

Chapter 16

COUNTRY RISK

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• Last Class

We finished the pure **FX part** of the semester.

- FX Market: FX Rates and Theories of FX Determination
- FX Rates Forecasting
- FX Risk: Tools & Hedging
- FX Exposure: FX Risk at the firm level (TE & EE)

Topics in International Corporate Finance

- **DFI**: Why DFI instead of exports?

Many reasons. We emphasize Reduce Economic Exposure & International Diversification

- **Multinational Capital Budgeting**. Follow standard NPV process, incorporating taxes (local and foreign) & exchange rates. Use discount rates specific to the (systematic) risk of the country. Agency Problems are addressed through simulations, sometimes based on previous experience

- **This Class**

For the rest of the class, we will continue with a collection of **different topics**, ranging from country risk analysis to international bond markets and financial engineering.

- In this class, we cover
 - Country Risk (Chapter 16)
 - Capital Structure & the Cost of Capital (Chapter 17)
 - International Bond Markets (Chapter 18)

Country Risk

Definition: Country Risk

Country risk (CR) is the risk attached to a borrower or an investment by virtue of its location in a particular country.

Example: ConocoPhillips invested in Venezuela in the 1990s to help develop the Petrozuata, Hamaca and Coroco projects, it added an additional risks to its investment portfolio: **Venezuelan country risk**.

Country Risk? In 2007, the Venezuelan government expropriated all ConocoPhillips investments without fair compensation. ¶

Note: CR is different than FX risk. CR risk can be zero and FX can be huge for a given country. The reverse, though unusual, can also happen.

- CR reflects the (potentially) negative impact of a country's economic and political situation on an MNC's or an investor's cash flows.
- CR is a **broad risk**: It includes economic risk, financial risk, political risk, etc. It affects MNC's discount rates and, thus, NPV-based decisions!
- Situations that can affect MNC's Cash flows:
 - Nationalization of subsidiaries or joint ventures.
 - Labor strikes in an industry.
 - Recession or a big macroeconomic shock.
 - A political scandal that introduces new laws or regulations.
 - New trade restrictions, limiting imports or exports.

Q: Does *country risk* analysis matter?

A: Look at companies investing in Ukraine & Russia in 2022, Greece in 2011 or Argentina in 2020. Value of affected assets went down significantly.

International Crisis Are Not Rare

Graph X.1

Sovereign External Debt 1800 - 2006 – Taken from Reinhart and Rogoff (2011)



This graphs describes *sovereign crises*, with the associated risk, *sovereign risk*.

- Measures to reduce country risk:

- A *cap* on the total amount invested in a particular country.
- Diversification.
- Credit/Political Risk Derivatives

Diversification and Country Risk (From The Economist, Sep 20, 2014)

After China's revolution in 1949 HSBC, then a purely Asian bank, lost half its business. Iran's nationalization in 1951 of the Anglo-Iranian Oil Company's assets devastated the firm, a precursor of BP.

Modern episodes:

- Repsol (Spain), fell in love with Argentina, leaving it vulnerable when YPF, the firm it bought there, was nationalized in 2012.
- First Quantum, (Canada), had made a third of its profits from a mine that the Democratic Republic of Congo nationalized in 2009.

Remark: Ben van Beurden, the boss of Royal Dutch Shell, recently said *diversification* is “the only way to inoculate yourself”.

- **Quantifying CR**

CR is an important component of the Multinational Capital Budgeting process.

- MNCs make decisions on DFI projects on the basis of NPVs.
- MNCs use discount rates to establish NPV for projects (the higher the discount rate, the lower the chances of a project to have a $NPV > 0$).

Q: Where do discount rates come from?

A: For projects abroad, a key element is Country risk (CR). We need to quantify this risk.

- **Simple Idea**

Many factors affect a country's economy: political, economic, social, etc.

We want a **global indicator** that assesses the likelihood of a (negative) change in a given country's economic policy.

This indicator, reported as a single number, is called *country risk* (CR).

- Similar to *credit risk* ratings, CR is usually measured as a letter:
A=excellent, B=good, C=bad \Rightarrow Letter = Grade
- Ideally, CR gives companies and lenders a very good indicator of a country's likelihood of default.

- Credit and Interest Rate Risk for Bonds: Brief Review

Bonds are subject to two types of risk:

- 1) **Interest rate risk:** Risk associated to changes in interest rates.
- 2) **Credit/default risk:** Risk associated to the probability of default (& not receiving principal and interest payments after default)

Credit rating agencies describe/measure the risk with a **credit rating** (a letter).

Implication: The higher the grade, the lower the yield (YTM) of the bond.

For any company borrowing money, the YTM is set by a spread, reflecting credit risk, over **base rate** (usually, **risk-free rate**):

$$\text{YTM} = \text{Base rate} + \text{Credit Risk Spread}$$

Note: For us, the risk-free rate of a country is set by the YTM of government bonds.

Risk-free rate for country J = **YTM of government bonds of Country J.**

- **General Idea**

From a big data set (with a lot of economic, socioeconomic and political variables), we produce a single measure (a letter).

- **Two approaches to measure CR (and get a grade)**

(1) *Qualitative* – collect data, get opinions from “experts” \Rightarrow *consensus* grade.

(2) *Quantitative* – collect data, process data with a computer model \Rightarrow grade.

(1) **Qualitative Approach:** Talk to experts (politicians, union members, economists, etc.) to form a *consensus* opinion about the risk of a country.
 \Rightarrow **Consensus opinion** = Final grade.

(2) **Quantitative Approach:** Start with some quantifiable factors that affect CR. Use a formula to determine numerical scores for each factor. Calculate a weighted average of the factors’ numerical scores.
 \Rightarrow **Weighted average of scores** = Final grade.

(1) Qualitative Approach is considered “**subjective.**”

(2) Quantitative Approach is considered “**objective.**”

We will emphasize the Quantitative Approach.

- **Pros**

- It is **simple**
- It allows cross-country and across time comparison.

- **Cons**

- It is **too simple.**
- In practice, ratings tend to converge (**herding**).
- Not a lot of predictive power.

