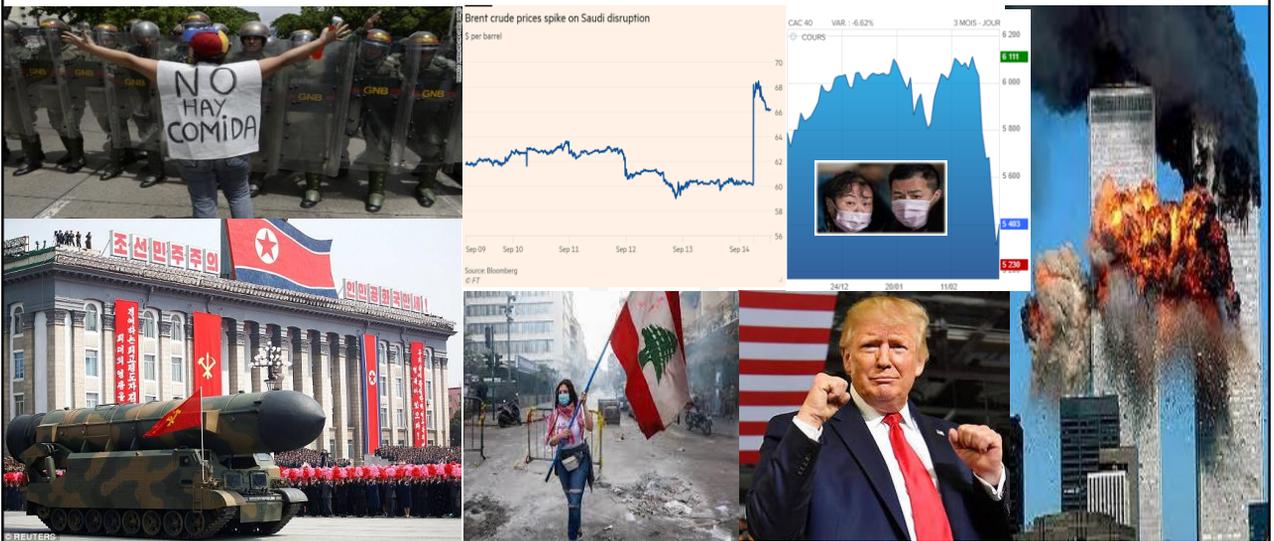


WHAT IS RISK ALL ABOUT?

“CONVERTING RISKS INTO SPRINGBOARDS OF SUCCESS”

CIFE SEMINAR ROMA-BERLIN-NICE 2024-25
MICHEL-HENRY BOUCHET

CAN YOU PREDICT RISK? RISK = UNCERTAINTY = INFORMATION DEFICIT



Michel H. Bouchet (c) CIFE 2024-25

2 TYPES OF CRISES:



► Type 1 Crisis

It emerges brutally, its timing cannot be anticipated, and it requires drastic adjustment

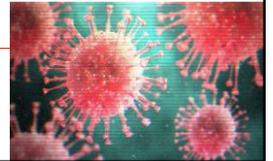
1. 1929 crisis
2. 1973 OPEC oil crisis
3. 12/2004 Asian tsunami
4. 2011 earthquake-driven Fukushima disaster
5. Twin Towers 1/11
6. Turkish lira crisis 04/2021



► Type 2 Crisis

It emerges brutally, it is unprecedented but probable, and it could have been expected

1. 1985 EMCs debt crisis
2. 1986 Chernobyl
3. 1999 Asian banking crisis
4. 2008 financial crisis
5. **Covid-19** (CIA 2005 report, Bill Gates 2015 TED talk, 2016 World Bank Facility, Obama 2016 pandemic report, 10/2019 Crimson Contagion planning)
6. **Russia's war against Ukraine**
7. **10/7/24 Hamas attack and subsequent retaliatory spiral**
8. (next) **Climate change crisis!**



Michel H. Bouchet (c) CIFE 2024-25

3

VIX = « FEAR INDEX » : Q1-2020



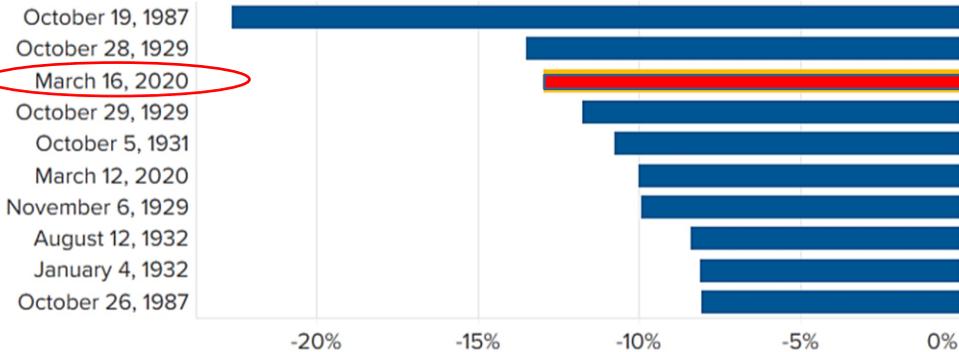
Michel H. Bouchet (c) CIFE 2024-25

4

ANTICIPATING ABRUPT STOCK MARKET DOWNTURNS WHAT IS THE ULTIMATE TRIGGER?

Biggest Dow losses of all time

Dow Jones Industrial Average's 10 largest one-day percentage drops



SOURCE: FactSet. Data as of market close on 3/16/2020.



Michel H. Bouchet (c) CIFE 2024-25

5

5



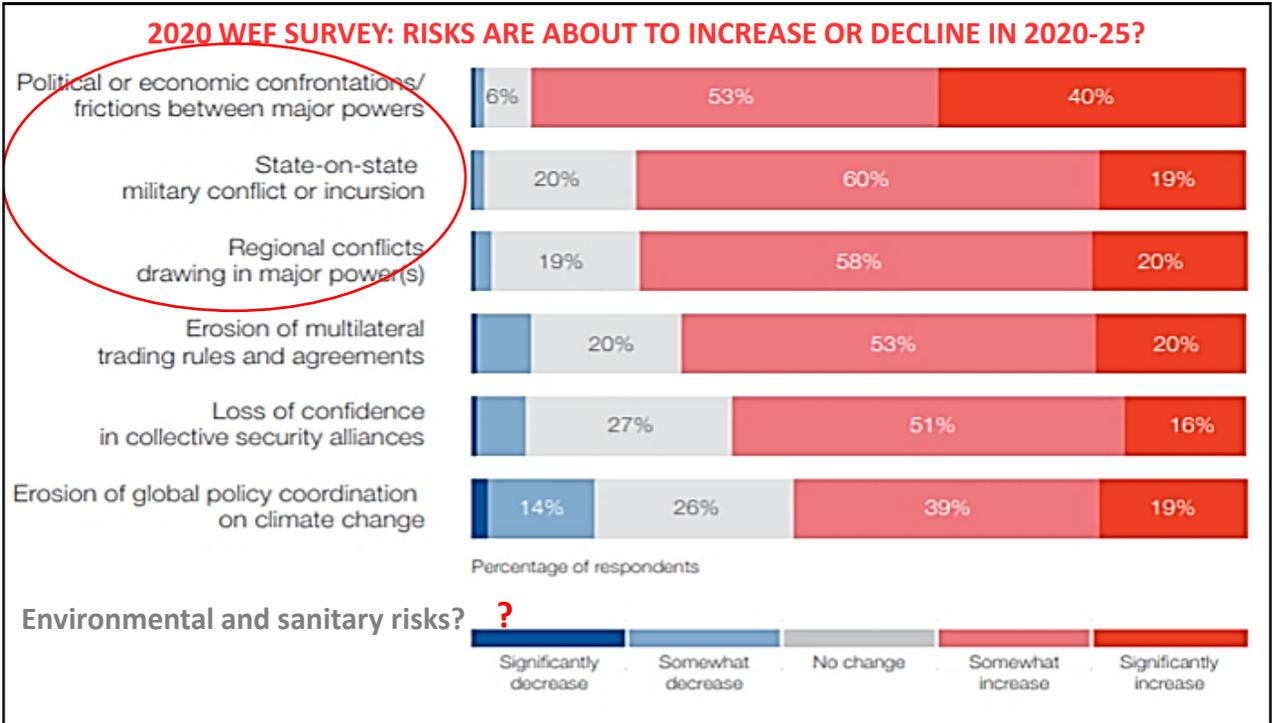
WHICH KEY QUESTIONS WILL UNDERPIN RISK ASSESSMENT STRATEGIES?

