Asset Allocation, Country Risk & Topics in International Corporate Finance

(for private use, not to be posted/shared online)

• **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)

• **This Class**

We start a collection of **different topics**, ranging from building an optimal international portfolio to hedging commodity & FX risks with swaps.

• In this class, we cover

- International Asset Allocation
- Country Risk (&, if time allows, Country Report)

• **Case 3** (Templeton Fund Case)

Introduction to Asset Allocation

• **Two Main Approaches**:

- Passive: Manager follows an Index.
- Active: Manager designs strategies to outperform an Index.

Passive Approach

• Passive fund manager aims to mirror performance of a market index.

- Passive manager = *Lazy manager*.
- Manager assumes **zero forecast ability**.
- Popular Indexes to follow: MSCI World, MSCI EAFE, S&P 500.

• The manager is not that lazy: She has to **track** an index, by selecting a representative set of securities. Futures may also be used.

• Advantages

- **Low costs** (no expensive stock picking needed, lower turnover.)

  Usual expense ratios: **0.15%** (U.S. Large caps) – **0.97%** (for EM Index), which compare favorably to the average expense ratio for U.S. managed large caps: **1.36%**.

- **No style drift** -a passive manager never deviates from the index!

Passive Approach

• Disadvantages

- Tracking error (= Difference between index fund and its target, usually measured as a standard deviation in bps)
  - Morningstar survey: Average tracking error is **38 bps**.
  - Morgan Stanley (2009): Average tracking error **113 bps**.
  - Vanguard (2015): **3 bps** to **20 bps** for popular passive funds
- An index composition change affects performance
  - *Market impact*: Stocks added to (removed from) index go up (down) in price.

• Practical considerations

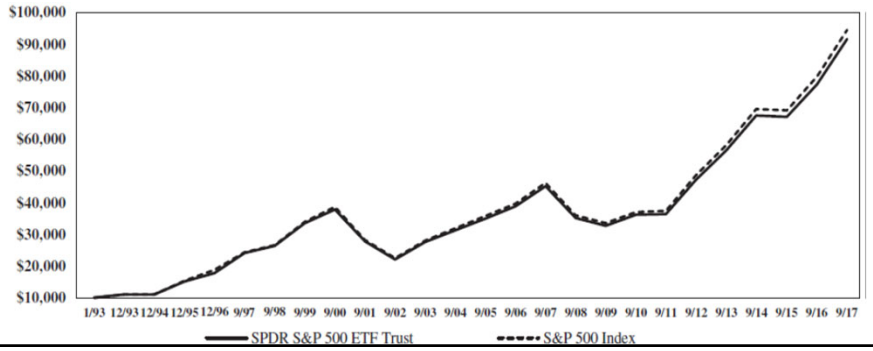
- Passive International Managers face **three decisions**:
  - **Country weights** (GDP, Market cap, ad-hoc?).
  - **Hedging strategies**.
  - International **market index**.
- Foreign markets tend to be more independent of each other
  - Different international allocations yield different returns.

Passive Approach: SPDR - Tracking the S&P 500

• Tracking the S&P 500

	Past One Year	Past Five Years	Past Ten Years
Trust			
Return Before Taxes	21.67%	15.64%	8.39%
Return After Taxes on Distributions	21.12%	15.07%	7.93%
Return After Taxes on Distributions and Sale or Redemption of Creation Units	12.67%	12.50%	6.73%
Index (reflects no deduction for fees, expenses or taxes)	21.83%	15.79%	8.50%

Growth of $10,000 Investment Since Inception[1][2]



Passive Approach: New Tool - ETFs

• **ETF** = **Exchange-traded fund**

ETFs are shares that trade on exchanges, just like a regular stock. They have a ticker symbol. Oldest ETF is the SPDR, tracking the S&P 500, launched in 1993 by *State Street*.

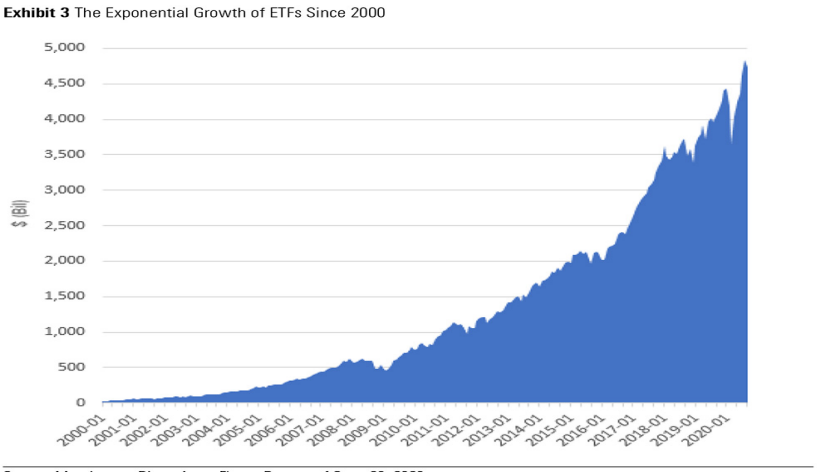
They are portfolios that hold companies under one umbrella unified by a particular investing theme, usually an index or a sector. For example, EWY tracks the MSCI South Korea Index (large- and mid-caps in SK).

Overall, ETFs offer similar benefits to index funds (& **lower fees**). In addition, the popular ETFs are **liquid**, easier to trade than Mutual Funds.

The main disadvantage: **Brokerage fees**.

Passive Approach: New Tool - ETFs

Exhibit 3 The Exponential Growth of ETFs Since 2000



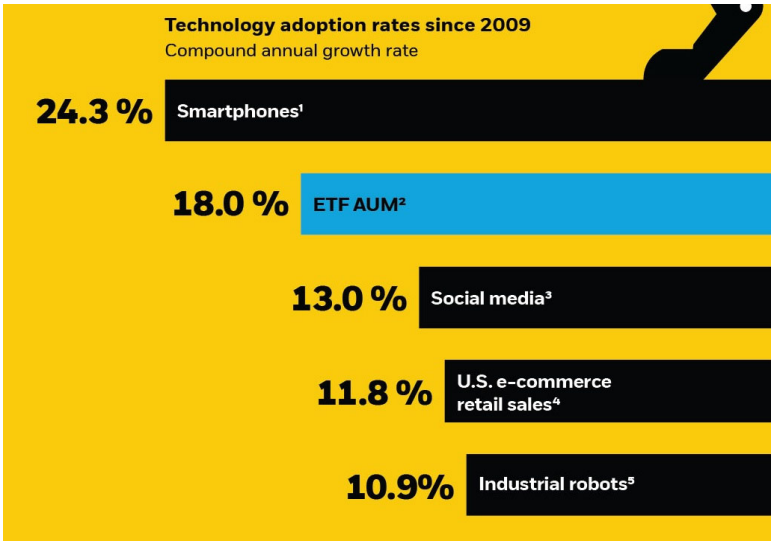
Source: Morningstar Direct Asset Flows. Data as of Sept. 30, 2020.

In 2022, JP Morgan reports over **10,000 ETFs** listed globally (up from 3,700 in 2012!), holding around **USD 10T**.

Extraordinary growth.

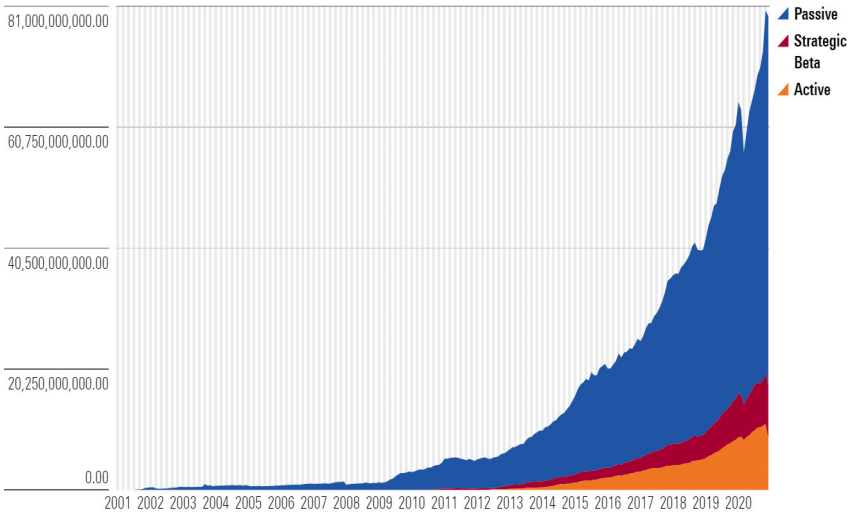
Passive Approach: New Tool - ETFs

• Impressive adoption rates since Financial Crisis.



Active and Passive (EFT Included) Flows

• Increasing popularity of passive investing since 2001, around the world, but more pronounced since the financial crisis. See growth of Passive investment, mainly ETFs, in Australia (source: Morningstar).



Active Approach

• Managers try to time markets and switch currencies.
Active managers "have" forecasting ability.

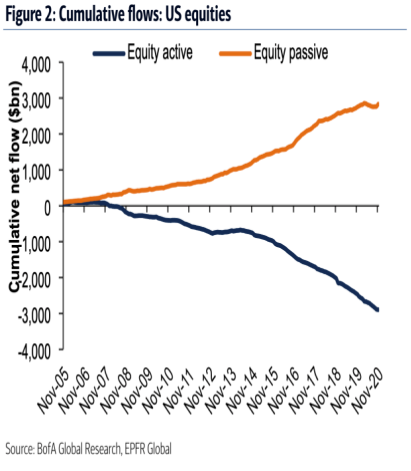
• An active strategy can be broken down into three parts:
(1) Asset allocation (bonds, stocks, real estate, etc.).
(2) Security selection (specific bonds or stocks.)
(3) Market timing (when to buy and sell).

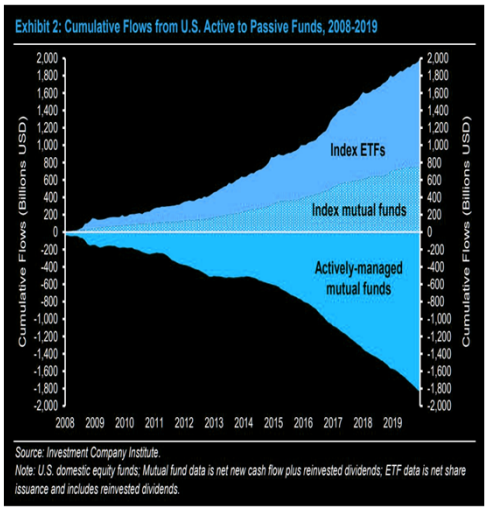
• Two approaches to active international management:
- **Top-down approach**:
  1. Choice of markets and currencies
     1.a Selection among asset classes (stocks, bonds, or cash).
  2. Then, selection of the best securities available.