Note: Ideally, rating companies are independent. But, they have incentives to accommodate clients (countries).

CR: Is it really a good indicator of economic problems/default?

The lack of predictive power for many crisis is a major criticism.

Example: A month before the 1997 Asia crisis, South Korea was rated as Italy and Sweden. Then, Fitch went from rating Korea as **AA-** (*investment grade*) to **B-** (*junk*) in one month. Other rating agencies replicated the same dramatic sudden change in Korea's CR rating.

In early 1998, Fitch justified the situation:

“There were no early warnings about Korea from us or, to the best of our knowledge, from other market participants, and our customers should expect a better job from us.” ¶

Similar sudden downgrades occurred during the 2009-2013 European debt crisis with Greece, Ireland, Italy, Portugal, and Spain (PIIGS).

• Practical use of CR

• We associate CR to the **spread over** a base, global **risk-free rate**, say U.S. T-bills. We call the spread, *CR spread* or *CR premium*.

⇒ CR influences the interest on the debt issued by a government of a country (& the discount rate on foreign projects!).

That is, suppose country DX issues new debt, the yield is determined by:

$$\text{Yield}_{\text{DX-debt}} = \text{Base Rate} + \text{CR Spread}$$

Example: Setting yields for Mexico (actually, the Mexican government)

Data:

Mexico's grade: BBB -a *CR spread* of 140 bps (1.40%) over US Treasuries

Base Rate Yield (US Treasuries yield): **4%**

$$\text{Yield}_{\text{Mex}} = 4\% + 1.40\% = 5.40\%$$

Note: This is a **USD** yield. To translate it to MXN, we use **linearized IFE**:

$$\text{Yield}_{\text{Mex}} (\text{MXN}) \approx \text{Yield}_{\text{Mex}} (\text{USD}) + E[e_f].$$

Example (continuation):

$$\text{Yield}_{\text{Mex}} (\text{MXN}) \approx \text{Yield}_{\text{Mex}} (\text{USD}) + E[e_f].$$

To calculate $E[e_f]$, we can use **linearized PPP**. Data:

$$E[I_{\text{MEX}}] = 7\%$$

$$E[I_{\text{US}}] = 2\%$$

$$\Rightarrow E[e_f] = E[I_{\text{MEX}}] - E[I_{\text{US}}] = 5\%$$

$$\Rightarrow \text{Yield}_{\text{Mex}} (\text{MXN}) \approx 5.40\% + 5\% = 10.40\%.$$

- **Yield_{Mex} (MXN)** becomes the risk-free rate for projects in Mexico, used to the discount CFs in MXN. That is:

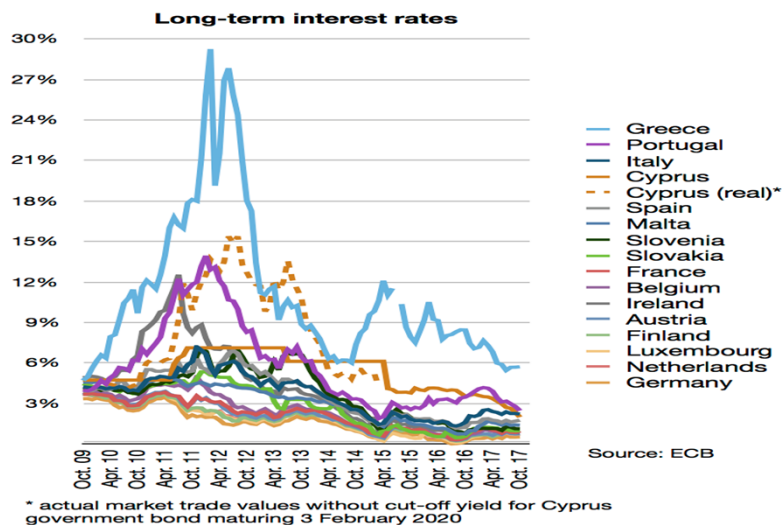
$$\text{Discount Rate Project}_{\text{Mex}} = \text{Yield}_{\text{Mex}} + \text{project's risk premium}.$$

Suppose an oil company is investing in a project in Mexico and sets a **3%** project's risk premium. Then,

$$\text{Discount Rate Oil Project}_{\text{Mex}} = 10.40\% + 3\% = 13.40\%.$$

The MXN CFs will be discounted using **13.40%** as the discount rate. ¶

Example: During the European debt crisis (2009-mid 2010s), yields of European government bonds became very dispersed. ¶



- What explains the difference between the yields in Germany and Portugal, Italy, Greece & Spain? Country Risk Spread (there is no FX risk!).

• Risk Rating Method (Check list)

- Weighted average of grades for four major aspects of a country:
 - Economic Indicators (financial condition)
 - Debt management (ability to repay debt)
 - Political factors (political stability)
 - Structural factors (socioeconomic conditions)

The grades (between **0** and **100**) for each factor are a function of “*fundamental data*.” For example, the economic indicator’s grade depends on GDP per capita, GDP growth, inflation, interest rates, etc.

A specific formula is used to compute the grades. For example,

$$\text{Score(EI)} = \alpha_0 + \alpha_1 \text{ GDP growth} + \alpha_2 \text{ Inflation} + \alpha_3 \text{ Productivity} + \dots$$

Regressions and experience will determine the coefficients ($\alpha_0, \alpha_1, \alpha_2, \dots$). We expect GDP growth & inflation to have $\alpha_1 > 0$ and $\alpha_2 < 0$.

• Risk Rating Method (Check list)

- Final score (& CR letter) will be determined by a weighted average:

$$\text{Final Score} = \omega_{EI} \text{ Score(EI)} + \omega_{DM} \text{ Score(DM)} + \omega_{PF} \text{ Score(PF)} + \omega_{SF} \text{ Score(SF)}$$

Note: Weights should be non-negative and add up to 1:

$$\sum_j \omega_j = 1, \quad \text{—i.e., } \omega_{EI} + \omega_{DM} + \omega_{PF} + \omega_{SF} = 1.$$

Q: Where are the weights and the formulae for the grades coming from?