1. What about the **time frame**?
2. What about the risk **exposure**? (investor, exporter, importer, banking, NGO, IFI)
3. What is the **type** of risk? (direct, indirect, spill-over?)
4. What is the risk **profile**, e.g., sectoral, global, economic, socio-political, institutional, country specific?
5. Can the risk be **mitigated**?
6. Can the risk consequences be **insured**? e.g. MIGA, OPIC, Coface...

Michel H. Bouchet (c) CIFE 2024-25

6

6

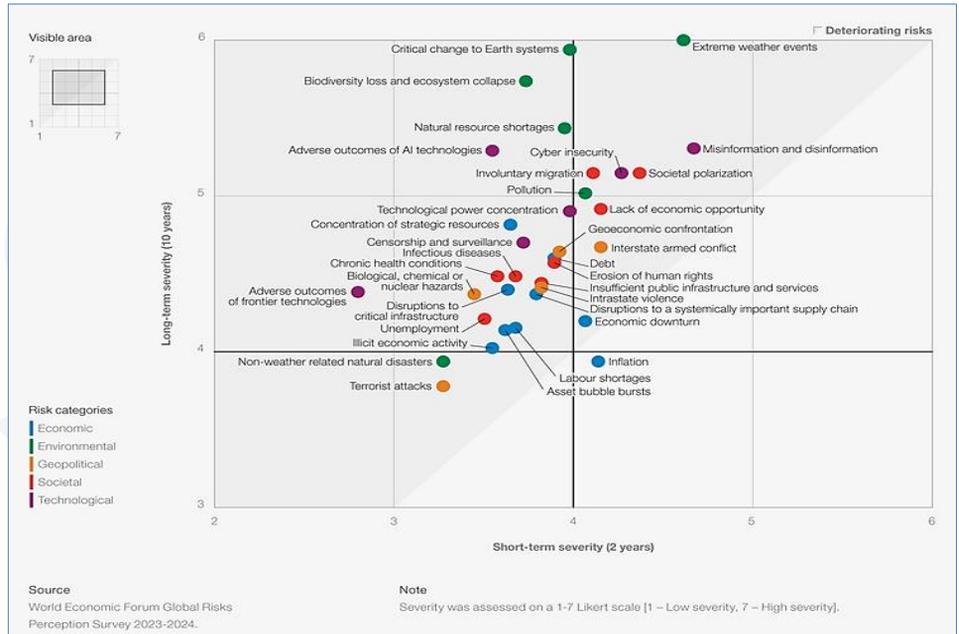


7



8

WEF RISK PERCEPTIONS OVER 2-10 YEAR HORIZON



Michel H. Bouchet (c) CIFE 2024-25

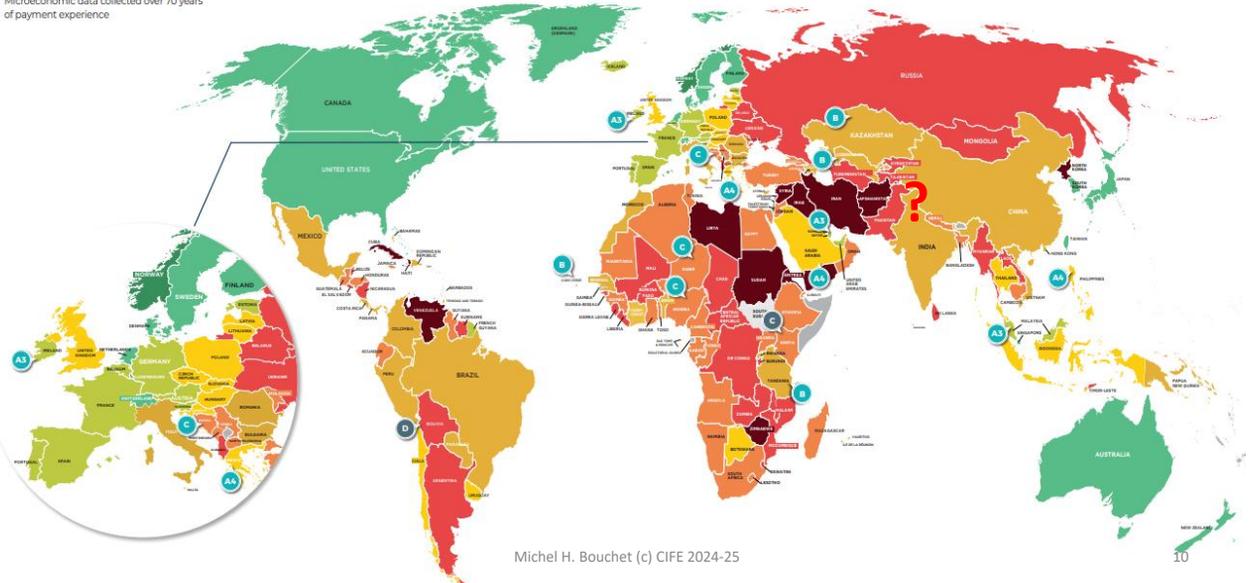
162 COUNTRIES UNDER THE MAGNIFYING GLASS

A UNIQUE METHODOLOGY

- Macroeconomic expertise in assessing country risk
- Comprehension of the business environment
- Microeconomic data collected over 70 years of payment experience



COFACE GLOBAL RISK MAP 2024



Michel H. Bouchet (c) CIFE 2024-25

WHAT IS RISK?

▶ Risk stems from all the negative consequences of the Unknown

- “Risk means more things **can** happen than will happen.” Elroy Dimson
- “Risk” derives from the early Italian *risicare* = “to dare” :
risk is a **choice** rather than a fate.
(Peter L. Bernstein- *Against the Gods: The Remarkable Story of Risk*)

Risk is always related to Uncertainty!