- **Bottom-up approach**
  1. Choice of individual stocks, regardless of origin.
  2. Choice of markets and currencies is implicit in (1).

Active and Passive (EFT Included) Flows

• Big turnaround after financial crisis.

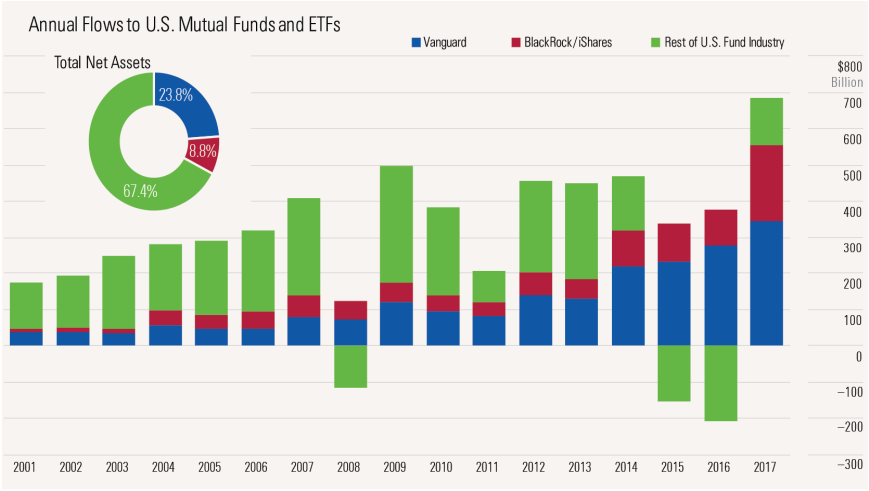




• Huge increase in market share of passive investing since 2001 in U.S.: from 10% (2001) to 50% (2023).

Active and Passive (EFT Included) Flows

• Vanguard (offering passive MFs) and BlackRock (offering iShare ETFs) pioneered passive investment. As expected, they have benefited tremendously by the shift to passive investment.



Active and Passive (EFT Included) Flows

• Not just in U.S. Equities, in almost all investment categories passive investment is the most popular tool.

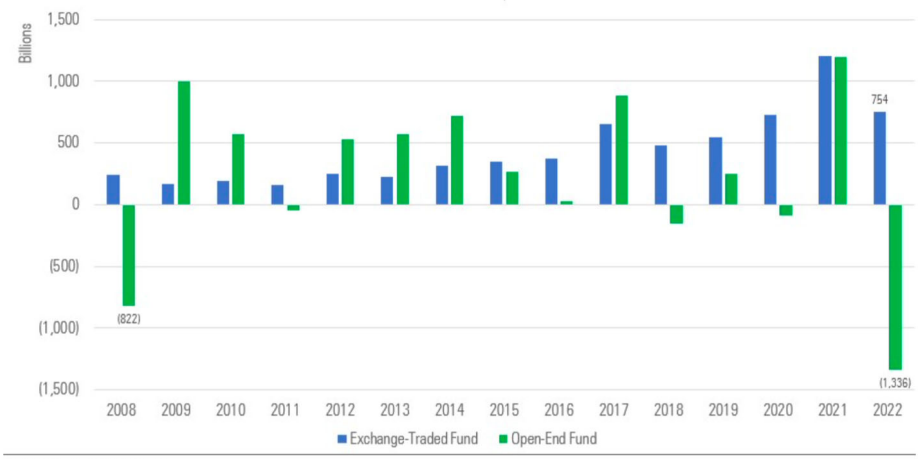
U.S. Category Flows

	Active			Passive			Total			
U.S. Category Group	Dec 2021 ($Mil)	TTM ($Mil)	Assets ($Bil)	Dec 2021 ($Mil)	TTM ($Mil)	Assets ($Bil)	Dec 2021 ($Mil)	TTM ($Mil)	TTM OGR	Assets ($Bil)
U.S. Equity	(11,900)	(194,851)	6,078	42,233	345,730	7,454	30,333	150,878	1.4%	13,532
Sector Equity	(3,039)	(152)	549	7,811	97,753	922	4,772	97,602	8.5%	1,472
International Equity	5,203	46,821	2,490	23,834	215,327	1,790	29,037	262,148	6.8%	4,280
Allocation	(1,058)	(2,921)	1,582	(352)	1,360	13	(1,410)	(1,562)	-0.1%	1,595
Taxable Bond	(3,353)	256,690	3,571	19,606	274,828	2,035	16,253	531,518	10.4%	5,607
Municipal Bond	2,611	88,706	987	2,258	17,574	74	4,869	106,280	11.3%	1,062
Alternative	3,569	33,197	144	(22)	213	2	3,546	33,411	30.9%	146
Commodities	(1,473)	8,502	40	(1,902)	(10,145)	130	(3,375)	(1,643)	-1.0%	169
Nontraditional Equity	1,069	9,778	35	859	5,783	8	1,928	15,561	63.0%	43
Miscellaneous	71	4,143	45	1,608	10,010	96	1,679	14,153	16.8%	141
All Long Term	(8,299)	249,913	15,522	95,932	958,433	12,526	87,633	1,208,346	5.1%	28,047
Money Market							129,859	411,419	6.0%	4,734

Source: Morningstar Direct Asset Flows. Data as of Dec. 31, 2021. TTM is trailing 12 months. OGR is organic growth rate.

Active and Passive (EFT Included) Accumulated Flows

• Mutual Funds still dominate ETFs: MFs are older vehicle & still the primary investment tool in 401(k) and 403(b) retirement plans. MFs have **77%** of global long-term assets. But, current trends do not look good for MFs.



Source: Morningstar Direct.

Aside: High-Frequency Trading (HFT) Approach

• **Algorithm-based** trading.

No clear definition. It is regularly an attempt to do **high speed arbitrage**. Frequently associated with:

- Mining high-frequency (intra-daily) data
- Direct feed (HFT's computers are close to exchange's computers)
- Heavy reliance on Technical Analysis Models
- Exploitation of "*market microstructure*" strategies (*front-running*)
- Very short-term horizons (sometimes, microseconds)
- Very high turnover rates

Blamed for the "Flash Crash of 2010." Huge growth from **2000-2009**.

• Good or Bad?

- **2005-2011** study: Impact on liquidity (lower bid-ask spreads) and price discovery (reduction of arbitrage opportunities from **97 milliseconds** to **7 milliseconds**).
- Profitability of HFT **had not changed** over the same 2005-2011 period.

Aside: High-Frequency Trading (HFT) Approach

• No reliable stat for HFT, since a lot of the trading classified as Active trading is HFT. Estimates range from **50%** to **75%** of trading. Below estimates from Tabb Group, reported by Franklin Templeton, **2019**.

High-Frequency Trading: Half of US Stock Market Trading Volume for Past Decade

Empirical Evidence

- Securities **within a single market** tend to **move together**, but **national markets** and currencies **do not**.
- The performance of **international money managers** is attributable to **asset allocation**, not security selection.
- The ***alpha*** (returns in excess of the market) tends to be positive for active managers, but the **fees** capture the gains and more.

• **Active or Passive Approach? Recent Evidence (S&P Global 2023)**

- From **2012-2022**, **83%** of U.S. large caps; **73%** of U.S. mid-caps; **76%** of U.S. small caps, and **87%** of U.S. Multi-caps *failed to outperform* their respective benchmark indexes.

- The **20-year performance** (**2002-2022**) is worse for Active Funds.

- Even during bear markets, active managers underperform.

Fund Category	Comparison Index	3-Year (% Underperforming Index)	10-Year (% Underperforming Index)	20-Year (% Underperforming Index)
All Large-Cap	S&P 500	69.71	83.32	94
All Mid-Cap	S&P MidCap 400	53.49	72.8	88.03
All Small-Cap	S&P SmallCap 600	57.04	76.31	88.06
All Multi-Cap	S&P Composite 1500	62.87	86.57	90.07

• **Active or Passive Approach? Recent Evidence (S&P Global 2023)**

Q: What about investment styles (growth, value, size, etc)?

Across nine U.S. style categories, small-growth managers performed the best over the **10-year horizon**, with a **43%** *success rate* relative to its benchmark, the S&P 500 Value.

Q: What about international investments?

Over the **10-year investment horizon**, the diversified emerging markets active managers were the best, with a **43%** *success rate* relative to their benchmarks.

Note: Active Mutual Funds are disappearing. Over the five-year period (2011-2016), nearly 21% of domestic equity funds, 21% of global/international equity funds, and 14% of fixed income funds were merged or liquidated (*survivorship bias* is a problem).

• Not related to the Global Crisis 2008 or Covid-19 Crisis 2020-2021

- Different horizons & styles success rate for active funds (**2022**).

Category	1-Year	3-Year	5-Year	10-Year	15-Year	20-Year	10-Year (Lowest Cost) *	10-Year (Highest Cost)
U.S. Large Blend	44.0	34.4	24.8	11.8	10.9	10.4	18.4	5.2
U.S. Large Value	34.5	31.7	27.7	15.8	11.1	19.3	24.6	11.7
U.S. Large Growth	39.3	22.3	15.8	6.3	2.4	2.3	11.9	2.2
U.S. Mid Blend	67.3	56.8	29.6	16.9	8.1	10.1	36.0	0.0
U.S. Mid Value	31.2	45.9	31.8	2.8	18.4	—	4.8	0.0
U.S. Mid Growth	45.9	40.5	54.1	40.0	21.0	—	46.5	30.2
U.S. Small Blend	60.3	41.8	28.8	19.8	17.8	13.1	32.4	18.9
U.S. Small Value	65.5	29.2	33.3	26.0	11.6	19.0	31.6	15.0
U.S. Small Growth	43.3	47.4	54.1	44.2	24.9	—	48.8	43.2
Foreign Large Blend	25.0	42.0	26.7	28.6	26.6	21.7	35.3	24.3
Foreign Large Value	27.3	40.4	15.8	31.7	15.7	—	36.8	19.0
Foreign Small-Mid Blend	25.9	30.3	13.3	28.6	—	—	50.0	40.0
World Large-Blend	36.1	20.5	17.8	20.4	—	—	20.0	20.0
Diversified Emerging Markets	19.7	43.6	32.5	42.6	28.2	—	51.7	46.7
Europe Stock	31.3	44.4	30.4	36.4	26.1	14.6	75.0	20.0

• Latest annual Active Fund "success rate" (Morningstar, 2022)