A: This method seems more “*objective*,” because it is based on hard economic data, but weights and formula for grades may be “*subjective*.”

⇒ CR is more an art, than a science.

- CR is a broad concept. It is possible to treat *political risk* as a separate risk. Why? Political risk can be insured (many governments subsidize it) & if political risk is independent of systematic risk, it does not affect discount rates.

• **Risk Rating Method (Check list)**

The model can deliver different forecasts, according to the **investment or loan horizon**:

- Short-term
- Medium-term
- Long-term

⇒ Weights and grades can change depending on your horizon.

For example:

- (a) **Short-term**: More weight to debt management & political factors.
- (b) **Long-term**: More weight to economic indicators & structural factor.

Remark: Once we have the final grade, we use it to set a **spread** in basis points (bps) over base rate, usually a risk free rate.

TABLE 16.1

Conversion Table of a Country's Grade into a Rating and Spreads over US Treasuries

<u>Overall grade</u>	<u>Rating</u>	<u>Interpretation</u>	<u>Spread (in bps)</u>	<u>Average</u>
91-100	AAA	Excellent	10-70	50
81-90	AA		50-100	70
71-80	A		80-130	100
61-70	BBB	Average risk	110-220	160
51-60	BB		190-300	240
41-50	B		270-410	350
31-40	CCC	Excessive risk	360-490	450
21-30	CC		450-700	570
10-20	C		700+	800
0-10	D	In Default	(debt in arrears)	

Note I: A rating of BBB or better is considered “**investment grade**.”

Note II: A rating of BB or less is considered “**junk**.” In the U.S., the usual spread of junk debt is between 400 to 600 bps over 1-yr T-bills. Range is very wide: Spreads can go over 2600 bps.

Note III: As time to maturity increases, the spread (in bps) also increases.

Example: Bertoni Bank evaluates the country risk of country DX.

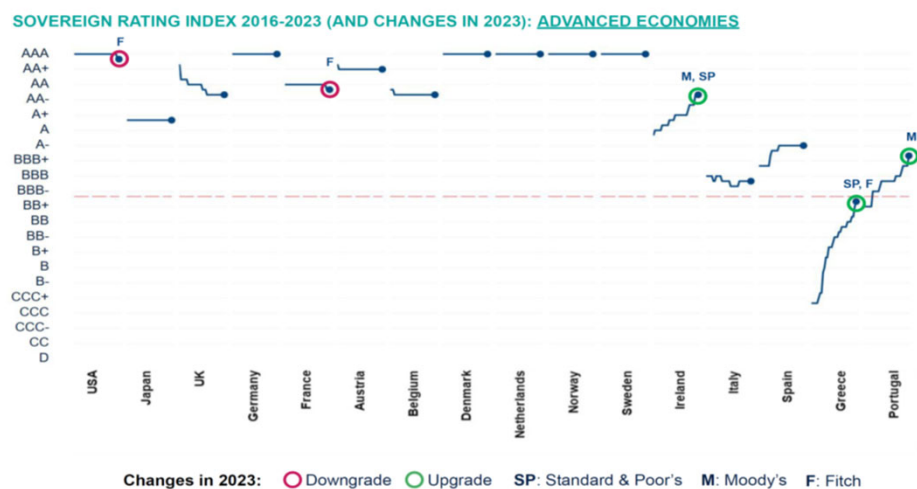
Factor	Short-term Horizon			Medium-term Horizon		
	Weight	Grade		Weight	Grade	
Economic	.3	80	24	.3	70	21
Debt managt	.3	90	27	.2	70	14
Political	.3	67	20.1	.2	50	15
Structural	.1	75	<u>7.5</u>	.3	60	<u>12</u>
Total			78.6			63
Short-term ranking: A				Medium-term ranking: BBB		

⇒ **Short-term** debt (in USD) of country DX gets a spread in the **80-130 bps** range, say **93 bps** over US Treasuries; while *medium-term* debt gets a higher spread, say **128 bps**.

Suppose *short-term* US Treasuries yield **4%** (s.a.). Then,

$$\text{YTM}_{\text{DX}} (\text{short-term, in USD}) = 4\% (\text{s.a.}) + 0.93\% (\text{s.a.}) = 4.93\% (\text{s.a.}). \P$$

Example: Evolution of Country Risk Ratings for Developed markets (2016-2023), aggregated by BBVA, in **2024**. ¶



<https://www.bbvaresearch.com/en/publicaciones/country-risk-annual-report-2024/>

Example: Yields tend to be similar for similarly rated (*herding?*); but not always.

10-year government bonds: Q2 2025 (from Bloomberg).

Americas 10-Year Government Bond Yields

COUNTRY	YIELD	1 DAY	1 MONTH	1 YEAR	TIME (EDT)
United States »	4.24%	-5	-27	-9	4:06 PM
Canada »	3.33%	+1	+0	-16	4:06 PM
Brazil	13.86%	-6	-18	-182	4:06 PM
Mexico	9.33%	+0	-10	-61	3:44 PM

Europe, Middle East & Africa 10-Year Government Bond Yields

COUNTRY	YIELD	1 DAY	1 MONTH	1 YEAR	TIME (EDT)
Germany »	2.57%	+0	+1	+12	11:59 AM
United Kingdom »	4.47%	-1	-21	+34	11:59 AM
France	3.25%	-1	+1	+2	11:59 AM
Italy	3.45%	-3	-10	-54	11:59 AM
Spain	3.21%	-2	+3	-12	11:59 AM
Netherlands	2.78%	0	+0	-1	11:59 AM
Portugal	3.02%	-1	-3	-17	11:59 AM
Greece	3.25%	-4	-2	-42	11:59 AM
Switzerland	0.35%	-1	+9	-19	11:59 AM

Example: Country Risk in Practice

Euromoney produces semi-annual CR analysis of 189 countries using a panel of 400+ experts. *Euromoney* rates 6 categories with a score (ECR, from 0 to 100).