Michel H. Bouchet (c) CIFE 2024-25

11

11

▶ Risk stems from all the uncertainty regarding current or future situations, where information about the situation's outcome is **insufficient, lacking or wrong**

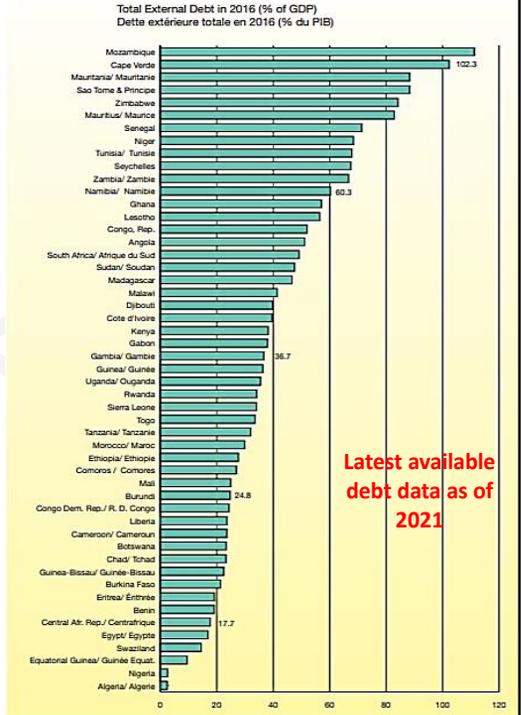
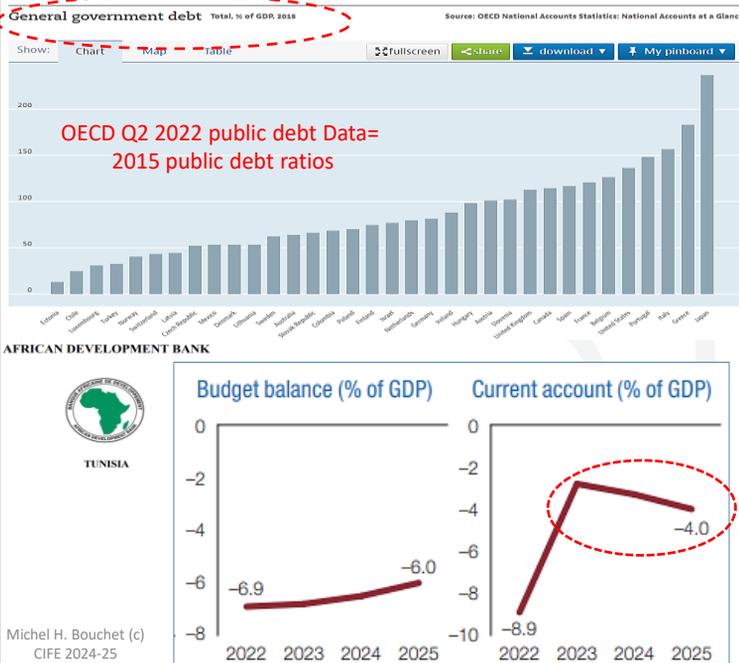
- Information availability = measure of risk (BOP, debt data, income gaps, governance, corruption...)
- Information scarcity = taking action might produce negative and costly consequences (investigation time, transaction cost, delays...)

Michel H. Bouchet (c) CIFE 2024-25

12

12

COUNTRY RISK FOR HISTORIANS!?



13

RISK & UNCERTAINTY

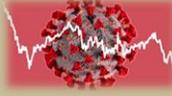
► **Frank Knight:** 1921 Risk stems from **outcomes that are unknown** but can be tackled with probability distribution.... **Uncertainty** stems from a deficit of information, hence randomness of results

► **Harry Markowitz:** 1959: Risk = probability of loss = historical volatility in returns as measured by standard deviation or Beta.
But **risk diversification** and tolerance also matter!

► **J M. Keynes:** (Treatise on Probability 1921): **Non-linear nature** of risks and danger of expecting the future as simple projection of the past: Role of animal spirits in volatility spill-over and herd behavior

► **Ulrich Beck:** 2010: « Global risk society where current decisions and technological developments trigger **long-term global impact** » (warming, terrorism, pollution, financial deregulation...)= secular stagnation?

14

Strong Uncertainty	Weak Uncertainty	Ambiguity	Complexity
<p>1. Substantive uncertainty = Lack of all the information necessary to make decisions with certain outcomes</p> <p>2. Fundamental uncertainty = List of possible events is not predetermined or knowable ex ante, as the future is yet to be created</p>	<p>Risk = Decision-makers use homogenous data for additive and fully reliable probability distributions to measure uncertainty</p>	<p>Unforeseen contingencies and « Judgmental uncertainty = How specifying which of a set of distributions is appropriate in a given situation?</p>	<p>Individuals are exposed to the occurrence of unexpected events with wide range of ramifications and risk of spill-over effects</p>
<p>3. Procedural uncertainty = Lack of complete knowledge on the part of the economic agents about the very structure of the problem they face given the available information</p>	<p>Individuals can act on the basis of a probability that is objective (any reasonable person would agree on it) and known.</p>	<p>High ambiguity even with ample quantity of information due to conflicting opinion and evidence, or poor understanding of the causal process</p>	

Michel H. Bouchet (c) CIFE 2024-25

15

ILLUSTRATION OF COUNTRY RISK EXAMPLES OF EVENT UNCERTAINTY

Country Risk Event	Strong uncertainty ?	Weak & measurable uncertainty	Ambiguity ?	Complexity ?
Economic events	FDI decision in post-Brexit UK	Exchange rate depreciation	Inflation decrease; growth slowdown	Sharp fall in oil prices Corona Virus
Socio-political events	Revolution, strikes and coup d'état	New market-oriented and pro-business government	High rate of electoral abstention	Upcoming elections; mounting corruption
Financial events	Nationalization of banking system	Interest-rate increase	Over-valuation of tech companies QE & ultra-low rates	External debt default
Spill-over events	Regional crisis contamination	US economic recession	€/USD volatility	Regional competitive devaluations Systemic crisis

Michel H. Bouchet (c) CIFE 2024-25

16

ECONOMIC AND SOCIO-POLITICAL + REGIONAL CONTAMINATION

Climate Change, the Great Displacer

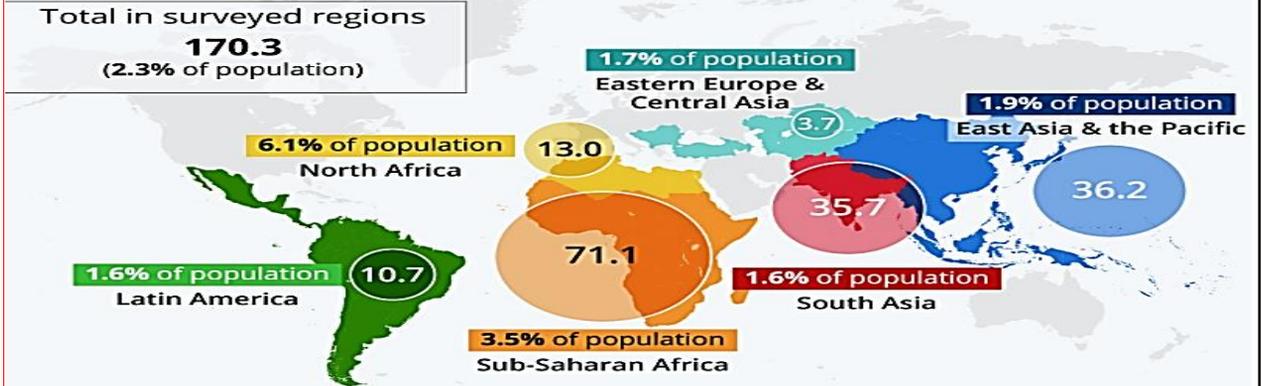
Average number of internal climate migrants by 2050 per region (in millions)*