Category	2022	2021	Year-Over-Year Change
U.S. Large Blend	44.0	48.1	-4.2
U.S. Large Value	34.5	48.4	-13.9
U.S. Large Growth	39.3	37.1	2.2
U.S. Mid Blend	67.3	45.1	22.2
U.S. Mid Value	31.2	38.5	-7.3
U.S. Mid Growth	45.9	22.8	23.1
U.S. Small Blend	60.3	44.9	15.4
U.S. Small Value	65.5	23.8	41.8
U.S. Small Growth	43.3	40.8	2.5
Foreign Large Blend	25.0	63.6	-38.6
Foreign Large Value	27.3	52.3	-25.0
Foreign Small-Mid Blend	25.9	51.7	-25.8
World Large-Blend	36.1	55.3	-19.2
Diversified Emerging Markets	19.7	65.9	-46.2
Europe Stock	31.3	62.5	-31.3
U.S. Real Estate	78.6	30.0	48.6
Global Real Estate	85.1	66.7	18.4
Intermediate Core Bond	26.4	83.8	-57.4
Corporate Bond	22.2	69.6	-47.4
High-Yield Bond	31.9	73.3	-41.4

• **Q: Active or Passive Approach? Evidence from Bonds (2022)**

Similar story for Bonds and Real Estate

Category	1-Year	3-Year	5-Year	10-Year	15-Year	20-Year	10-Year (Lowest Cost) *	10-Year (Highest Cost)
U.S. Real Estate	78.6	76.2	64.6	50.7	27.3	25.9	50.0	35.7
Global Real Estate	85.1	67.3	55.0	49.0	—	—	30.0	45.5
Intermediate Core Bond	26.4	51.4	46.0	40.2	19.8	14.1	53.6	24.2
Corporate Bond	22.2	42.1	41.2	43.6	—	—	33.3	75.0
High-Yield Bond	31.9	60.3	44.8	45.6	—	—	61.5	31.0

• **Active or Passive Approach? Older Evidence (1983-2003)**

A: From T. P. McGuigan (Journal of Financial Planning, Feb 2006)

Data: U.S. Large-Caps (**1983 - 2003**)

Table I: Large-Cap Fund Performance Versus Index Fund

Time Frame	# Funds Above	# Funds Below	% Above	% Below
5 Years	94	76	55.29%	44.71%
10 Years	42	128	24.71%	75.29%
15 Years	37	133	21.76%	78.24%
20 Years	18	152	10.59%	89.41%

1. The longer the investment time frame, the more difficult it was for active managers to outperform the index.
2. Percentage of funds outperforming the index over 20-years: **10.59%**
3. Distinction between returns based on growth, value, and blend styles faded as the investment time frame lengthened.
4. A long-term investor (10-20 years) had a 10.59% to 24.71% chance of selecting an outperforming actively managed fund.

Evaluation of Asset Allocations

International Performance Analysis (IPA)

- IPA measures the return on a portfolio or a portfolio segment.
- IPA calculations are usually done on a monthly or quarterly basis.
- Tournament evaluation: good managers beat the competition.

Popular measures to beat:

1. MSCI World or EAFE Index.
2. U.S. S&P 500
3. Mean return of managed portfolios.

- Issues:
  1) Computation of returns
  2) Risk considerations

Calculating a rate of return (r_T)

Three methods are very common:

1. Time-weighted rate of return (TWR)
2. Internal rate of return (IRR)
3. Money-weighted rate of return (MWR)

Notation:
V_t: value of portfolio at time t.
C_{t+k}: cash outflow at time $t + k$.

When no cash flows occur during period T all methods give the same r_T.

$$r_T = (V_{t+T} - V_t)/V_t$$

Problem: When cash flows occur the three common methods might diverge.

Calculating r_T (continuation)

When cash flows occur the three common methods might diverge.

Consider the following example:

a. $V_t = 100$ (initial value)

b. $C_{t+k} = 50$, $k = 30$ days

c. $V_{t+T} = 60$, $T = 365$ days (end of period value).

Change in value = $V_{t+T} + C_{t+k} - V_t = 10$.

Now, methods differ on how to calculate the rate of return, r_T.

1) MWR:

$$\text{MWR} = \frac{V_{t+T} + C_{t+k} - V_t}{V_t - 0.5 * C_{t+k}}$$

$$= (60 + 50 - 100)/(100 - 25) = 13.33\%$$

MWR does not take into account the exact timing of the cash flows: it assumes that they take place in the middle of the period.

Calculating r_T (continuation)

1') MWR*:

To avoid this problem, we have modified MWR*:

$$\text{MWR}^* = \frac{V_{t+T} + C_{t+k} - V_t}{V_t - [(365 - t)/365] * C_{t+k}}$$

$$= \frac{60 + 50 - 100}{100 - (335/365) * 50} = 18.48\%$$

If several cash flows take place, each is weighted accordingly.

2) IRR:

The IRR is the discount rate that equals V_t to the sum of the discounted cash flows including the V_{t+T}. In our example,

$$V_t = \frac{C_{t+k}}{(1+r)^{(t+k)/365}} + \frac{V_{t+T}}{(1+r)}$$

In this example, the IRR = 18.90%

Calculating r_T (continuation)

3) TWR:

TWR is calculated independently of cash flows.

TWR measures the performance that would have been realized had the same capital been under management over the period.

TWR calculations require knowledge of V_t **before** a cash flow occur.

The first period rate of return, before C_{t+k}, r_{t+k-1} is:

$1 + r_{t+k-1} = (V_{t+k-1}/V_t)$.

The rate of return for the second period, that is, from $t+k$ to $t+T$, is:

$1 + r_{t+T-k} = V_{t+T}/(V_{t+k-1} - C_{t+k})$.

The total rate of return, r_{t+T}, is:

$1 + r_{t+T} = (1 + r_{t+k-1}) * (1 + r_{t+T-k})$.

In the above example, assume $V_{t+k-1} = 95$, then

$1 + r_{t+k-1} = 95/100 = 0.95$ $(r_{t+k-1} = -5.00\%)$

$1 + r_{t+T-k} = 60/45 = 1.33$ $(r_{t+T-k} = 33.33\%)$

$1 + r_{t+T} = 1.27$ $(r_{t+T} = 26.66\%)$

Calculating r_T (continuation)

The various methods yield different results: from **13.33%** to **26.66%.**

If the required information is available, **TWR** should be used. MWR can be unfair.

Calculating r_T (continuation)

Example:

Situation: A U.S. manager manages USD 1,000,000.
Cap on Japanese investments: **10%**.
USD Investment in the Nikkei Japanese Index: USD 100,000.
After two weeks the Nikkei *rises* **30%**.
Japanese segment is over cap ⇒ Transfer out USD 30,000.
Over the next two weeks the Nikkei *loses* **30%**.

The following table summarizes the performance of the manager:

	t=1	t=15	t=30	TWR	MWR
Index	100	130	91	-9%	-9%
Portfolio	100	100	70	**-9%**	**0%**

Calculations for the portfolio TWR and MWR:
1 + TWR = (130/100) * (70/100) = 0.91 (TWR = -9%)
MWR = (70 + 30 – 100)/[100 – 0.5 * (**30**)] = 0 (MWR = 0%). ¶

Designing an IPA

- **Idea**

An active manager to be considered good has to beat a passive manager.

Active managers need to show:

- Better **asset selection**
- Better **security selection**

Q: Can the active manager beat the passive allocation of the MSCI?

Q: Can the active manager select local stocks or bonds and beat the local MSCI index?

IPA

The base currency rate of return is easily derived by translating all prices into the base currency X at exchange rate $S_{j,t}$:

$$r_{jX} = \frac{(P_{j,t}\, S_{j,t} + D_{j,t_j} S_{j,t} - P_{j,t-1}\, S_{j,t-1})}{P_{j,t-1} S_{j,t-1}}$$

where p_j, d_j, and s_j are the rate of change (percent) of $P_{j,t}$, $D_{j,t}$ and $S_{j,t}$.

After some algebra:

$$r_{jX} = p_j + d_j + s_j * (1 + p_j + d_j) = p_j + d_j + c_j.$$

Over period t, the total return, r_X, is computed in the base currency X as:

$$r_X = \Sigma_j\, \omega_j\, r_{jX} = \Sigma_j\, \omega_j\, (p_j + d_j + c_j) =$$

$$= \Sigma_j\, \omega_j\, p_j + \Sigma_j\, \omega_j\, d_j + \Sigma_j\, \omega_j\, c_j$$

Capital gain component + *Yield component* + *Currency component*

Example: Below are the last two statements for a small portfolio.

Account Valuation - December 2013.

Security	Shares	Price	Dividend/Sh	Total (USD)	
U.S.					***28.53%***
DOW (USD)	1,000	51.05		50,250	
GE (USD)	500	30.00		15,000	
MS (USD)	800	22.13		17,704	
Japan					***71.47%***
Mitsubishi (JPY)	1,000	6,420		70,620	
Sony (JPY)	2,200	5,750		139,150	
S_t = .011 USD/JPY					

Account Valuation - December 2014.

U.S.					***30.80%***
DOW (USD)	1,000	54.58	1.80	56,380	
GE (USD)	500	32.10	1.20	16,650	
MS (USD)	800	25.93	0.31	20,992	
Japan					***69.20%***
Mitsubishi (JPY)	1,000	6,900		69,690	
Sony (JPY)	2,200	5,870	500	141,541	
S_t = .0101 USD/JPY					

Example (continuation): We decompose the return into the different components (capital gains, dividend yield and currency) per market.

• U.S. – Total return (USD) = 94,022/83,754 = .1226

P_0 = 83,755

P_1 = 91,374 $\Rightarrow p_{USA}$ = 7,620/83,755 = **.0910**

D_1 = 2,648 $\Rightarrow d_{USA}$ = 2,648/83,755 = **.0316** $\Rightarrow r_{USA}$ = **.1226**

s_{USA} = 0 $\Rightarrow c_{USA}$ = **0**

• JAPAN – Total return (USD) = 211,231/209,770 = .0070

P_0 = 19,070,000

P_1 = 19,814,000 $\Rightarrow p_{JAP}$ = **.0390**

D_1 = 1,100,000 $\Rightarrow d_{JAP}$ = **.0577** $\Rightarrow r_{JAP}$ = **.0070**

s_{JAP} = -0.08181 $\Rightarrow c_{JAP}$ = -0.08181 (1 + **.0390** + **.0577**) = **-.0897**

• **Total Return** (USD): r_{USD} = *.2853* * **.1226** + *.7147* * **.0070** = **0.0399805**

Example (continuation): Now, we compute each components for the overall portfolio.

