cife Centre international de formation européenne

NICE BERLIN BRUXELLES ISTANBUL

WHAT IS RISK ALL ABOUT?

"CONVERTING RISKS INTO SPRINGBOARDS OF SUCCESS"

CIFE SEMINAR NICE MAY 6-8, 2020

MICHEL-HENRY BOUCHET

1

CAN YOU PREDICT RISK?

RISK = UNCERTAINTY = INFORMATION DEFICIT

2 TYPES OF CRISES:

▶Type 1 Crisis

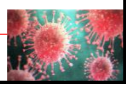
It emerges brutally, its timing cannot be anticipated, and it requires drastic adjustment

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

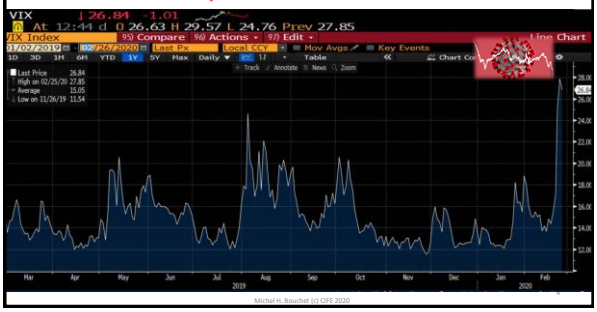
▶Type 2 Crisis

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 exercice International Security Program)
6. (next) Environmental crisis?!

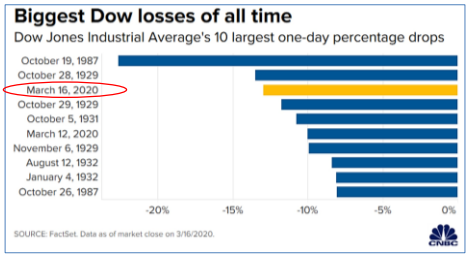


VIX = « FEAR INDEX » : Q12020



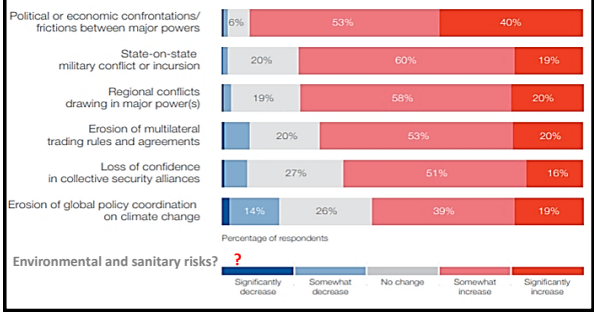
ANTICIPATING ABRUPT STOCK MARKET DOWNTURNS

WHAT IS THE ULTIMATE TRIGGER?

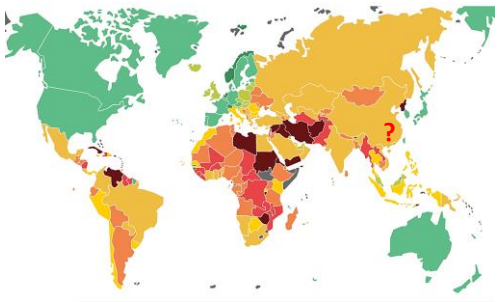


Michel H. Bouchet (c) CIFE 2020 5

2019 WEF SURVEY: RISKS ARE ABOUT TO INCREASE OR DECLINE IN 2020?



COFACE GLOBAL RISK MAP Q1 2020



7

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*)

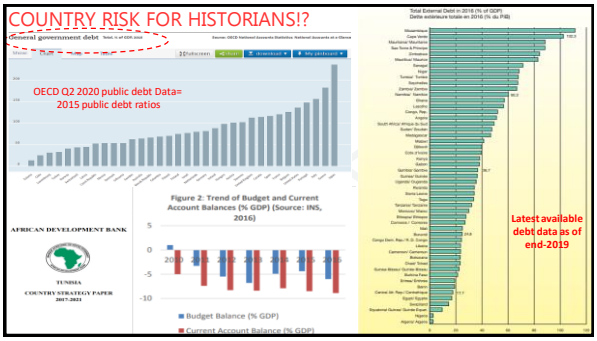
Risk is always related to **Uncertainty**!