• Categories and weights:

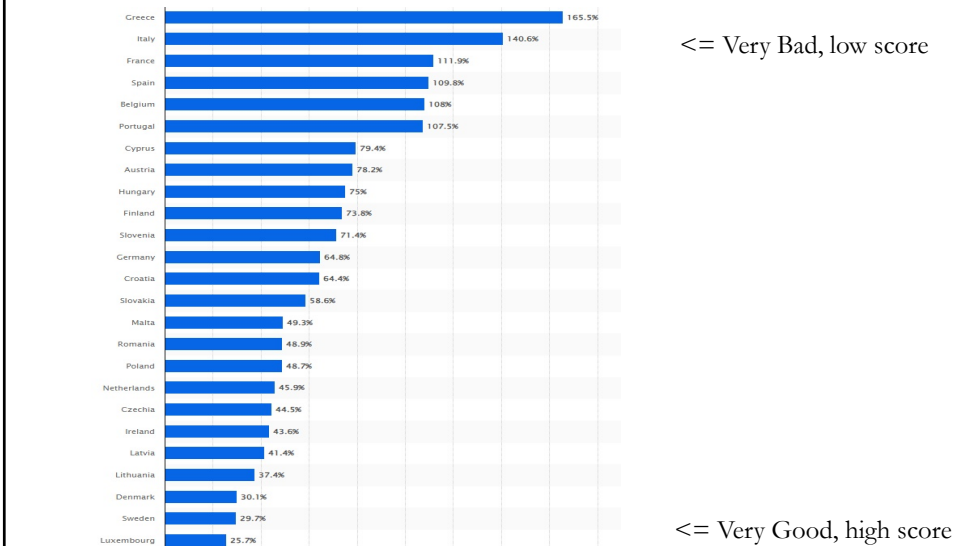
<i>Economic performance</i>	-30%
<i>Political Risk</i>	-30%
<i>Structural assessment</i>	-10%
<i>Debt indicators:</i> Debt/GDP; Debt service/X; & X-M/GDP	-10%
<i>Credit rating:</i> Moody's or S&P's or Fitch IBCA's rating	-10%
<i>Access to bank finance/Capital markets:</i> Grade from 0 to 10	-10%

The first three categories are (mainly) qualitative and the last three categories are (mainly) quantitative.

Based on the weighted average for each country, each country is placed on a Tier, with **Tier 1** = AAA (80 - 100); and **Tier 5** = C (0 - 35.9). ¶

Example: Country Risk in Practice

Euromoney's experts evaluate each category for each country and grade them from 0 to 100. For example, they look data like Debt-to-GDP for the category **Debt Indicator** (10% weight) and grade it:

**Example: Country Risk in Practice**

- *Euromoney* CR ratings – Top 10 1982 - 2019

1982			2019		
Rank	Country	ECR Score	Rank	Country	ECR Score
1	UK	100	1	Singapore	88.75
2	Sweden	100	2	Norway	88.45
3	France	99	3	Switzerland	88.36
4	Denmark	98.4	4	Denmark	86.55
5	Belgium	94	5	Sweden	86.23
6=	New Zealand	88	6	Luxembourg	86.02
6=	Australia	88	7	Netherlands	84.56
8	Austria	87.5	8	Finland	84.02
9	Netherlands	87.3	9	Australia	83.01
10	Canada	87	10	Canada	82.85
14	Singapore	86.2			

Source: Euromoney Country Risk

Remark: Five out 10 countries remain in the Top 10 after almost 40 years!

Example: Country Risk in Practice

- *Euromoney* CR ratings

- *Congo* (2021: 36.80 – World Ranking: 130)

2011: 28.89 (World ranking: 139. In 2001, Congo ranked 180th.)

- *Romania* (2021: 58.53 – World Ranking: 52)

2011: 49.09 (World ranking: 72. In 2001, Romania ranked 89th.)

- *China* (2020: 58.62 - World Ranking: 50)

2011: 63.55 (World ranking: 40. In 2001, China ranked 45th.)

- *Taiwan* (2019: 69.10 - World Ranking: 23)

2011: 80.04 (World ranking: 18. In 2001, Taiwan ranked 28th.)

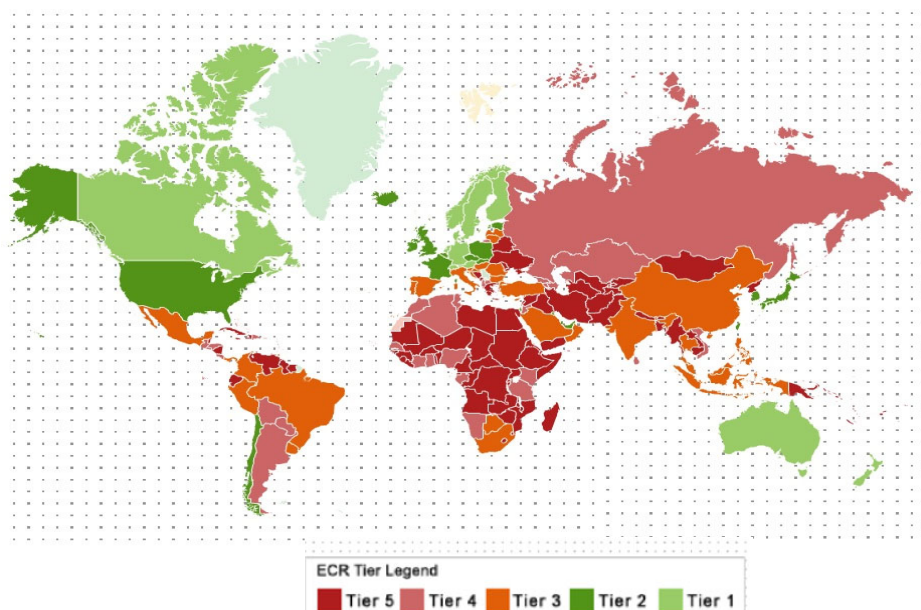
- *Singapore* (2019: 88.75 - World Ranking: 1)