Total in surveyed regions

170.3

(2.3% of population)



* Modeled on pessimistic reference = High emission & unequal development scenarios concerning water availability, crop productivity and sea-level rise
Source: World Bank

17

THE DISCOVERY OF RISK



Michel H. Bouchet (c) CIFE 2024-25

18

18



**XIII° CENTURY:
GRADUAL SHIFT
FROM CIRCULAR
TIME TO
LINEAR TIME**

Michel H. Bouchet (c) CIFE 2024-25



19

**RISK HAS TO DO WITH UNCERTAINTY REGARDING THE FUTURE,
HENCE THE NEED OF TACKLING FUTURE PROSPECTS!**



« Ancient times » = circular time... until the Middle Age

**XV° century Renaissance = « Modern time » = Merchant time
= linear time of economic & financial transactions +
secular progress**



Michel H. Bouchet (c) CIFE 2024-25

20

20

THE « DISCOVERY » OF RISK



Pascal 1654



Fermat 1654



Leibniz 1703



Markowitz 1959



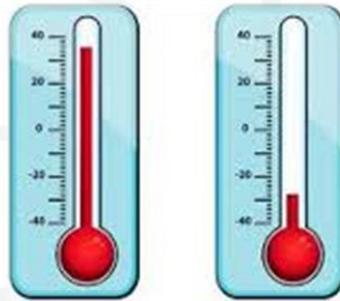
M. Scholes 1990



B. Mandelbrot 1990

el H. Bouchet (c) CIFE 2024-25

THE DISCOVERY OF THE MEASURE OF RISK



Michel H. Bouchet (c) CIFE 2024-25



NICOLAS DE CONDORCET: 1765: PROBABILITY DISTRIBUTION AND STATISTICS (BEGINNING OF BIG DATA?)



Robert Brown: Scottish botanist: in 1827, while examining grains of pollen suspended in water under a microscope, Brown observed minute particles ejected from the pollen grains, **executing a continuous jittery motion**



Jules Regnault (1863): « Le calcul des chances » : random walk model of stock price variations (good/bad speculation)



Louis Bachelier (1900): **stock price forecasting** is impossible due to endless number of influences though it is possible to study **probability distribution of price variations** (sigma) = volatility risk



Alfred Cowles (1933): forecasting stock market prices is impossible (large gap between actual stock prices and professional forecasting)

Michel H. Bouchet (c) CIFE 2024-25
25

23

LOOKING TOWARD EARLY WARNING SIGNALS OF UPCOMING CRISIS

THE CANARI IN THE COAL MINE?



- ▶ IMF & WB + UN reports?
 - ▶ Rating agencies?
 - ▶ CDS prices?
- ▶ Stock market volatility
 - ▶ Vix Index
 - ▶ Spreads and yields
- ▶ Minsky's speculative bubbles and herd-instinct
- ▶ B. Mandelbrot's fractal geometry
 - ▶ N. Taleb's Black Swans
- ▶ D. Sornette's Dragon-Kings (extreme events)
 - ▶ Capital Flight?
- ▶ Cife governance barometer?

Michel H. Bouchet (c) CIFE 2024-25
24

24



Michel H. Bouchet (c) CIFE 2024-25

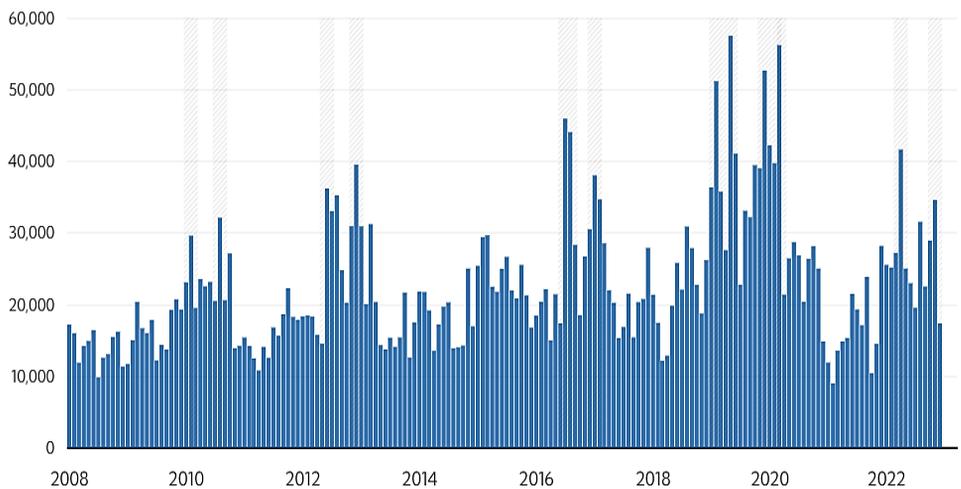
MEASURING « EXPECTED GLOBAL ECONOMIC UNCERTAINTY » 2007-23

Monthly Index with 3 underlying components:

1. EIU coverage of policy-related economic uncertainty.
2. number of federal tax code provisions set to expire in future years.
3. disagreement among economic forecasters as a proxy for uncertainty.

World Uncertainty Index

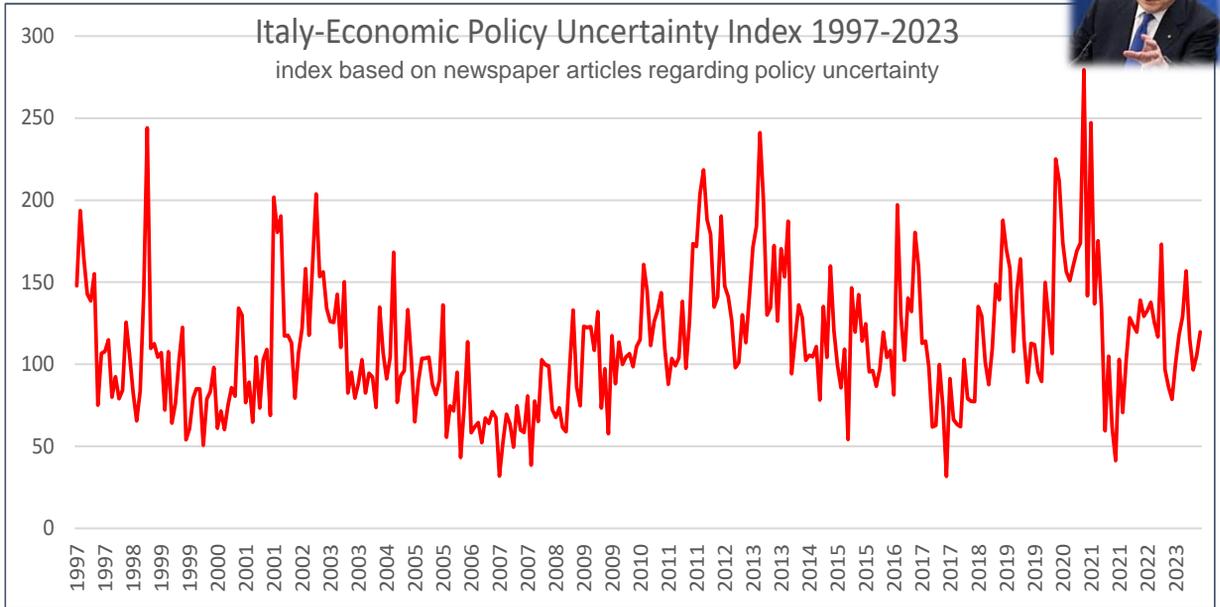
Uncertainty surged again following Russia's invasion of Ukraine.
(Index, GDP weighted average)