Michel H. Bouchet (c) CIFE 2020 8

▶ 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, governance, corruption…)
- Information scarcity = taking action might produce negative and costly consequences (investigation time, transaction cost, delays…)

COUNTRY RISK FOR HISTORIANS!?



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…)

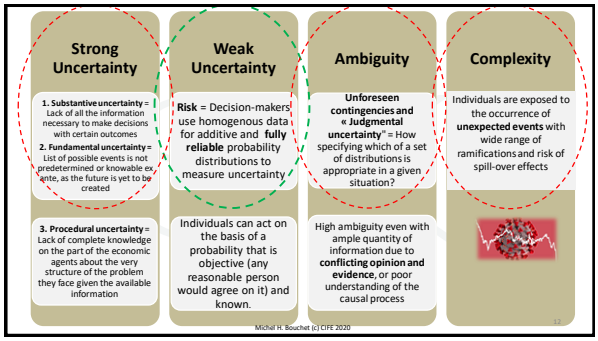


ILLUSTRATION OF COUNTRY RISK EXAMPLES OF EVENT UNCERTAINTY

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

THE DISCOVERY OF RISK

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

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!

THE « DISCOVERY » OF RISK

THE DISCOVERY OF THE **MEASURE** OF RISK

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

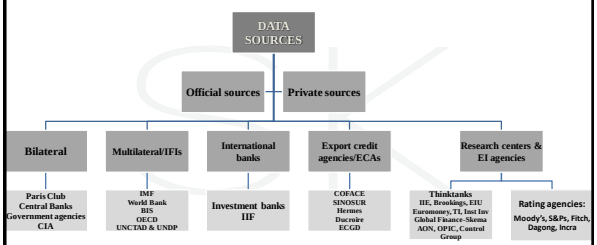
Robert Brown: Scottish botanist: in 1827, while examining grains of pollen suspended in water under a microscope, Brown observed minute particles ejected from the pollen grains, **executing a continuous jittery motion**

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)

MAJOR SOURCES OF COUNTRY RISK INTELLIGENCE



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

LOOKING TOWARD EARLY WARNING SIGNALS OF UPCOMING FINANCIAL AND SOCIO-POLITICAL CRISIS

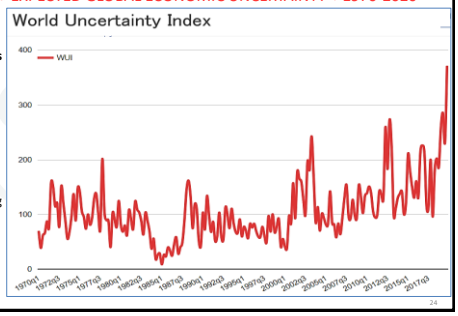
THE CANARI IN THE COAL MINE?

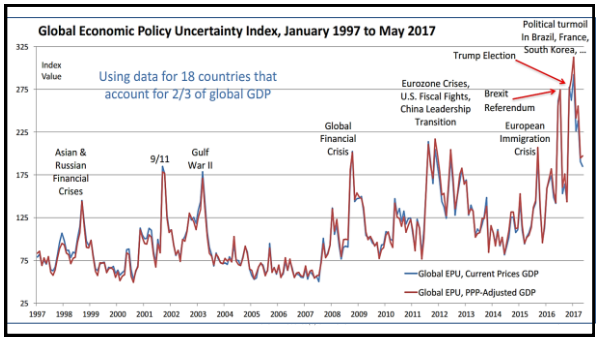
- ▶IMF reports?
- ▶Rating agencies?
- ▶CDS prices?
- ▶Stock market volatility
- ▶Vix Index
- ▶Spreads and yields
- ▶Minsky's speculative bubbles and herd-instinct
- ▶B. Mandelbrot's fractal geometry
- ▶N. Taleb's Black Swans
- ▶D. Sornette's Dragon-Kings (extreme events)
- ▶Capital Flight?