Data:

USA - ω_{USA} = ***28.53%***; p_{USA} = **.0910**; d_{USA} = **.0316**; c_{USA} = 0

Japan - ω_{JAP} = ***71.47%***; p_{JAP} = **.0390**; d_{JAP} = **.0577**; c_{JAP} = -.0897

◊ **Capital gain component**: $p = \sum_j \omega_j \, p_j$

p = *.2853* * **0.0910** + *.7147* * **0.0390** = **0.053835**

◊ **Dividend yield component**: $d = \sum_j \omega_j \, d_j$

d = *.2853* * **0.0316** + *.7147* * **0.0577** = **0.050254**

◊ **Currency component**: $c = \sum_j \omega_j \, c_j$

c = *.2853* * 0 + *.7147* * -0.0897 = **-0.0641085**

◊ **Total Return**: $r_X = \sum_j \omega_j \, p_j + \sum_j \omega_j \, d_j + \sum_j \omega_j \, c_j$

$r_{X=USD}$ = **0.053835** + **0.050254** + **-0.0641085** = **0.0399805**

The relative performance of a manager may be measured by:

1.- Security selection ability: determined by isolating the local market return of his/her account.
Let I_j be the return in local currency X of the market index of segment j.

$$r_{jX} = I_j + (p_j - I_j) + d_j + c_j.$$

The total portfolio return may be written as:

$$r_X = \sum_j \omega_j I_j + \sum_j \omega_j (p_j - I_j) + \sum_j \omega_j d_j + \sum_j \omega_j c_j$$

= Market return component + **Security selection component** + **Yield component** + **Currency component**

Example (continuation): Breakdown of the performance of an equity investment. We want to decompose the capital gain component (**5.38%**) for the equity part of the portfolio:
Data:
Portfolio weights (ω_j): $\omega_{USA} = 28.53\%$, $\omega_{JAP} = 71.47\%$.
Capital gains component (p_j): $p_{USA} = .0910$, $p_{JAP} = .0390$
$\Rightarrow p = .2853 * 0.0910 + .7147 * 0.0390 = 0.053835$
Target International index returns (I_j): $I_{USA} = 0.055$, $I_{JAP} = 0.04$,

Then, for the equity capital gain component (**5.38%**) we have:
I = Market return component = $.2853 * 0.055 + .7147 * 0.04 = 0.04428$
$p - I$ = Security selection component = $.2853 * (0.091 - .055) + .7147 * * (0.039 - 0.04) = 0.00956$.

◊ **Total Return**: $r_X = \sum_j \omega_j I_j + \sum_j \omega_j (p_j - I_j) + \sum_j \omega_j d_j + \sum_j \omega_j c_j$
$r_{USD} = 0.04428 + 0.00956 + 0.050254 + -0.0641085 = 0.0399805.$ ¶

Example (continuation): We break down the total return of an account:

Total Return			**7.35**
Capital gains (losses)		**7.03**	
Fixed income	1.65		
Equity	**5.38**		
Market return		**4.43**	
Indiv. stocks selection		**0.96**	
Currency movements		**-5.00**	
Fixed income	1.41		
Equity	**-6.41**		
Yield		**5.32**	
Fixed income	0.33		
Equity	**5.02**		

¶

***2.- Performance relative to a standard* (I*).**

Objective: Measure $(r_X - I^*)$

I*: return on an international index (MSCI World Index).

Let I_{jX} be the return on market index j, translated into base currency X.

$$I_{jX} = I_j + E_j$$

E_j: currency component of index return in X $\Rightarrow E_j = s_j * (1 + I_j)$.

Let ω_j^* be the weight of market j in the international index chosen as a standard (these weights are known). In currency X, the return on this international index equals:

$$I^* = \sum_j \omega_j^* * I_{jX}$$ (the sum is over all markets in index)

Now, we can write r as:

$$r_X = \Sigma_j \omega_j^* * I_{jX} + \Sigma_j(\omega_j - \omega_j^*) * I_j + \Sigma_j(\omega_j c_j - \omega_j^* E_j) + \Sigma_j \omega_j d_j + \Sigma_j \omega_j (p_j - I_j)$$

Now, we can estimate the contribution to total performance of any deviation from the standard asset allocation $(\omega_j - \omega_j^*)$.

• Relative performance managers, $(r_X - I^*)$, is the result of two factors:
  – An asset allocation different from that of the index: $\omega_j \neq \omega_j^*$.
  – Superior security selection $(p_j - I_j)$.

Example (continuation): Suppose the target international index is equal weighted index of three countries: Japan, USA, and UK.
Data:

	USA	JAP	UK
Portfolio weights (ω_j)	**28.53%,**	**71.47%,**	**0%**
International index weights (ω_j^*):	**33.333%**	**33.333%**	**33.333%**
International index returns (I_j):	0.055	0.04	0.045
Change in FX rates (s_j)	0	-0.08181	0.02
Index FX component ($E_j = s_j*(1+I_j)$)	**0**	-0.0851	0.0209
Intern. index returns in DC X ($I_{jX} = I_j + E_j$)	0.055	-0.0451	0.065
Portfolio FX component ($c_j = s_j*(1+p_j+d_j)$	**0**	-0.0897	0.02

Target Return: $I^* = \sum_j \omega_j^* * I_{jX}$ = (0.055 + -.0451 + 0.065)/3 = **0.024967**

Example (continuation): Data:

	USA	JAP	UK
Portfolio weights (ω_j)	**28.53%,**	**71.47%,**	**0%**
International index weights (ω_j^*):	**33.333%**	**33.333%**	**33.333%**
International index returns (I_j):	0.055	0.04	0.045
Change in FX rates (s_j)	0	-.08181	.02
Portfolio FX component ($c_j = s_j*(1+p_j+d_j)$)	**0**	-.0897	.02
Index FX component ($E_j = s_j*(1+I_j)$)	**0**	-.0851	.0209

$I^* = \sum_j \omega_j^* * I_{jX}$ = (0.055 + 0.04 + .045)/3 = **0.024967**

$\Sigma_j(\omega_j - \omega_j^*)*I_j$ = (***.2853*** - ***.3333***) * 0.055 + (***.7147*** - ***.3333***) * 0.04
+ (**0** - ***.3333***) * 0.045 = -0.002383

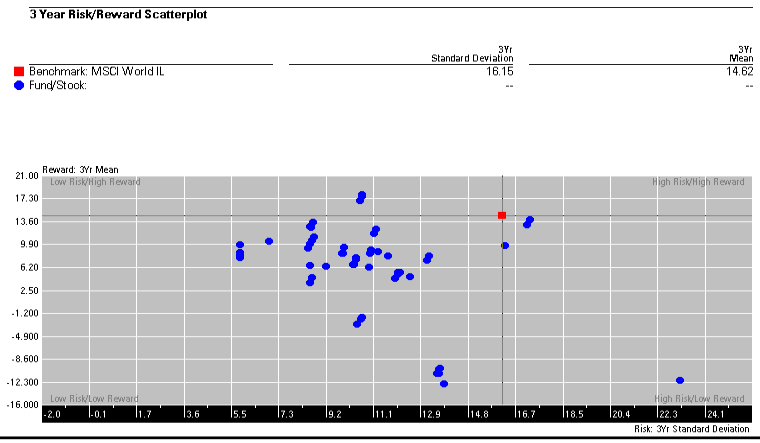
$\Sigma_j(\omega_j c_j - \omega_j^* E_j)$ = (***.2853****0 -***.3333****0) + (***.7147****(-.0897) - ***.3333****(-.0851)) +
+ (**0*** .02 - ***.3333**** .02) = -0.04241

$r_X = \Sigma_j \omega_j^* * I_{jX} + \Sigma_j(\omega_j - \omega_j^*)*I_j + \Sigma_j(\omega_j c_j - \omega_j^* E_j) + \Sigma_j \omega_j d_j + \Sigma_j \omega_j (p_j - I_j)$
= **0.02497** + -0.00238 + -0.04241 + **0.050254** + **0.00956** = **0.03999**

Risk

Final step: analyze the risk borne by the manager.

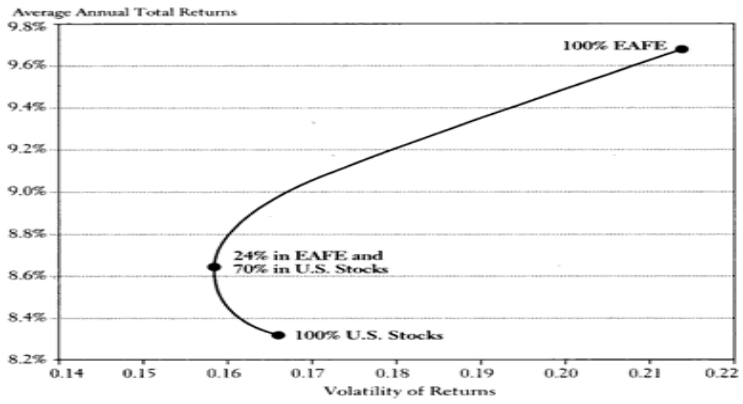
Traditional measure of total risk of an account: SD of its rate of return.



Risk Matters

Risk/Return tradeoff: Efficient Frontier (1970-2006)

Taken from Malkiel's "A Random Walk Down Wall Street."



- Important Issues
  - Q: What should be the optimal allocation?
  - Q: Is SD a good measure to adjust for risk?

Risk Adjusted Performance

It seems attractive to use a single number that takes into account both performance and risk.

Note:

- No debate about measuring returns for asset or portfolio i:

$$\text{Excess Return} = \text{E}[(r_i - r_f)]$$

- But, there are different measures for risk.

Popular performance measures:

Reward to variability (Sharpe ratio):	**RVAR** = $\text{E}[(r_i - r_f)]/SD_i$.
Reward to volatility (Treynor ratio):	**RVOL** = $\text{E}[(r_i - r_f)]/Beta_i$
Risk-adjusted ROC (BT):	**RAROC** = $r_i/Capital\ at\ risk_i$
Jensen's alpha measure:	**Estimated constant** (α_i) on a CAPM-like regression

RAPM: Pros and Cons

- **RVOL** and **Jensen's alpha**:

  Pros: They take **systematic risk** into account

  $\Rightarrow$ Appropriate to evaluate **diversified portfolios**.

  Comparisons are fair if portfolios have the same systematic risk, which is not true in general.

  Cons: They use **the CAPM** $\Rightarrow$ Usual CAPM's problems apply.

- **RVAR**

  Pros: It takes **unsystematic risk** into account. Thus, it can be used to compare **undiversified portfolios**. Free of CAPM's problems.

  Cons: Not appropriate when portfolios are well diversified.

  SD is sensible to upward movements, something irrelevant to Risk Management.

- **RAROC**

  Pros: It takes into account only **left-tail risk**.

  Cons: **Calculation of VaR** is more of an art than a science.