Michel H. Bouchet (c) CIFE 2024-25

Source= IMF, Stanford, Chicago + Northwestern-Kellogg School universities (143 countries)

THE UPS AND DOWNS OF ECONOMIC POLICY RISK & UNCERTAINTY



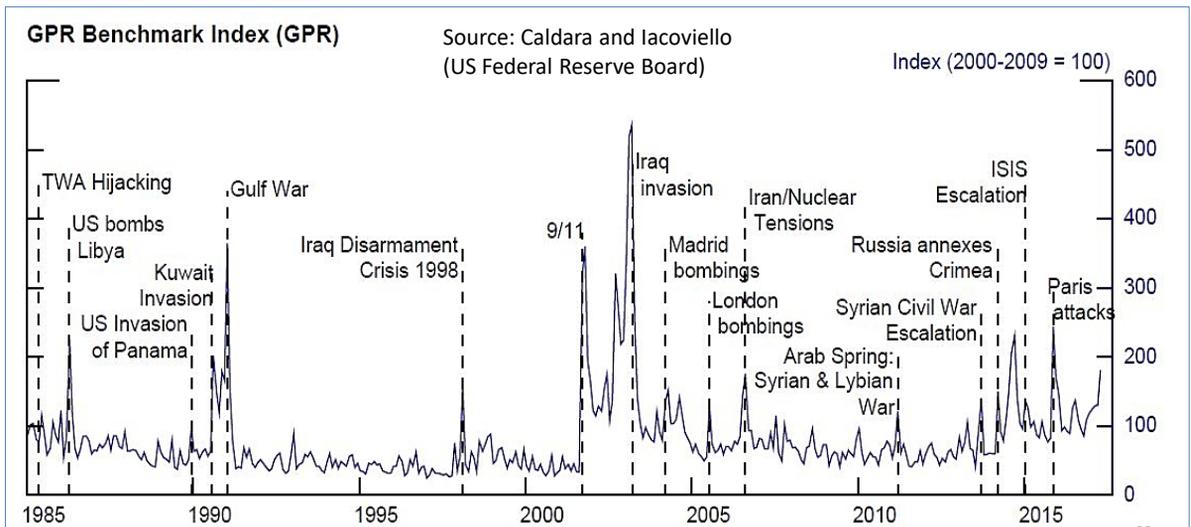
Michel H. Bouchet (c) CIFE 2024-25

27

27

THE GEOPOLITICAL RISK INDEX

MONTHLY INDEX OF GEOPOLITICAL RISK COUNTING THE OCCURRENCE OF WORDS RELATED TO GEOPOLITICAL TENSIONS IN 11 LEADING INTERNATIONAL NEWSPAPERS. THE INDEX IS NORMALIZED TO AVERAGE A VALUE OF 100 IN THE 2000-2009 DECADE. KEY INPUTS = GEOPOLITICAL RISK, MILITARY-RELATED TENSIONS, NUCLEAR TENSIONS. WAR THREATS AND TERRORIST THREATS, TERRORIST ACTS OR THE BEGINNING OF A WAR.



Michel H. Bouchet (c) CIFE 2024-25

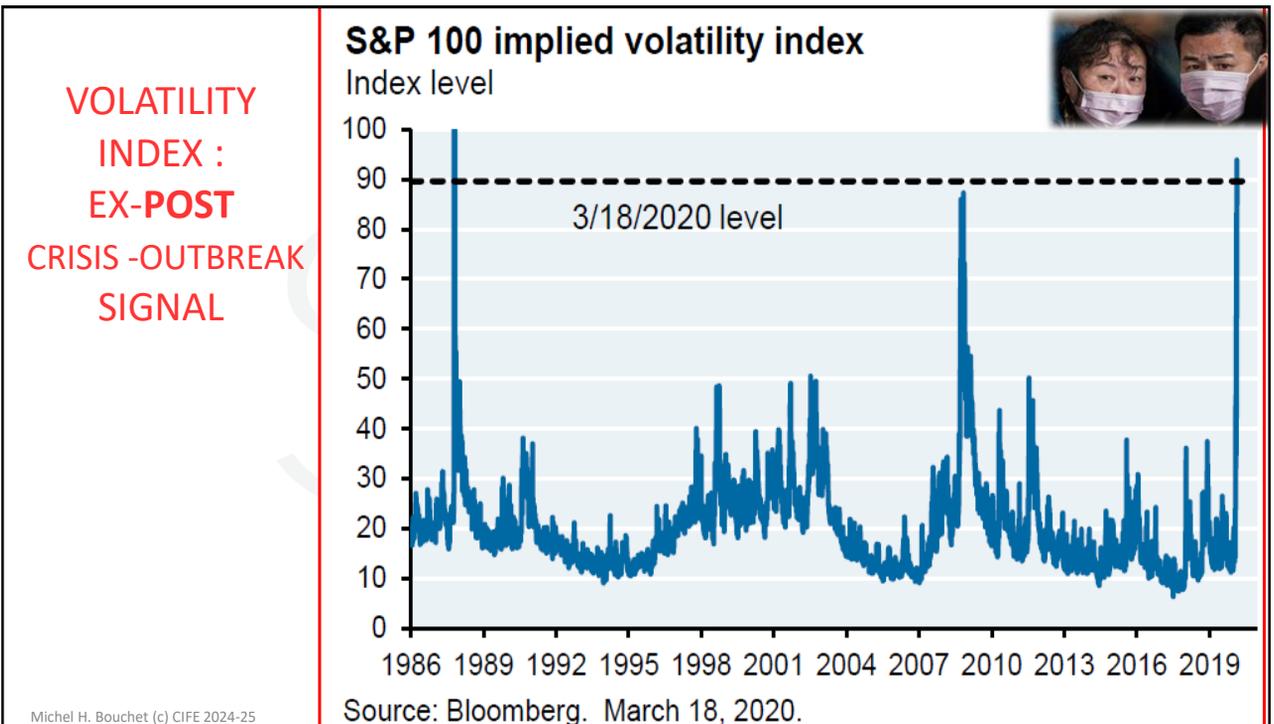
28

28

VIX INDEX IN PERSPECTIVE: 2015-2021



29



30

CHALLENGE? HOW PREDICTING AN ABRUPT SOCIO-POLITICAL CRISIS?