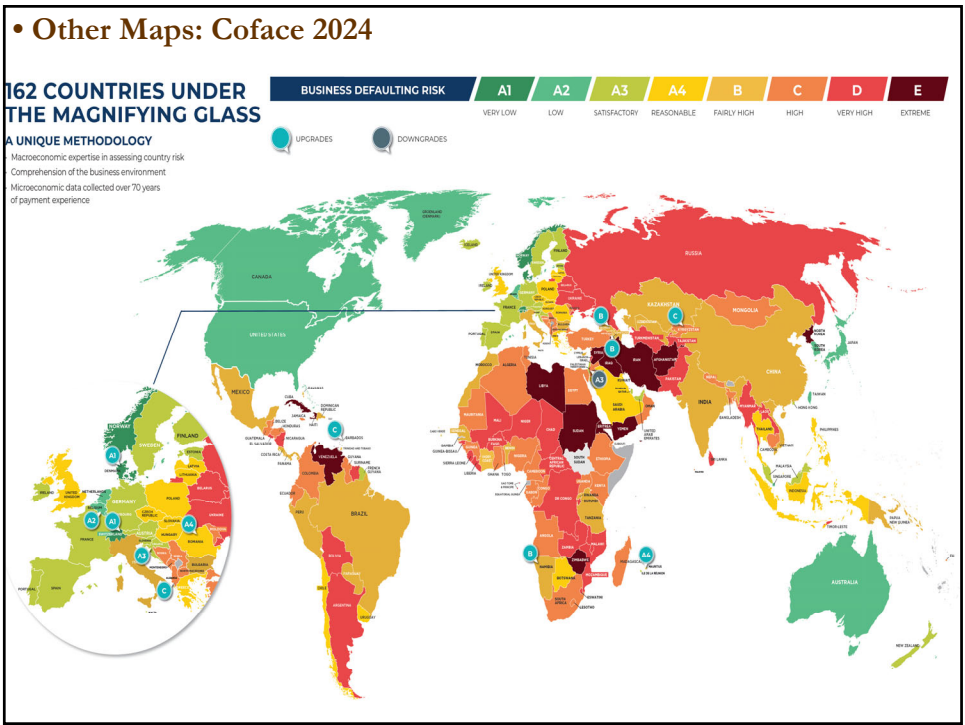
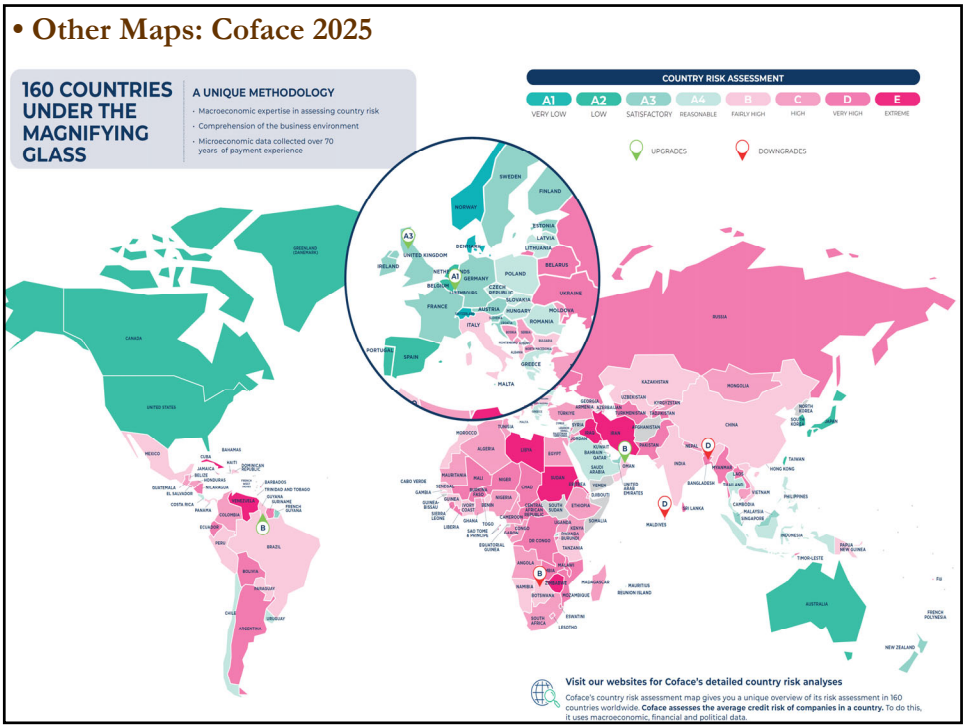
2011: 87.48 (World ranking: 6. In 2001, Singapore ranked 14th.)

- As expected, there is a wide dispersion of CR across countries. Ratings tend to be **persistent** over time.

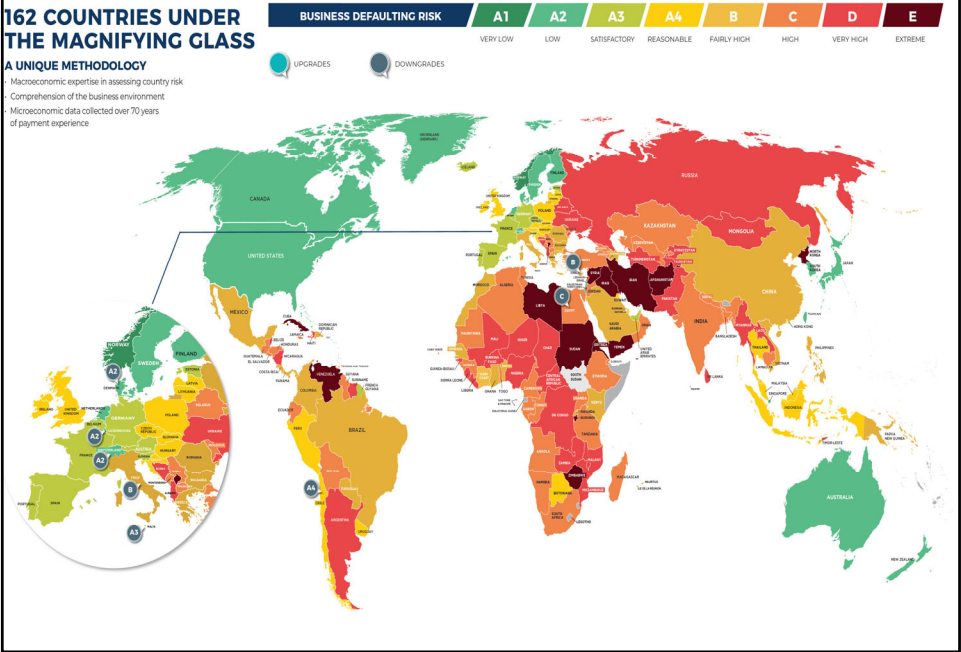
Example: *Euromoney*, World Country Risk February 21, 2018