1. RVAR and RVOL

Measures: $RVAR_i = (r_i - r_f) / \sigma_i$.

$RVOL_i = (r_i - r_f) / \beta_i$.

Example: A U.S. investor considers foreign stock markets:

Market	$(r_i - r_f)$	σ_i	β_{WLD}	RVAR	RVOL
Brazil	0.2693	0.52	1.462	0.5170	0.1842
HK	0.1237	**0.36**	**0.972**	0.3461	0.1273
Switzerland	0.0548	0.19	0.759	0.2884	0.0722
Norway	0.0715	0.29	1.094	0.2466	0.0654
USA	0.0231	0.16	0.769	0.1444	0.0300
France	0.0322	0.22	1.073	0.1464	0.0300
Italy	0.0014	0.26	0.921	0.0054	0.0015
World	0.0483	**0.155**	1.0	0.3116	0.0483

Example: RVAR and RVOL (continuation)

Using RVAR and RVOL, we can rank the foreign markets as follows:

Rank	RVAR	RVOL
1	Brazil	Brazil
2	Hong Kong	Hong Kong
3	Switzerland	Switzerland
4	Norway	Norway
5	France	USA
6	USA	France

Note: RVAR and RVOL can give different rankings. ¶

2. Bankers Trust risk adjustment method

Bankers Trust used a modification of RVAR: RAROC

RAROC = Risk-adjusted return on capital.

RAROC adjusts returns taking into account the capital at risk.

Capital at Risk: Amount of capital needed to cover 99% of the maximum expected loss over a year.

Key: BT needs to hold enough cash to cover 99% of possible losses.

Bankers Trust risk adjustment method (continuation)

Example: Ranking two traders I and II, dealing in different markets.

	Segment	Profits (in USD, annualized)	Position (in USD)	Volatility (annualized)
Trader I	Futures stock indices	**3.3 M**	**45 M**	**21%**
Trader II	FX Market	**3.0 M**	**58 M**	**14%**

Recall: BT needs to hold enough cash to cover 99% of possible losses.

We need to calculate the worst possible loss in a 99% CI.

Assuming a normal distribution: The 1% lower tail of the distribution lies 2.33 standard deviations below the mean.

Bankers Trust risk adjustment method (continuation)

Example: (continuation)

Recall: BT needs to hold enough cash to cover **99%** of possible losses.

(1) Calculate worst possible loss in a **99% CI** (under normal distribution)
BT determines the worst possible loss for both traders:

Trader I: **2.33** * **0.21** * **USD 45,000,000** = USD 22,018,500.
Trader II: **2.33** * **0.14** * **USD 58,000,000** = USD 18,919,600.

(2) Calculate RAROC:

Trader I: RAROC = **USD 3,300,000** /USD 22,018,500 = .1499.
Trader II: RAROC = **USD 3,000,000** /USD 18,919,600 = .1586.

Conclusion: Once adjusted for risk, Trader II provided a better return.

3. Jensen's alpha measure

Goal: Measure the performance of managed fund i, with a return r_i.

Recall that CAPM implies: $E[(r_i - r_f)] = \beta_i \, E[(r_m - r_f)]$

In a regression framework:

$$(r_i - r_f) = \alpha_i + \beta_i \, (r_m - r_f) + \varepsilon_i$$

$\Rightarrow$ H_0 (CAPM true): $\alpha_i = 0$.
H_1 (CAPM not true): $\alpha_i \neq 0$.

If $\alpha_i > 0$ $\Rightarrow$ Manager is outperforming the expected (CAPM) return.

• *Jensen's alpha*: The estimated α_i from a CAPM-like regression.

If $|t_{\alpha_i}| > 1.96$ $\Rightarrow$ Managed fund has a **superior** risk-adjusted performance than the market.

3. Jensen alpha measure (continuation)

$\Rightarrow$ Jensen's alpha reflects the selectivity ability of a manager.

• It is common to introduce other factors (say, Fama-French factors) in regression:

$\Rightarrow$ Multi-factor market model.

Example: Analysts might include a portfolio of riskless assets denominated in each currency on the portfolio, with a return of r_c,

$$(r_i - r_f) = \alpha_i + \beta_i\,(r_m - r_f) + \beta_{ic}\,(r_c - r_f) + \varepsilon_i.$$

Example: Including Fama-French factors. A momentum factor can be included (4 factor model):

$$(r_i - r_f) = \alpha_i + \beta_i\,(r_m - r_f) + \delta_{HML}\,HML + \delta_{SMB}\,SMB + \delta_{Mom}\,Mom + \varepsilon_i.$$

Example: Jensen measure for 14 US international funds.

Jensen's Alpha Measures (α_i) and Tests of Performance (t-stats)

Variables in the regression:	r_m	r_m & r_c
Alliance	-0.191	-0.191
	(.476)	(.480)
GT Pacific	-0.476	-0.465
	(.536)	(.536)
Kemper	-0.182	-0.184
	(.471)	(.486)
Keystone	-0.389	-0.390
	(1.420)	(1.465)
Merrill	0.042	0.040
	(.088)	(.085)
Oppenheimer	-0.486	-0.486
	(1.240)	(1.232)
Price	-0.083	-0.085
	(.259)	(.277)
Putnam	-0.030	-0.030
	(.110)	(.112)

Example (continuation):

Variables in the regression:	r_m	r_m & r_c
Scudder	-0.150	-0.151
	(.453)	(.468)
Sogen	0.198	0.199
	(.849)	(.869)
Templeton Global	-0.054	-0.050
	(.124)	(.164)
Transatlantic	-0.543	-0.544
	(1.378)	(1.446)
United	0.095	0.094
	(.419)	(.416)
Vanguard	0.281	0.278
	(.756)	(.782)

Measured by the Jensen measure, the poor performance is surprising. Moreover, 10 out of 14 alphas have the "wrong" sign.

Possible explanation: Inclusion of an outlier (Crash of October 87).

Example:

One approach to separate the effects of a specific outlier in a regression is to include in the regression a Dummy variable.

For the above mutual funds, we ran the following regression:

$$(r_i - r_f) = \alpha_i + \beta_i\,(r_m - r_f) + \delta_i\, D_{87} + \varepsilon_i,$$

where D_{87} = 1 for t = October 1987.
= 0 otherwise.

Example: Jensen measure for 14 US international funds.

Jensen's Alpha Measures (α_i) and Tests of Performance (t-stats)

Variables in the regression:	r_m	r_m & r_c	r_m & D_{87}
Alliance	-0.191	-0.191	0.123
	(.476)	(.480)	(0.308)
GT Pacific	-0.476	-0.465	0.005
	(.536)	(.536)	(0.009)
Kemper	-0.182	-0.184	0.208
	(.471)	(.486)	(.563)
Keystone	-0.389	-0.390	-0.280
	(1.420)	(1.465)	(.990)
Merrill	0.042	0.040	0.407
	(.088)	(.085)	(.862)
Oppenheimer	-0.486	-0.486	-0.164
	(1.240)	(1.232)	(.424)
Price	-0.083	-0.085	0.132
	(.259)	(.277)	(.410)
Putnam	-0.030	-0.030	0.129
	(.110)	(.112)	(.467)

Example (continuation):

Variables in the regression:	r_m	r_m & r_c	r_m & D_{87}
Scudder	-0.150	-0.151	0.192
	(.453)	(.468)	(.694)
Sogen	0.198	0.199	0.484
	(.849)	(.869)	**(2.285)**
Templeton Global	-0.054	-0.050	0.392
	(.124)	(.164)	(1.211)
Transatlantic	-0.543	-0.544	-0.308
	(1.378)	(1.446)	(.771)
United	0.095	0.094	0.297
	(.419)	(.416)	(1.351)
Vanguard	0.281	0.278	0.387
	(.756)	(.782)	(1.005)

Now, the signs tend to be positive. Sogen over-performs, that is, it has a positive alpha.

Formation of Optimal Portfolios (OP)

Example: We want to form an *optimal portfolio* with 7 stocks (indices):

Market	$(r_i - r_f)$	σ_i	$ß_{WLD}$	RVAR	RVOL
USA	0.0231	0.16	0.769	0.1444	0.0300
Switzerland	0.0548	0.19	0.759	0.2884	0.0722
France	0.0322	0.22	1.073	0.1464	0.0300
Italy	0.0014	0.26	0.921	0.0054	0.0015
Norway	0.0715	0.29	1.094	0.2466	0.0654
Brazil	0.2693	0.52	1.462	0.5170	**0.1842**
HK	0.1237	**0.36**	**0.972**	0.3461	**0.1273**
World (Market)	0.0483	**0.155**	1.0	0.3116	0.0483
Equal Weighted	**0.0823**		**1.0071**		**.08170**

- Metric to form the optimal portfolio is $RVOL_i = (r_i - r_f) / \beta_i$.
- An equally weighted portfolio delivers RVOL = **.0817** (=**.0823** /**1.0071**)

Q: Can we do better?

Formation of Optimal Portfolios (OP)

- Approach based on a single-index model: the CAPM.

Using RVOL to rank assets, we derive a number C*, a cut-off rate.

Very simple rules:

i) Rank assets according to their RVOL from highest to lowest.
ii) OP: Invest in all stock for which $RVOL_i > C^*$.

- Calculation of C* (the cut-off rate)

Suppose we have a value for C*, C_i.
Assume that *I* securities belong to the optimal portfolio and calculate C_i.
If an asset belongs to the OP, all higher ranked assets also belong in OP.
It can be shown that, for a portfolio of *i* assets, C_i is given by:

$$C_i = C_{num} / C_{den},$$

$$C_{num} = \sigma_m^2 \sum_{j=1}^{i} (r_j - r_f) * (\beta_j / \sigma_{\varepsilon,j}^2),$$

$$C_{den} = 1 + \sigma_m^2 \sum_{j=1}^{i} (\beta_j^2 / \sigma_{\varepsilon,j}^2),$$

where σ_m^2: variance of market index (say, $\sigma_{m=World}^2 = 0.155^2$)
$\sigma_{\varepsilon,j}^2$: asset *j*'s unsystematic risk. ($\sigma_j^2 = \beta_j^2 \sigma_m^2 + \sigma_{\varepsilon,j}^2$)

Formation of Optimal Portfolios (OP)

• Steps

0) Rank all assets in descending order, according to their RVOL.

Then,

1) Compute C_i (= C_{num}/C_{den}) as if the first ranked asset is in OP ($i = 1$).

2) Compare $C_{i=1}$ to $RVOL_1$. If $RVOL_1 > C_1$ ⇒ Continue.

3) Compute $C_{i=2}$ as if the first and second ranked assets were in OP ($i = 2$)

4) Compare $C_{i=2}$ to $RVOL_2$. If $RVOL_2 > C_2$ ⇒ Continue.