Liquidity indicators

- ▶ Inflation
- ▶ Foreign-exchange reserves
- ▶ interest rates differential
- ▶ Non-compressible import cover
- ▶ Debt servicing ratio and current account deficit
- **Socio-political and behavioral indicators**
 - Corruption and institutional weaknesses
 - Political turmoil
 - Capital flight
 - Bank run : number of customers withdraw their deposits simultaneously due to concerns about banking solvency

Solvency and structural indicators

- ▶ Debt levels (Debt/GDP, Debt/X, ST Debt)
- ▶ Worsening terms of trade
- ▶ Productivity's protracted weakness
- **Exogenous and global indicators**
 - Systemic crisis
 - Regional crisis contagion
 - Commodity prices
 - \$ Exchange rate volatility

Michel H. Bouchet (c) CIFE 2024-25

31

31

THE COMPLEXITY OF FINANCIAL RISK!

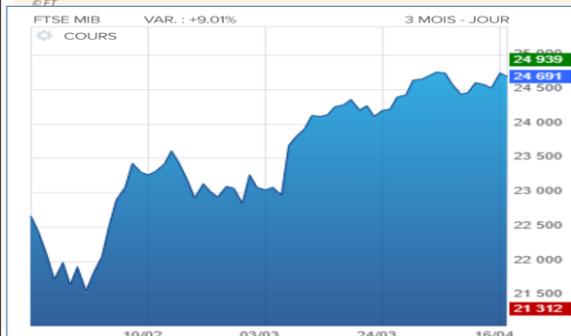
Cost to protect against Turkish debt default abruptly jumps
Five year CDS spread (basis points)



Source: Refinitiv
© E.T.



Naci Agbal in his office in February 2021, and his successor, Sahap Kavcıoğlu, less than two months later © Reuters

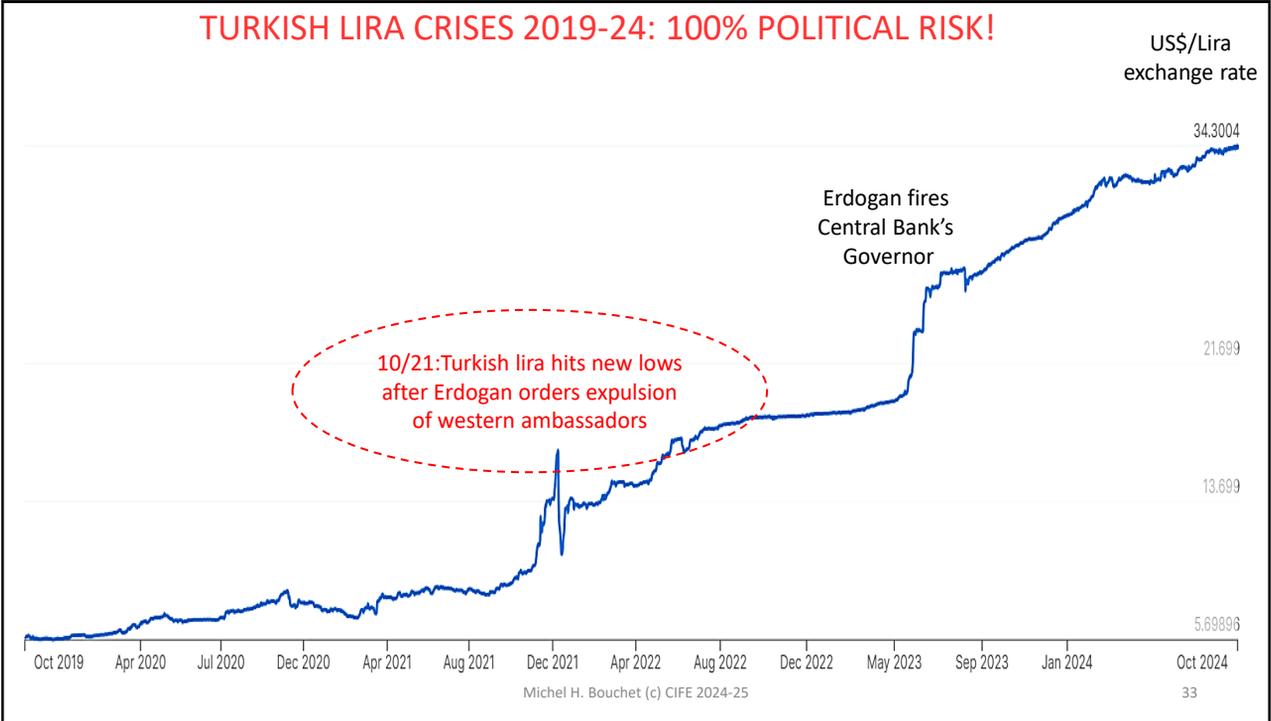


Bouchet (c) CIFE 2024-25



32

32



33



34

BUT HOW TACKLING AN « ABNORMAL » RISK?

LARGE, ABRUPT, AND OUTSIDE THE STANDARD TOOLKIT OF RISK INDICATORS?



Gradual trend of mounting riskiness

- ▶ Liquidity indicators
- ▶ Solvency ratios
- ▶ Ratings and rankings
- ▶ Surveys and polls
- ▶ Behavioral change
- ▶ Institutional weaknesses
- ▶ Growth slowdown

= « Gaussian law »

Abrupt turmoil and crisis

- War
- Coup d'état and Revolution
- Pandemic crisis (Ebola, HIV, Covid-19)
- Commodity crisis
- Sharp Exchange rate devaluation
- Bank run
- Global virus contamination
- Debt crisis and default
- Nationalization & confiscation

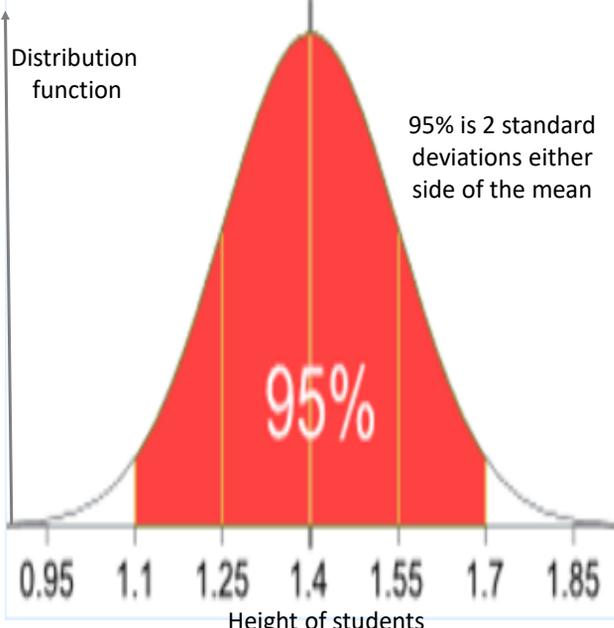
= « Fat tails and Black swans »

Michel H. Bouchet (c) CIFE 2024-25 35

35

BELL-SHAPED CURVE NORMAL DISTRIBUTION AND FAT TAILS?

As the number of discrete events increases, the function looks like a normal distribution
Values < one standard deviation away from the mean account for 68% of the set



Distribution function

95% is 2 standard deviations either side of the mean

0.95 1.1 1.25 1.4 1.55 1.7 1.85

Height of students
Solvency ratios
Current account deficits

Michel H. Bouchet (c) CIFE 2024-25 36

36

WHAT ABOUT RARE BUT CONSEQUENTIAL RISK AND FAT TAILS?