World Country Risk weighted average: 42.77 (**B** rating or Tier 4)

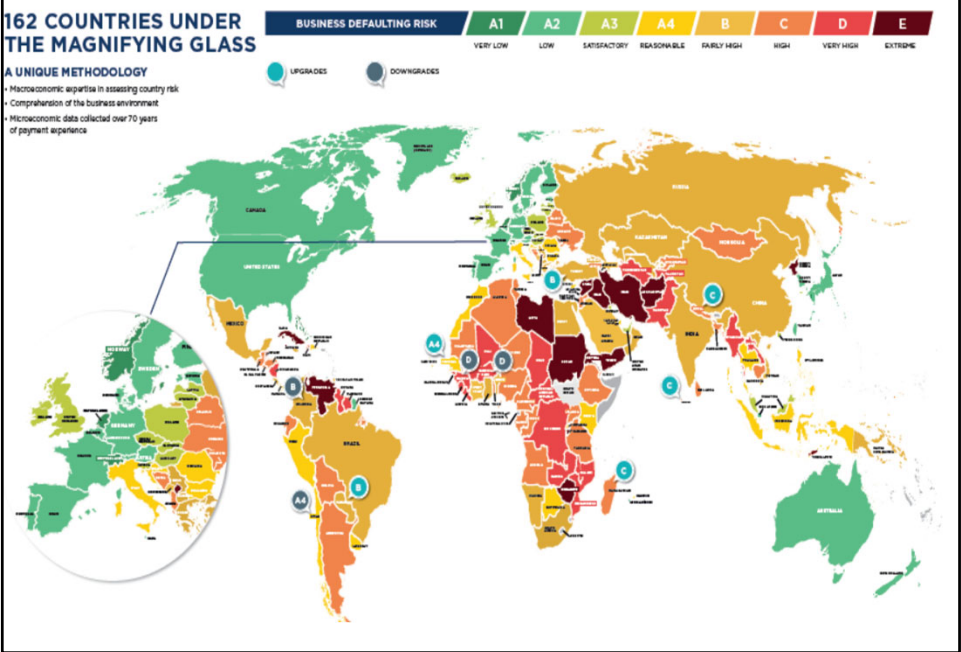




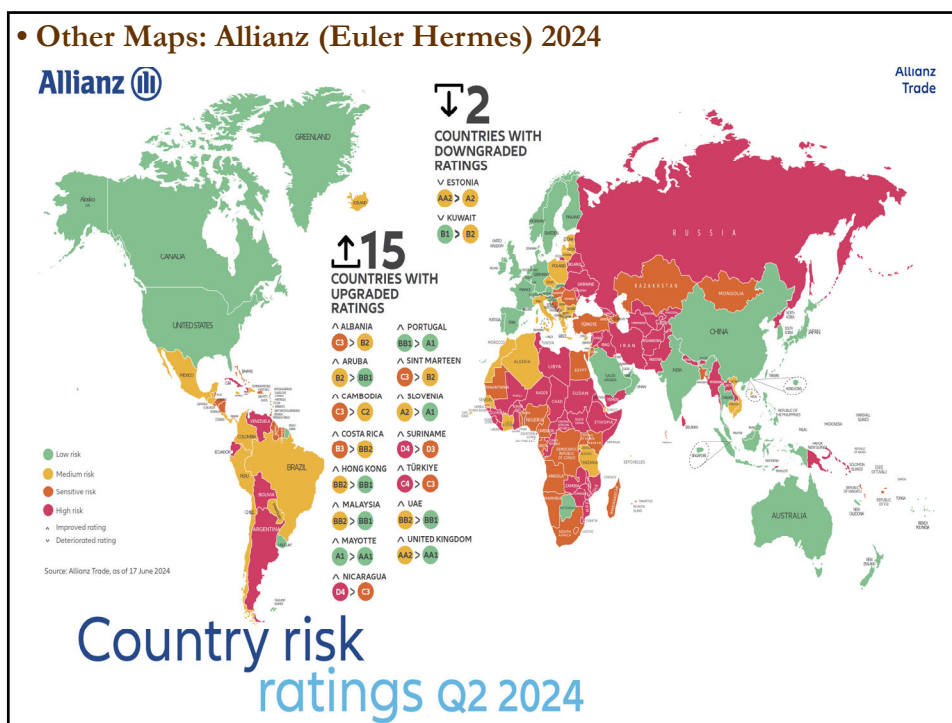
• Other Maps: Coface 2022



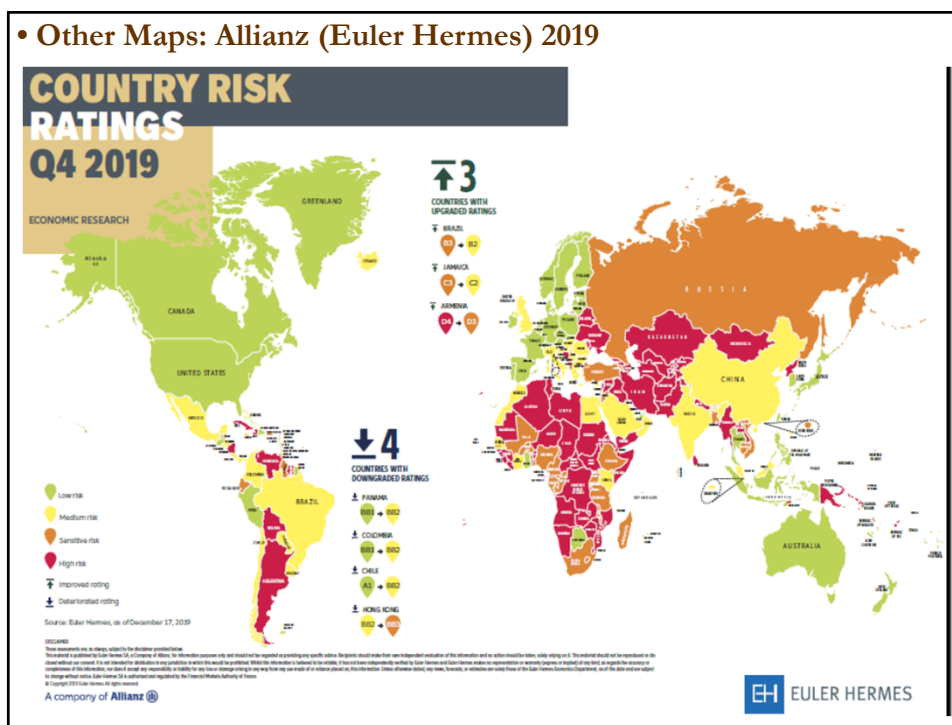
• Other Maps: Coface 2020



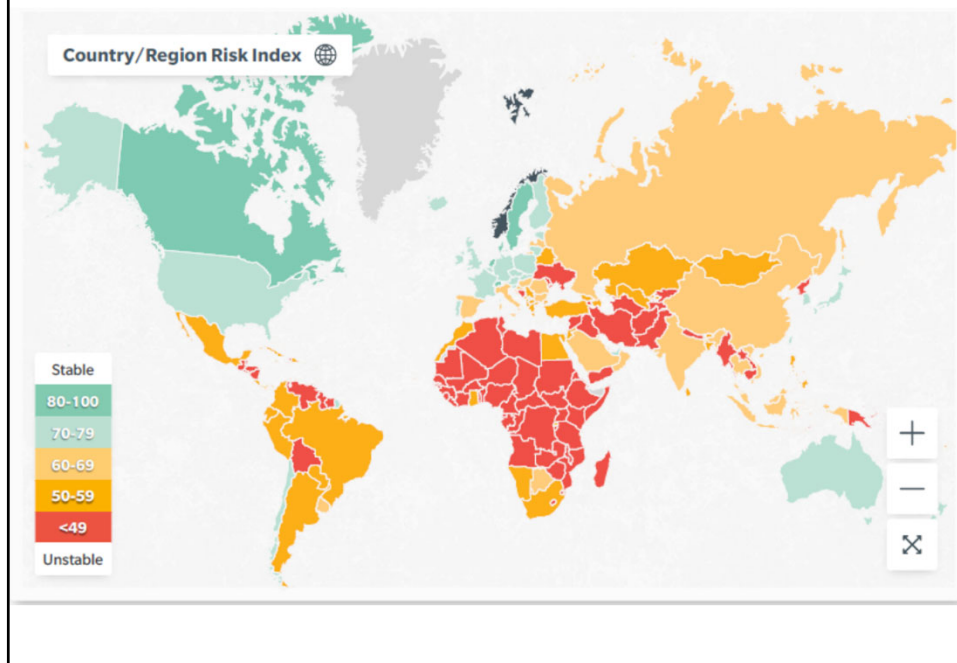
• Other Maps: Allianz (Euler Hermes) 2024



• Other Maps: Allianz (Euler Hermes) 2019



• **Other Maps: Marsh Political Risk 2019**



• **Other Country Risk Indicators**

• Given the lack of predictive power of CR, a single indicator may not be enough. There are other indexes that may also signal the *true* riskiness of a country –i.e., they can be correlated with the CR.

• Popular indicators

- A.T. Kearny: *Globalization Index* (it measures a country's global links) -
- A.T. Kearny: *FDI confidence index* (survey of MNCs indicating the likelihood of investment in specific markets).
- World Economic Forum: *Global competitiveness index* (it uses indexes to rate growth environment and opportunities).
- Institute for Management Development *World Competitiveness index*.
- PWC: *Opacity Index* (it measures the adverse impact of opacity of capital - the cost of borrowing funds- in different countries).
- Heritage Foundation: *Index of economic freedom* (absence of government obstructions).

- **Other Country Risk Indicators**
 - Popular indicators
 - Fraser Institute: *Index of Economic Freedom*
 - UNDP: *Human Development Index* (HDI is a composite index measuring average achievement in life expectancy, education, and standard of living).
 - Nord Sud Export (NSE) index (market potential assessment for foreign investor)

- **Other Country Risk Indicators**
 - Popular indicators: Summary

In general, we see countries’ rankings moving in a similar range (say, Japan is between 9 and 28; USA between 1 and 15); but not always.

The economic freedom rankings of Brazil and China create huge intervals for these countries, far away from the others.

Country	Euromoney (2011)	Global’n (2007)	GCI - WEF (2011)	WCI - IMD (2011)	Opacity (2009)	Economic Freedom (2011)
Brazil	41	67	53	44	28	99
China	40	66	26	19	45	138
Japan	25	28	9	26	16	22
UK	17	12	10	20	2	14
USA	15	7	5	1	6	10

• Country Risk : Implications

- Country/Political risk affects the expected cash flows of an investment. MNCs need to account for this type of political risk when evaluating international projects.
- In general, companies try to adjust the expected cash flows by decreasing them by an amount that reflects the probability of a loss due to country/political risk.
- It is complicated how to calculate the probability distribution associated with country/political risk.