...

...

...

Stop the first time an asset i has $C_i > RVOL_i$ ⇒ $C_i = C^*$

Formation of Optimal Portfolios (OP)

Example (continuation): Steps to form an OP with 7 stocks.

• 1st Step: Rank stocks according to RVOL:

Market	$(r_i - r_f)$	σ_i	$ß_{WLD}$	$\sigma^2_{\varepsilon,i}$	RVOL
Brazil	0.2693	0.52	1.462	0.2190	**0.1842**
HK	0.1237	**0.36**	**0.972**	**0.1069**	**0.1273**
Switzerl	0.0548	0.19	0.759	0.0223	0.0722
Norway	0.0715	0.29	1.094	0.0553	0.0654
USA	0.0231	0.16	0.769	0.0114	0.0300
France	0.0322	0.22	1.073	0.0207	0.0300
Italy	0.0014	0.26	0.921	0.0472	0.0015
World	0.0483	**0.155**	1.0	0	0.0483
Equal Weighted	**0.0823**		**1.0071**		**.08170**

Note: $\sigma^2_{\varepsilon,HK} = (.36)^2 - (.972)^2 (.155)^2 = .1069$.

Formation of Optimal Portfolios (OP)

• 2nd Step: Calculate the C_i for all assets.

Market	$(r_i - r_f)$	$ß_{WLD}$	RVOL	$\sigma^2_{\varepsilon,i}$	$(r_i - r_f)ß_i/\sigma^2_{\varepsilon,i}$	$\sigma^2_m ß_i^2/\sigma^2_{\varepsilon,i}$	C_i
Brazil	0.2693	1.4620	**0.1842**	0.2190	1.7974	0.2344	0.0350
HK	0.1237	**0.9720**	0.1273	**0.1069**	1.1247	0.2123	0.0485
Switzerl	0.0548	0.7590	0.0722	0.0223	1.8685	0.6218	0.0556

Some calculations for Hong Kong: (σ_{HK}= **.36**; σ_{world} = **.155**)

(1) $\sigma^2_{\varepsilon,HK}$ (From the Review Chapter, recall that $\sigma_i^2 = \beta_i^2 * \sigma_m^2 + \sigma^2_{\varepsilon,i}$.)

$\sigma^2_{\varepsilon,HK} = (.36)^2 - (.972)^2 * (.155)^2 = .1069$.

(2) C_{HK}

$C_{HK} = (.155)^2 * [1.7974 + 1.1247]/[\ 1 + (0.2344 + 0.2123)] = 0.0485$

Now, we compare the C_i coefficients with the $RVOL_i$:

$RVOL_{Bra} = .1842 > C_{BRA} = 0.0350$ (Brazil should be included).

$RVOL_{HK} = .1273 > C_{HK} = 0.0485$ (Hong Kong should be included).

Formation of Optimal Portfolios (OP)

Calculations for RVOL ordered assets (in descending order):

Market	$(r_i - r_f)$	$ß_{WLD}$	RVOL	$\sigma^2_{\varepsilon,i}$	$(r_i - r_f)ß_i/\sigma^2_{\varepsilon,i}$	$\sigma^2_m ß_i^2/\sigma^2_{\varepsilon,i}$	C_i
Brazil	0.2693	1.4620	0.1842	0.2190	1.7974	0.2344	0.0350
HK	0.1237	**0.9720**	0.1273	**0.1069**	1.1247	0.2123	0.0485
Switzerl	0.0548	0.7590	0.0722	0.0223	1.8685	0.6218	**0.0556**
Norway	0.0715	1.0940	0.0654	0.0553	1.4133	0.5195	**0.0576**
USA	0.0231	0.7690	0.0300	0.0114	1.5593	1.2471	**0.0486**
France	0.0359	0.9620	0.0373	0.0207	1.6660	1.3337	0.0438
Italy	0.0014	0.9210	0.0015	0.0472	0.0273	0.4316	0.0406

Now, we continue comparing the C_i coefficients with the $RVOL_i$:

$RVOL_{SWIT} = .0722 > C_{SWIT} = 0.0556$ (Switzerland should be included)

$RVOL_{NOR} = .0654 > C_{NOR} = 0.0576$ (Norway should be included)

$RVOL_{US} = .0300 < C_{US} = 0.0486$ (US should not be included) <= C*

Formation of Optimal Portfolios (OP)

Example: (continuation)

Now, we compare the C_i coefficients with the RVOL_i:

RVOL_{BRA} = **.1842** > C_{BRA} = **0.0350**? YES! ⇒ Brazil in

continue:

RVOL_{HK} = **.1273** > C_{HK} = **0.0485**? YES! ⇒ HK in

continue:

$\text{RVOL}_{\text{SWIT}}$ = **.0722** > C_{SWIT} = **0.0556**? YES! ⇒ Switzerland in

continue:

RVOL_{NOR} = **.0654** > C_{NOR} = **0.0576**? YES! ⇒ Norway in

continue:

RVOL_{US} = **.0300** > C_{US} = **0.0486**? NO! ⇒ US out

STOP!

From the above calculations, ⇒ **C*** = C_{US} = **.0486**.

⇒ Optimal portfolio includes Brazil, HK, Switzerland, and Norway. ¶

Formation of Optimal Portfolios (OP)

• Once the assets in the optimal portfolio are determined, we need to calculate the portfolio weights for each asset, or ω_i.

The ω's are determined by:

$$\omega_i = \frac{Z_i}{\sum_j Z_j}, \qquad \text{where } Z_i = \frac{\beta_i}{\sigma^2_{\varepsilon,i}} * (\text{RVOL}_i - \text{C*}).$$

That is, assets get a higher weight in the optimal portfolio when they have:

- high β_i
- low $\sigma^2_{\varepsilon,i}$
- higher (RVOL_i – **C***).

Recall $\omega_i = \frac{Z_i}{\sum_j Z_j}$, where $Z_i = \frac{\beta_i}{\sigma^2_{\varepsilon,i}} * (RVOL_i - C^*)$.

Example (continuation): We want to calculate ω_{HK} (HK's weight).

$\beta_{HK} = 0.972$

$\sigma^2_{\varepsilon,HK} = 0.1069$

$RVOL_{HK} = .1273$

$C^* = .0486$

(1) Using the above formula, we have:

$Z_{i=HK} = \frac{\beta_{HK}}{\sigma^2_{\varepsilon,HK}} * (RVOL_{HK} - C^*) = \frac{.972}{.1069} * (.1273 - .0486) = 0.71559.$

$Z_{BRA} = (1.462/.2190) * (.1842 - .0486) = 0.90524$

$Z_{SWIT} = (.759/0.0223) * (.0722 - .0486) = 0.80325$

$Z_{NOR} = (1.094/.0553) * (.0654 - .0486) = 0.33235$

$\sum_j Z_j = Z_{Bra} + Z_{HK} + Z_{SWIT} + Z_{NOR} = 0.7156 + 0.9052 + 0.8033 + 0.3324 = 2.75643$

(2) $\omega_{HK} = Z_{HK}/\Sigma_j Z_j = 0.71559/2.75643 = 25.96\%$ ¶

• RVOL of OP

$Z_{bra} = 0.90524$

$Z_{HK} = 0.71559.$

$Z_{SWIT} = 0.80325$

$Z_{NOR} = 0.33235$

$\sum_j Z_j = 0.71559 + 0.90524 + 0.80325 + 0.33235 = 2.75643$

Then,

$\omega_{Bra} = Z_{Bra}/\sum_j Z_j = 0.90524/2.75643 = 0.32841$

$\omega_{HK} = Z_{HK}/\sum_j Z_j = 0.71559/2.75643 = 0.25961$

$\omega_{SWIT} = Z_{SWIT}/\sum_j Z_j = 0.80325/2.75643 = 0.29141$

$\omega_{NOR} = Z_{NOR}/\sum_j Z_j = 0.33235/2.75643 = 0.12057$

We can also calculate the RVOL for the OP. For this, we need β_{OPor}:

$\beta_{OPor} = 1.462 * 0.32841 + .972 * 0.25961 + .0722 * 0.29141 + 1.094 * 0.12057 = .88542$

$RVOL_{OPor} = [0.2693 * 0.32841 + 0.1237 * 0.25961 + .0548 * 0.29141 + 0.0715 * 0.12057]/.88542 = .16022$ ¶

CASE 3 – Templeton Growth Fund

• Two parts – **Group assignment** (Templeton Growth Fund problem)
– **Class assignment**

Note: I got new data and updated the case to 2021 (check the new version).

• Group assignment

Evaluate Templeton Growth Fund performance (vs. World & EAFE).
Form an optimal portfolio using Templeton GF country allocation.
Incorporate restrictions (caps & floors) in the optimal portfolio.
Is the optimal portfolio in **2019** still optimal for **2020-2021**?

• Class assignment

You consider investing in 10 countries: U.S., U.K., France, Switzerland, China, India, Singapore, South Korea, Brazil, Mexico, & South Africa.

You are provided monthly MSCI return data (**datacase3.xlsx**), which you use to compute annualized returns, annualized SDs, and β's, using **1993-2019** data. Then, form:

- An optimal portfolio
- An equally weighted portfolio
- A restricted portfolio (50% weight in the U.S. market).

Evaluate the performance of the three **2019 portfolios** in terms of RVOL.

Then, you use the 2020-2021 to see which one of the three **2019 built portfolio** had a better *out-of-sample* performance.

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** concept. It includes economic risk, financial risk, political risk, etc.

• 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.

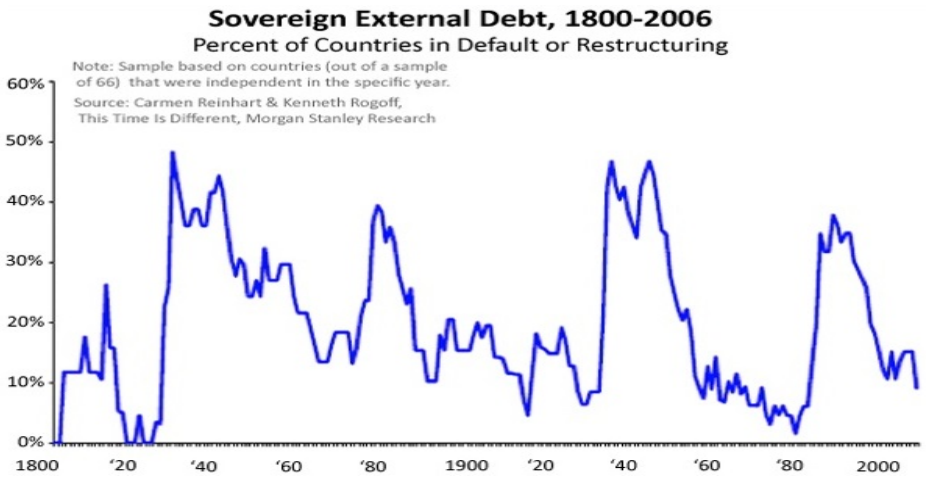
Q: Does *country risk* analysis matter?