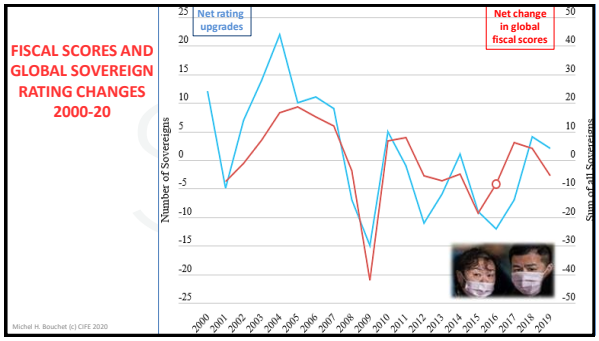
MEASURING « EXPECTED GLOBAL ECONOMIC UNCERTAINTY » 1970-2020

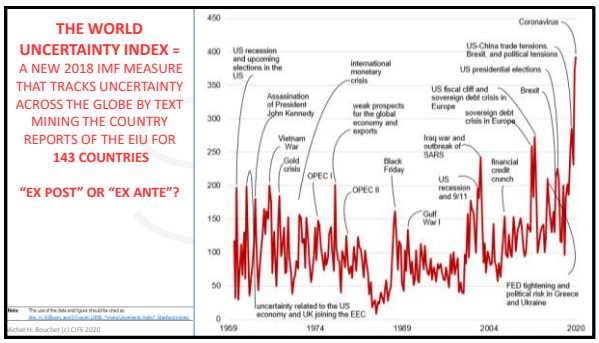
IMF Index with 3 underlying components

1. newspaper 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.







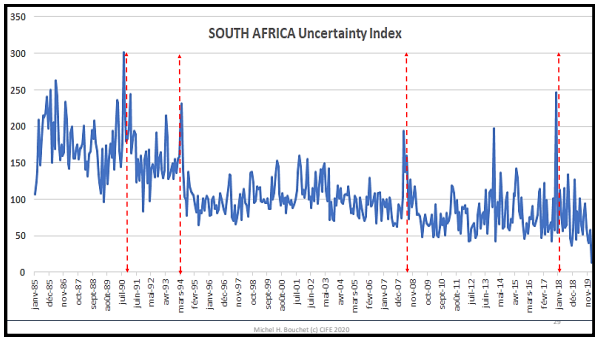


THE GEOPOLITICAL RISK INDEX

MONTHLY INDEX OF GEOPOLITICAL RISK (GPR INDEX) 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.

Source: Caldara and Iacoviello (US Federal Reserve Board)



CHALLENGE? HOW PREDICTING A **CURRENCY CRISIS**?

Liquidity indicators

- Inflation
- Foreign-exchange reserves
- interest rates differential
- Import cover
- Debt servicing ratio and current account deficit

Solvency and structural indicators

- Debt levels (Debt/GDP, Debt/X, ST Debt)
- Worsening terms of trade
- Productivity's protracted weakness

➢ **Socio-political and behavioral indicators**

- Political turmoil
- Capital flight
- Bank run : number of customers withdraw their deposits simultaneously due to concerns about banking solvency

➢ **Exogenous and global indicators**

- Systemic crisis
- Regional contagion
- Commodity prices
- $/€ Exchange rate volatility

Michel H. Bouchet (c) CIFE 2020 31

ARGENTINA: SWEEPING AUSTERITY MEASURES AND A $50 BILLION IMF CREDIT LINE HAVE FAILED TO PROP UP THE PESO DESPITE THE WORLD'S HIGHEST INTEREST RATES

Michel H. Bouchet (c) CIFE 2020 32

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 »

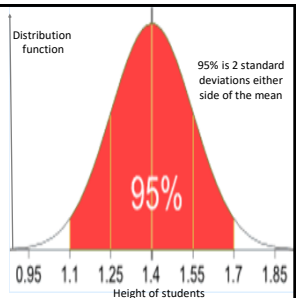
Abrupt turmoil and crisis

- 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

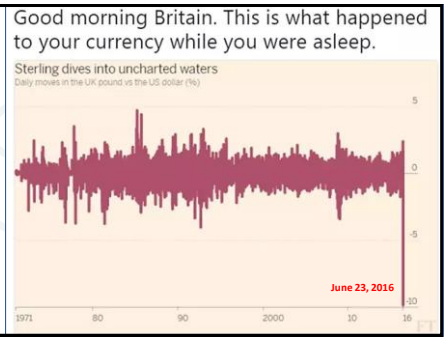
= « Fat tails and Black swans »