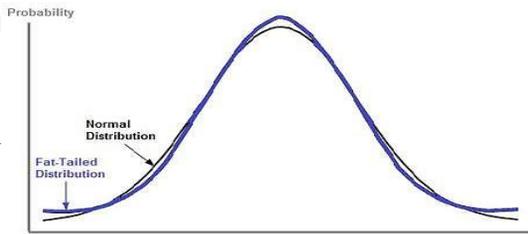
► Measuring average height

We select randomly two persons on earth and their total height is ... 4 m
 What is the most likely correlation between them??

► Measuring growth inequality within and between rich and poor nations?

We select randomly two persons on earth and their combined income is \$40 million: What is the most likely correlation between them?

Globally an additional 88 million to 115 million people fell into extreme poverty in 2020, a number that could rise to 150 million in 2021-22.



Michel H. Bouchet (c) CIFE 2024-25

37

37

Good morning Britain. This is what happened to your currency while you were asleep.

FAT TAILS:
 OUTSIDE THE
 COMFORT
 OF THE
 « BELL CURVE »

Sterling dives into uncharted waters
 Daily moves in the UK pound vs the US dollar (%)



Source: FT John Authers

Michel H. Bouchet (c) CIFE 2024-25

38

BLACK SWANS AND DRAGON KINGS

- **Nassim Taleb's Black Swans:** Major catastrophes are just events that started small and did not stop growing to develop into extreme sizes. These events are **unpredictable!** Black Swans are quantified by heavy-tailed distributions of event sizes ("fat tails" in Gaussian distributions). These outliers come from a small number of observations with a very large impact!



- **Sornette's Dragon Kings:** Very large in impact and born out of unique origins: non-linear systems. These **extreme events** are generated by herd-instinct, feedbacks, and unsustainable super-exponential acceleration before collapse. DKs are beyond the extrapolation of the fat tail distribution. Their occurrences **can be diagnosed ex-ante**, bringing back responsibility and accountability.

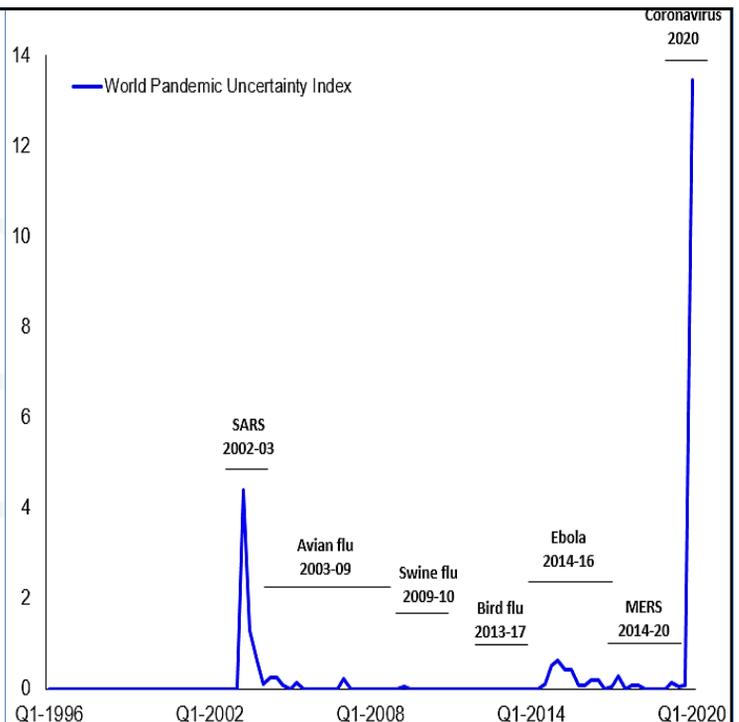
Michel H. Bouchet (c) CIFE 2024-25

39

39

THE WORLD PANDEMIC UNCERTAINTY INDEX 1996-2020

Note: The WPUI is the number of times that a word out of 100,000 in a given EIU country report mentions the word uncertainty near a word related to pandemics or epidemics. A higher number means higher global uncertainty around pandemics/epidemics and vice-versa. The numbers for 2020Q1 are based on the reports for March or the latest available. The WPUI is a sub-index of the World Uncertainty Index (<https://worlduncertaintyindex.com/>).



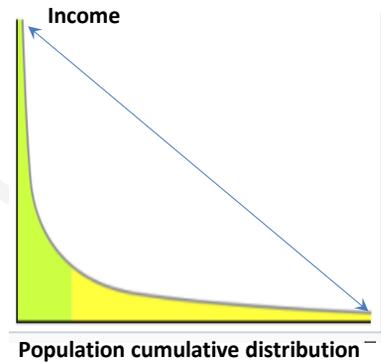
Michel H. Bouchet (c) CIFE 2024-25

40

POWER LAWS AND EXTREME RISKS?

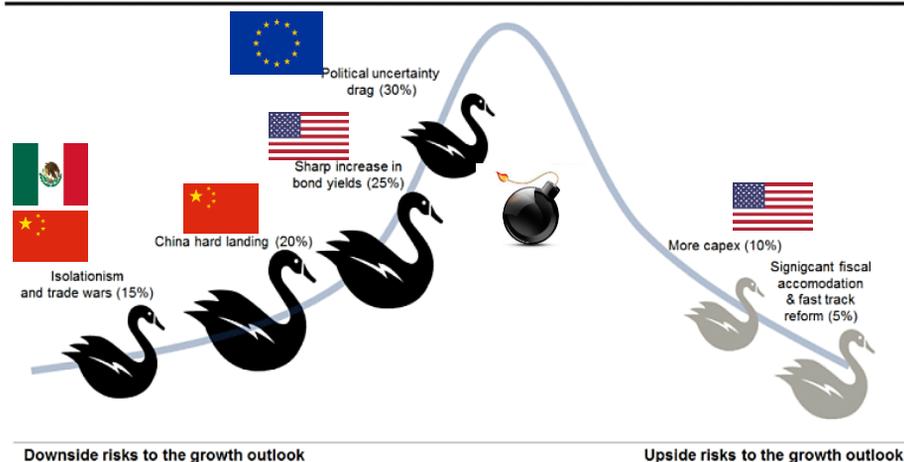
Power law probability distributions = Functional relationship between 2 quantities, where a relative change in one quantity results in a proportional relative change in the other quantity, independent of the initial size of those quantities: one quantity varies as a power of another.

- Considering the area of a square in terms of the length of its side, if the length is doubled, the area is multiplied by a factor of four!
- Car exhaust is distributed according to a power-law among cars : very few cars contribute to most contamination
- Wealth gap and Pareto distribution: The net worth of Americans is distributed according to a power law with an exponent of 2 (the average income hides fat-tails!)
- Power-law distributions are plotted on doubly logarithmic axes, which emphasizes the upper tail region ("extreme events")
- Log-log plot and power-law graph of cumulative distribution of ranking of popularity: right= long tail and left= the few that dominate, also known as the 80-20 rule



HOW DOES A GLOBAL BANK LIKE SOCIETE GENERALE MEASURE THE RISK OF « BLACK SWANS »?