A: Look at companies investing in Ukraine & Russia in 2014, Greece in 2011 or Argentina in 2020. Value of affected assets went down significantly.

International Crisis Are Not Rare

Graph X.1

Sovereign External Debt1800 - 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 ⇒ 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*):

YTM = **Base rate** + 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" ⇒ *consensus* grade.

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

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

⇒ **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.

⇒ **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:

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

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%**

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

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

$$\textbf{Yield}_{\text{Mex}}\textbf{ (MXN)} \approx \textbf{Yield}_{\text{Mex}}\textbf{ (USD)} + E[s_{t+T}].$$

Example (continuation):

$$\textbf{Yield}_{\text{Mex}}\textbf{ (MXN)} \approx \textbf{Yield}_{\text{Mex}}\textbf{ (USD)} + E[s_{t+T}].$$

To calculate $E[s_{t+T}]$, we can use linearized PPP. Data:

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

$E[I_{US}] = 2\%$ $\Rightarrow E[s_{t+T}] = E[I_{MEX}] - E[I_{US}] = \textbf{5\%}$

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

• $\textbf{Yield}_{\text{Mex}}\textbf{ (MXN)}$ becomes the risk-free rate for projects in Mexico, used to the discount CFs in MXN. That is:

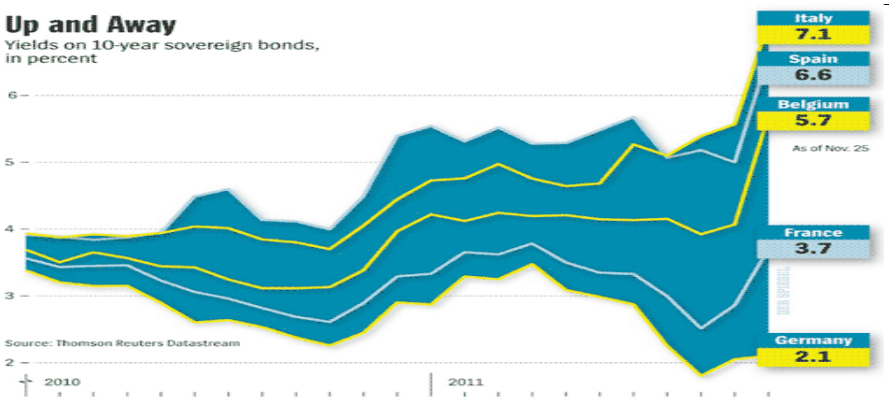
$$\text{Discount Rate Project}_{\text{Mex}} = \textbf{Yield}_{\text{Mex}} + \text{project's risk premium.}$$

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

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

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

Effect of CR in Yields



- Very different yields. All countries share the same currency:
  ⇒ FX Risk plays no role in explaining the yields.

Q: What explains the difference in yields? Country Risk

• We can calculate CR spreads, relative to Germany.

• 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,

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

Regressions and experience will determine the coefficients (α_0, α_1, α_2,...). 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:

Final Score = ω_{EI} Score(EI) + ω_{DM} Score(DM) + ω_{PF} Score(PF) + ω_{SF} Score(SF)

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

$\sum_j \omega_j = 1$, –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

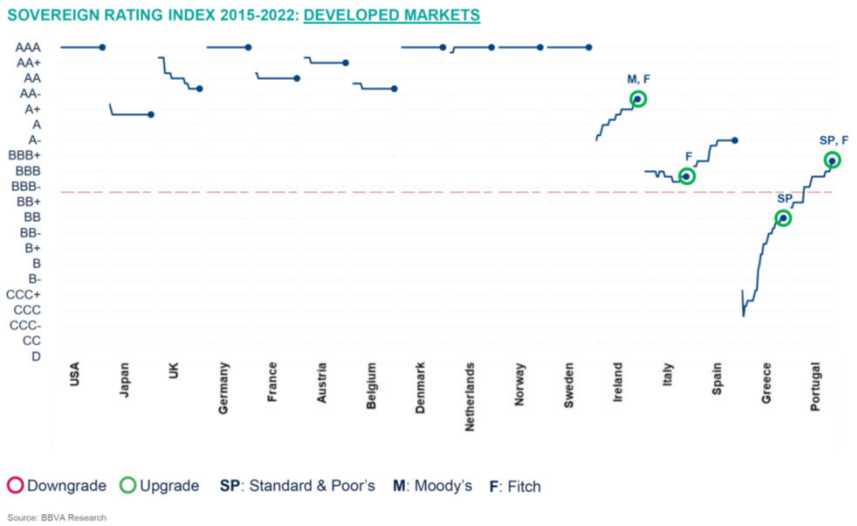
Overall grade	Rating	Interpretation	Spread (in bps)	Average
91-100	AAA	Excellent	10-70	50
81-90	AA		50-100	70
71-80	**A**		***80-130***	100
61-70	BBB	Average risk	110-220	160
51-60	BB		190-300	240
41-50	B		270-410	350
31-40	CCC	Excessive risk	360-490	450
21-30	CC		450-700	570
10-20	C		700+	800
0-10	D	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: Evolution of Country Risk Ratings for Developed markets, aggregated by BBVA, in 2022. ¶



From https://www.bbvaresearch.com/en/publicaciones/country-risk-annual-report-2022/.

Example: But, not always.

10-year government bonds: Q1 2023 (from Bloomberg, March 13).

Americas 10-Year Government Bond Yields

COUNTRY	YIELD	1 DAY	1 MONTH	1 YEAR	TIME (EDT)
United States »	3.57%	-13	-13	+158	4:59 PM
Canada	2.77%	-22	-34	+78	4:59 PM
Brazil	13.04%	-18	-37	+64	4:56 PM
Mexico	9.10%	+6	+27	+64	4:59 PM

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

COUNTRY	YIELD	1 DAY	1 MONTH	1 YEAR	TIME (EDT)
Germany »	2.25%	-25	-11	+201	12:59 PM
United Kingdom »	3.36%	-27	-3	+188	12:59 PM
France	2.79%	-21	-2	+208	12:59 PM
Italy	4.17%	-13	+1	+233	12:59 PM
Spain	3.35%	-19	+5	+212	12:59 PM
Netherlands	2.62%	-23	-6	+212	12:59 PM
Portugal	3.18%	-19	-2	+209	12:59 PM
Greece	4.24%	-5	+9	+171	12:59 PM
Switzerland	1.10%	-20	-24	+82	12:59 PM

• Ratings tend to converge (*herding*?); but they do not necessarily have the same impact on yields.

Example: Spread on government European bonds: Nov 11. 2014.

Higher risk (PIIGS), higher spread! ¶

European Bond Yields and Spreads

Yields online between 9:00am to 5:30pm CET.

Time snapshot: 14/11/2014 - 5:29 PM CET

Country	Yield	Spread*	Close†	Change‡
Germany (1% 15 Aug 2024)	*0.79*	-	*0.80*	*-0.01*
France (1.75% 25 Nov 2024)	1.15	+ 35	1.17	-0.02
Belgium (2.6% 22 Jun 2024)	1.07	+ 28	1.10	-0.03
Italy (2.5% 1 Dec 2024)	2.35	+ 156	2.37	-0.01
Spain (2.75% 31 Oct 2024)	2.20	+ 141	2.13	0.07
Denmark (1.75% 15 Nov 2025)	1.03	+ 23	1.02	0.00
Finland (2% 15 Apr 2024)	0.89	+ 10	0.91	-0.01

Higher spreads

From MTS Indices: http://www.mtsindices.com/european-bond-spreads.

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

	Short-term Horizon			Medium-term Horizon		
Factor	**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	7.5	.3	60	12
Total			**78.6**			**63**
Short-term ranking: **A**				Medium-term ranking: **BBB**		

$\Rightarrow$ *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 the *short-term* US Treasuries yield **4%** (s.a.). Then,

YTM_{DX} (*short-term,* in USD) = **4%** (s.a.) + **0.93%** (s.a.) = 4.93% (s.a.). ¶

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:

Economic performance	-30%
Political Risk	-30%
Structural assessment	-10%
Debt indicators: Debt/GDP; Debt service/X; & X-M/GDP	-10%
Credit rating: Moody's or S&P's or Fitch IBCA's rating	-10%
Access to bank finance/Capital markets: 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 at the category **Debt Indicator** (10% weight) and grade it:

<= Very Bad, low score

<= Very Good, high score

Example: Country Risk in Practice

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

Euromoney Country risk scores top 10 overall

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 **180**th.)

- *Romania* (**2021**: **58.53** – World Ranking: 52)
2011: 49.09 (World ranking: **72**. In 2001, Romania ranked **89**th.)

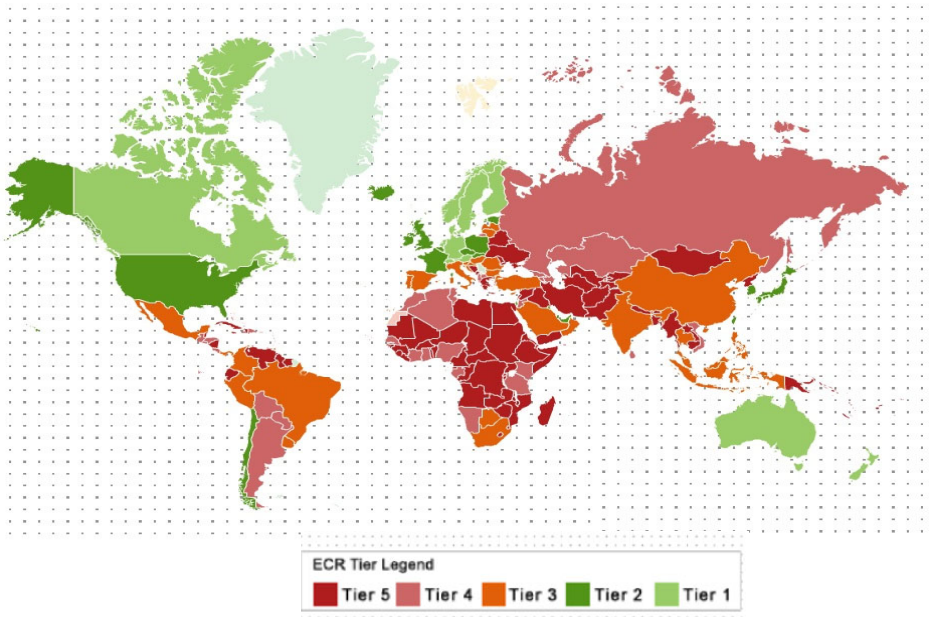
- *China* (**2020**: **58.62** - World Ranking: 50)
2011: 63.55 (World ranking: **40**. In 2001, China ranked **45**th.)