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

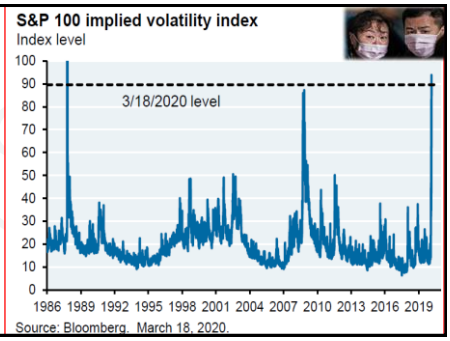


FAT TAILS: OUTSIDE THE COMFORT OF THE « **BELL CURVE** »



Source: FT John Authers

VOLATILITY INDEX A **POST** CRISIS -OUTBREAK SIGNAL



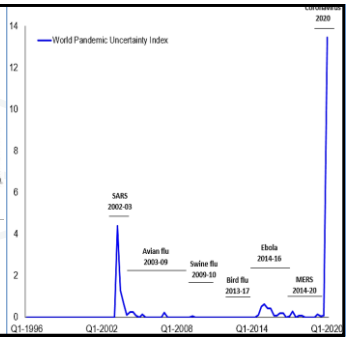
BLACK SWANS AND DRAGON KINGS

- **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 are anomalies with an abnormal distance from other values in a random sample from a population.


- **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 of the rest of the population. Their occurrences **can be diagnosed ex-ante**, bringing back responsibility and accountability.

THE WORLD PANDEMIC UNCERTAINTY INDEX 1996-2020

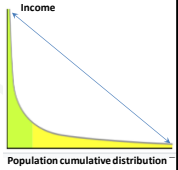
Note: The WPUI is the number of times that a word out of 100,000 in a given EIU country report mentions the word uncertainty near a word related to pandemics or epidemics. A higher number means higher global uncertainty around pandemics/epidemics and vice-versa. The numbers for 2020Q1 are based on the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



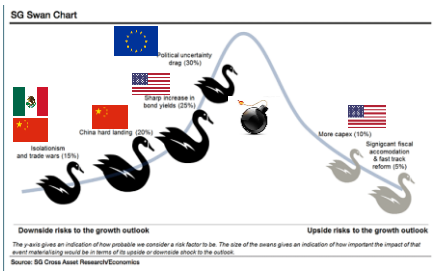
POWER LAWS AND EXTREME RISKS?

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

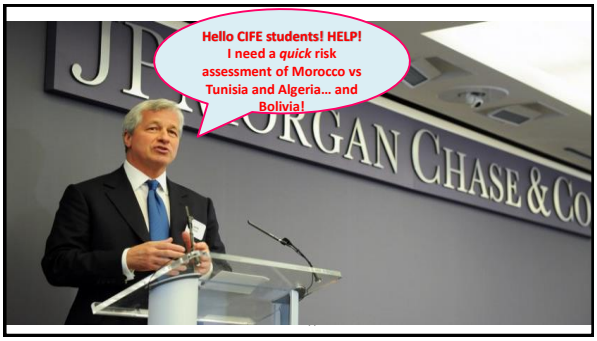


HOW DOES A GLOBAL BANK LIKE SOCIETE GENERALE MEASURE THE RISK OF « BLACK SWANS »?



CONCLUSION

- **Transforming information into economic intelligence = Best risk mitigation strategy!**



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

TUNISIA

- GDP Per capita = $11000
- HDI= 97
- Life expectancy f = 78
- Infant mortality= 13/1000
- Gender inequality: 0,28
- Doing Business= **78/190**
- Corruption = 74/180

ALGERIA

- GDP Per capita=$14000
- HDI= 83
- Life expectancy f= 75
- Infant mortality= 22/1000
- Gender inequality: 0,43
- Doing Business= **157/190**
- Corruption = **106/180**

MOROCCO

- GDP per capita ppp= $7500
- HDI = 123
- Life expectancy= 76
- Gender inequality = **0,49**
- Infant mortality= **23,7/1000**
- Doing Business = **53/190**
- CPI corruption= 80/180

BOLIVIA

- GDP per capita ppp= $7500
- HDI = 118
- Life expectancy= **69**
- Gender inequality = **0,49**
- Infant mortality= **30/1000**
- Doing Business = **150/190**
- CPI corruption= 123/180

COUNTRY RISK ASSESSMENT IN AN AGE OF GLOBALIZATION?

Reliable and updated information

= Economic intelligence

➔**Robust risk analysis**