Example: Suppose HAL, a U.S. MNC, is considering a project in Hong Kong with an initial investment of **USD 10 million** and a duration of 4 years with the following expected cash flows (in USD), including liquidation/sale at the end of Year 4:

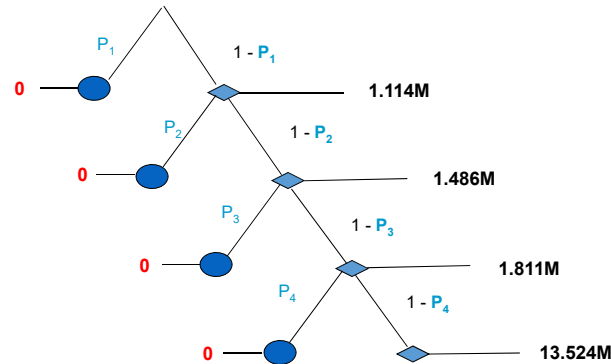
	Year 1	Year 2	Year 3	Year 4
Free CF	1.114M	1.486M	1.811M	13.524M

The MNC uses the usual **15%** discount rate for this type of project. Then,

$$\begin{aligned} \text{NPV (in M)} &= -10 + \left\{ \frac{1.114}{(1 + .15)} + \frac{1.486}{(1 + .15)^2} + \frac{1.811}{(1 + .15)^3} + \frac{13.524}{(1 + .15)^4} \right\} \\ &= \text{USD } 1.0155 \text{ M} > 0 \quad \Rightarrow \text{Yes, HAL undertakes project.} \end{aligned}$$

But, we have ignored political risk. Suppose the MNC thinks there is a P_i probability of expropriation every year. Assume, for simplicity, that after expropriation the CFs = 0 –that is, there is no recovery.

CFs for the next 4 year are given by the following diagram:



Assume that $P_i = P$ –that is, a constant– and set $P = 5\%$. Then,

$$\begin{aligned} \text{NPV (in M)} &= -10 + \left\{ \frac{1.114}{(1+.15)} * .95 + \frac{1.486}{(1+.15)^2} * (.95)^2 + \frac{1.811}{(1+.15)^3} * (.95)^3 + \right. \\ &\quad \left. + \frac{13.524}{(1+.15)^4} * (.95)^4 \right\} = -\text{USD } .747 \text{ M} < 0 \Rightarrow \text{No!} \end{aligned}$$

In practice, it is difficult to compute the P_i 's in the previous Example.

Sometimes, it is easier to calculate *break-even probabilities* and, then, compare them with other the probabilities used in other projects or with the experience of a company or expert.

In the previous example, the break-even probabilities, P_{BE} , can be derived from solving the following equation:

$$\begin{aligned} \text{NPV (in M)} &= -10 + \left\{ \frac{1.114}{(1+.15)} * (1 - P_{BE}) + \frac{1.486}{(1+.15)^2} * (1 - P_{BE})^2 + \right. \\ &\quad \left. + \frac{1.811}{(1+.15)^3} * (1 - P_{BE})^3 + \frac{13.524}{(1+.15)^4} * (1 - P_{BE})^4 \right\} \end{aligned}$$

Example: Using trial and error (or Excel or R), HAL determines

$$P_{BE} = 0.027964$$

MNC's rule: If $P_{BE} < .03 \Rightarrow$ The U.S. MNC undertakes the project. ¶

• **Country Risk : Insurance**

- NPV calculations are easier if there is insurance: MNC just adjust the expected cash flows by the cost of insurance and proceed as usual.
- There is an active market for Country Risk Insurance.
 - Sovereign Risk can be insured by the private market or CDS (swaps).
 - Political Risk can be insured by international organizations (**World Bank**), governments and private insurance companies (**AIG, Zurich**, etc.)
- Political risk is available for different events:
 - ◊ Political violence: Revolution, civil unrest, terrorism, war, etc.
 - ◊ Expropriation or confiscation of assets.
 - ◊ Repudiation of contracts.
 - ◊ Cancellation of credit or guarantees.
 - ◊ Business interruptions.
 - ◊ Currency inconvertibility, blockage of funds.

• **Country Risk: Insurance**

- Political risk insurance policies tend to be standardized, but can be adapted for specific situations. For larger investments or complex situations, tailor-made policies are common, with a syndicate of several insurers providing coverage.
- The private market is usually used for complex investments that require a great deal of customization.
- The U.S. government, through the ***Overseas Private Investment Corporation (OPIC)*** has been providing political risk insurance to U.S. international investors since 1971.
- The World Bank also offers political risk insurance through its ***Multilateral Investment Guarantee Agency (MIGA)***, which was established in 1988.

• **Country Risk: Insurance**

Example: Suppose HAL gets fully insured against political risk. It insured the full amount for each year. The premium is **1.5%** annual. That is,

$$\begin{aligned} \text{NPV (in M)} = & -10 + \left\{ \frac{1.114 * .985}{(1 + .15)} + \frac{1.486 * .985}{(1 + .15)^2} + \frac{1.811 * .985}{(1 + .15)^3} + \right. \\ & \left. + \frac{13.524 * .985}{(1 + .15)^4} \right\} = \text{USD } 0.8502 > 0 \\ \Rightarrow & \text{Yes! HAL undertakes project. ¶} \end{aligned}$$

- The example is very simple. In practice, MNCs cannot get insurance for 100% of cash flows, usually they can get covered from 50% to 90%.

• **Country Risk: Insurance**

In practice, MNCs cannot get insurance for 100% of cash flows, usually they can get covered from 50% to 90%.

Example (continuation): Now, HAL gets insurance against political risk for **70%** of the CFs. The premium is **1.5%** annual and **P = 5%**. That is,

$$\begin{aligned} \text{NPV (USD M)} = & -10 + \left\{ \frac{1.114 * .985}{(1 + .15)} + \frac{1.486 * .985}{(1 + .15)^2} + \frac{1.811 * .985}{(1 + .15)^3} + \right. \\ & \left. + \frac{13.524 * .985}{(1 + .15)^4} \right\} * .70 + \\ & + \left\{ \frac{1.114}{(1 + .15)} * .95 + \frac{1.486}{(1 + .15)^2} * (.95)^2 + \right. \\ & \left. + \frac{1.811}{(1 + .15)^3} * (.95)^3 + \frac{13.524}{(1 + .15)^4} * (.95)^4 \right\} * .30 \\ = & \text{USD } 0.37122 > 0 \Rightarrow \text{YES! ¶} \end{aligned}$$

- **Country Risk: Insurance**

In many situations, once expropriation happens, the company files a claim and the company gets a one-time payment.