SG Swan Chart



The y-axis gives an indication of how probable we consider a risk factor to be. The size of the swans gives an indication of how important the impact of that event materialising would be in terms of its upside or downside shock to the outlook.

Source: SG Cross Asset Research/Economics

CONCLUSION

▶ Transforming information
into knowledge & economic intelligence =
Best risk mitigation strategy!

Michel H. Bouchet (c) CIFE 2024-25

43

43



Michel H. Bouchet (c) CIFE 2024-25

44

44

COFACE + UNDP + TI + WORLD BANK= BETTER OFF IN ITALY OR IN SPAIN?



ITALY

- ▶ GDP Per capita ppp= \$43000
- ▶ HDI= 29
- ▶ Life expectancy f = 85,5
- ▶ Infant mortality= 3/1000
- ▶ Gender inequality: 0,07
- ▶ Doing Business= **58/190**
- ▶ Corruption = **42/180** ↑
- ▶ **Debt/GDP = 136%**
- ▶ **Unemployment = 7%**
- ▶ **Budget Deficit 2024: -3,8%**

SPAIN

- ▶ GDP Per capita ppp=\$41000
- ▶ HDI= 25
- ▶ Life expectancy f= 86
- ▶ Infant mortality= 2,5/1000
- ▶ Gender inequality: 0,07
- ▶ Doing Business= **30/190**
- ▶ Corruption = **36/180** ↓
- **Debt/GDP 2024 = 108%**
- **Unemployment= 11,5%**
- **Budget Deficit = -3,5%**

Michel H. Bouchet (c) CIFE 2024-25

45

45

COUNTRY RISK ASSESSMENT IN AN AGE OF GLOBALIZATION?

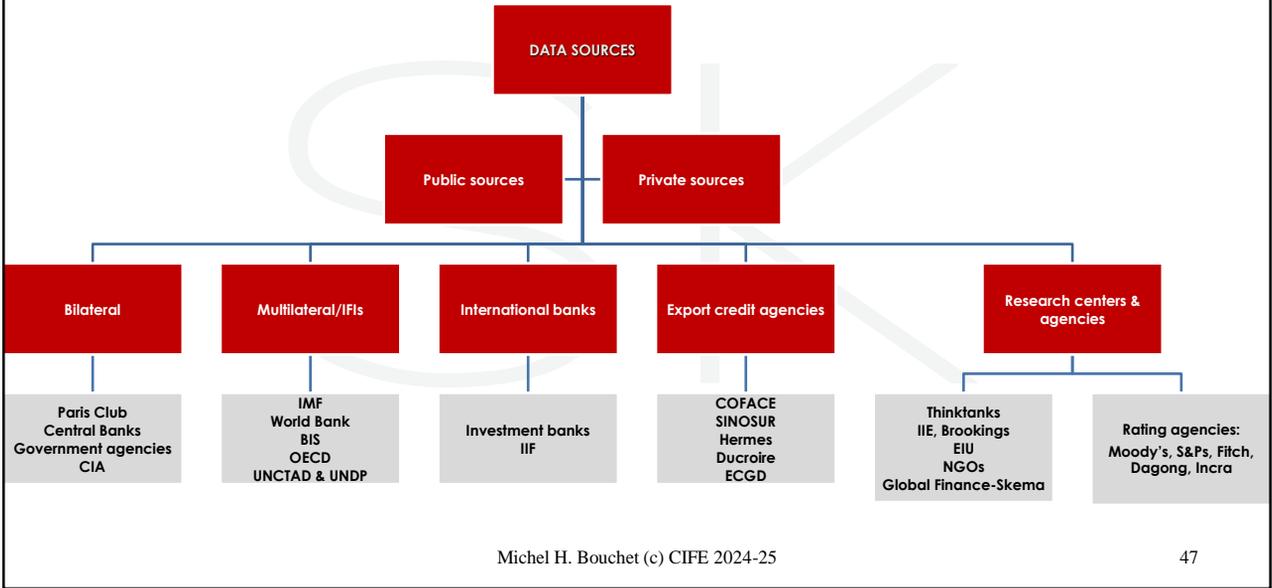
Reliable and updated information
= Economic intelligence

➔ **Robust risk analysis**



46

MAJOR SOURCES OF COUNTRY RISK INTELLIGENCE



47

INFORMATION SOURCES & ANALYSIS

- IMF, World Bank, IFC & MIGA**
- UNCTAD & UNDP**
- Fed Reserve Bk of St Louis**
- BIS, OECD, EBRD, EIB**
- Coface, Euler-Hermes**
- Moody's, S&P, Fitch, Dagong**
- Euromoney, Institutional Investor**
- CIA & US State Dept, ICRG**
- Transparency International**
- Hiscox, AON, Control Group**
- DEFI www.developingfinance.org**

Michel H. Bouchet (c) CIFE 2024-25 48

48



49

COFACE + UNDP + TI + WORLD BANK= BETTER OFF IN TUNISIA, MOROCCO OR ALGERIA?



TUNISIA



ALGERIA



MOROCCO

- ▶ GDP Per capita = \$10700
- ▶ HDI= 101
- ▶ Life expectancy f = 77,4
- ▶ Infant mortality= 13/1000
- ▶ Gender inequality: 0,28
- ▶ Doing Business= **78/190**
- ▶ CPI Corruption = **87/180**
- ▶ **MDPov Index: 2,8% of pop**

- ▶ GDP Per capita=\$11800
- ▶ HDI= 93
- ▶ Life expectancy f= 78
- ▶ Infant mortality= 22/1000
- ▶ Gender inequality: 0,43
- ▶ Doing Business= **157/190**
- ▶ CPI Corruption = **104/180**
- ▶ **MDPov Index: 4%**

- ▶ GDP per capita ppp= \$8300
- ▶ HDI = 120
- ▶ Life expectancy= 77
- ▶ Gender inequality = **0,49**
- ▶ Infant mortality= **23,7/1000**
- ▶ Doing Business = **53/190**
- ▶ CPI corruption= **97/180**
- ▶ **MDPov Index: 11%**

UNDP: Pop vulnerable to multidimensional poverty

Michel H. Bouchet (c) CIFE 2024-25

50

50



51

SUCCINCT CROSS-COUNTRY COMPARISON

	▶ KOSOVO	▶ ALBANIA	
	Population: 1,8 million GDP=€10 b	Population: 2,7 million GDP: €23 b	
	GDP growth: 3,8% CAD -7,7%	GDP growth: 3,3% Unemployment: 11%	
	Large trade deficit -30% gdp R/M= 2,5 months	Public debt: 60% gdp CAD: -4,5%	
	IMF SBA (\$20 m) large E&Os	Trade deficit: -10% gdp	
	Unemployment 15% Ext. debt: 40%gdp	External debt: 50% gdp R/M: 6 months	
	UNDP HDI= 0,7	UNDP HDI= 0,78	
	Corruption: 83/180 (between South Africa and Macedonia)	Corruption: 98 (same as Belarus and Argentina)	

in June 1999 Kosovo under the rule of an interim international administration.
New phase of reconstruction, recovery and development

Michel H. Bouchet (c) CIFE 2024-25

52

52