- *Taiwan* (**2019**: **69.10** - World Ranking: 23)
2011: 80.04 (World ranking: **18**. In 2001, Taiwan ranked **28**th.)

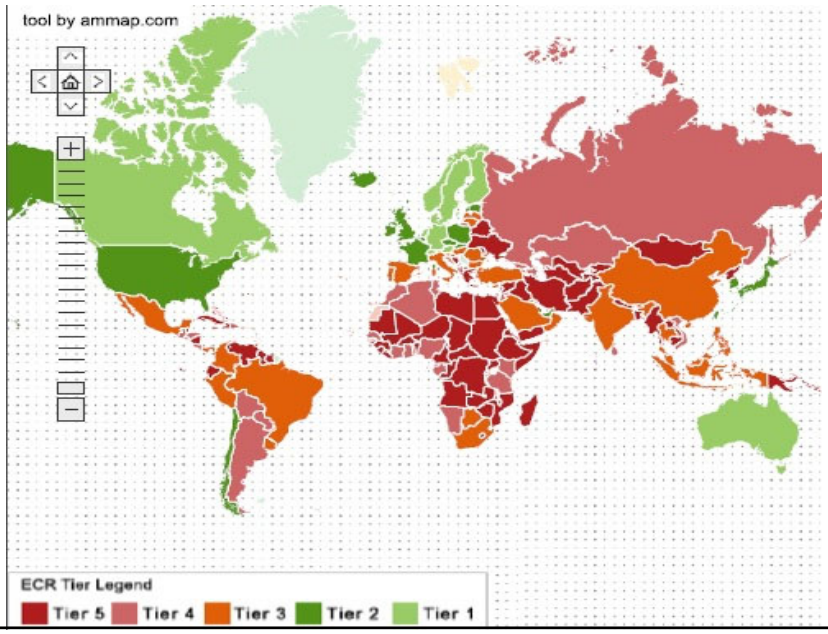
- *Singapore* (**2019**: **88.75** - World Ranking: **1**)
2011: 87.48 (World ranking: **6**. In 2001, Singapore ranked **14**th.)

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

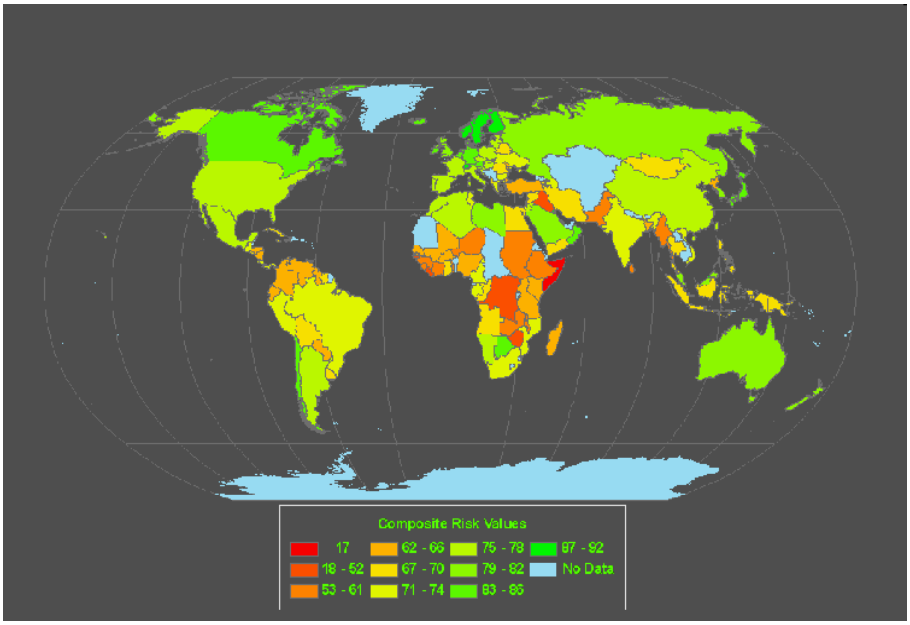
Example: *Euromoney,* *World* Country Risk February 21, 2018
World Country Risk weighted average: 42.77 (**B** rating or Tier 4)



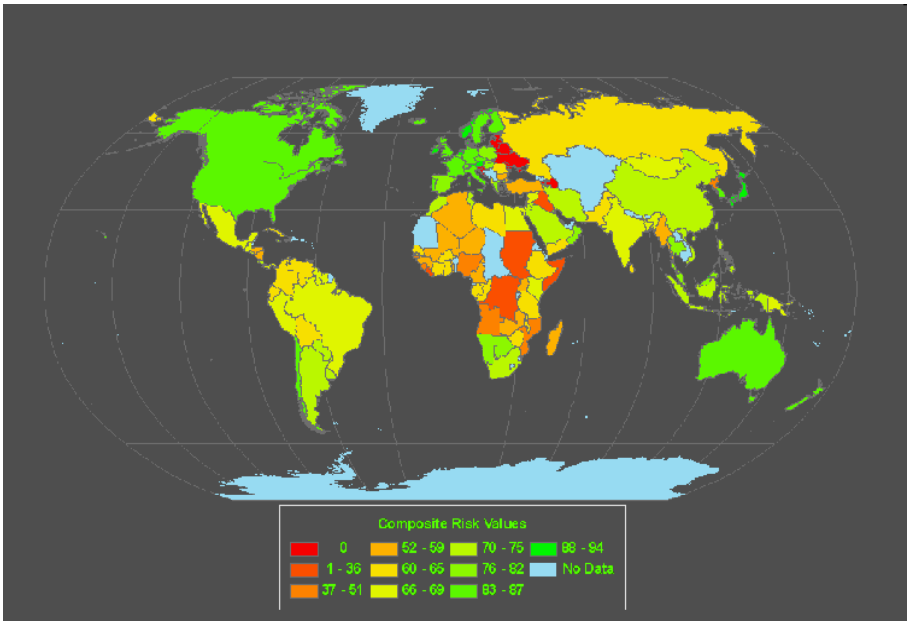
Example: World Composite Risk 2017



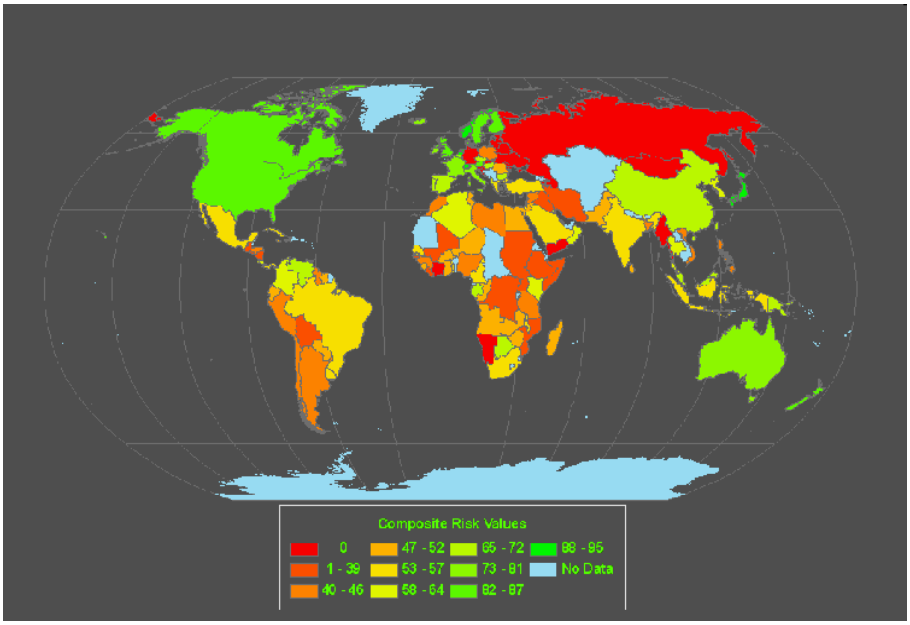
Example: World Composite Risk 2007



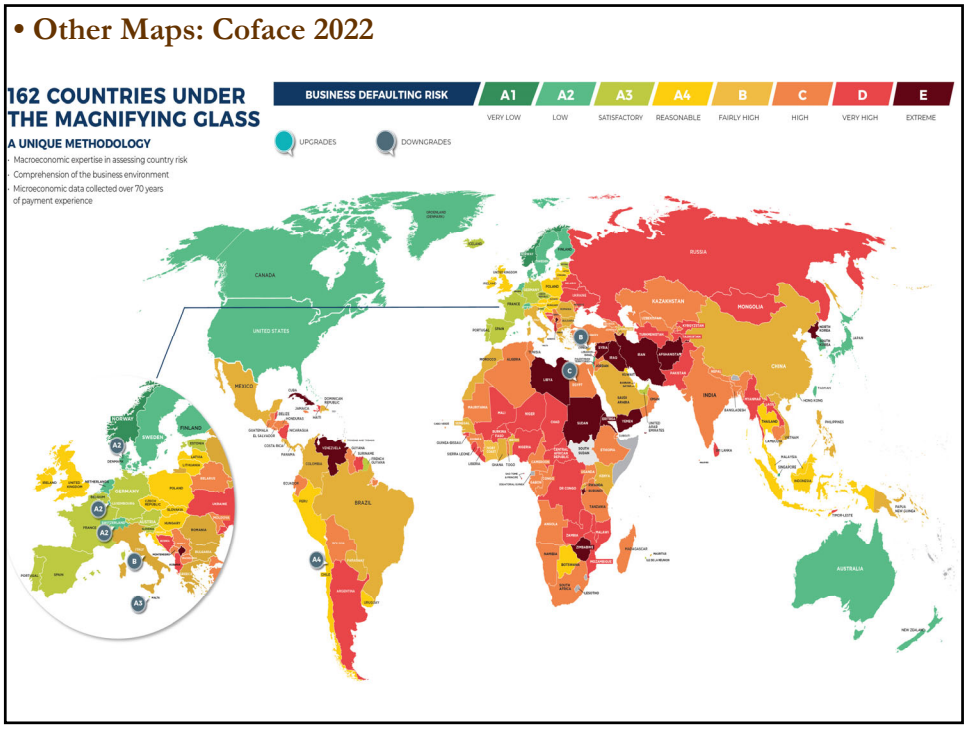
Example: World Composite Risk 1997



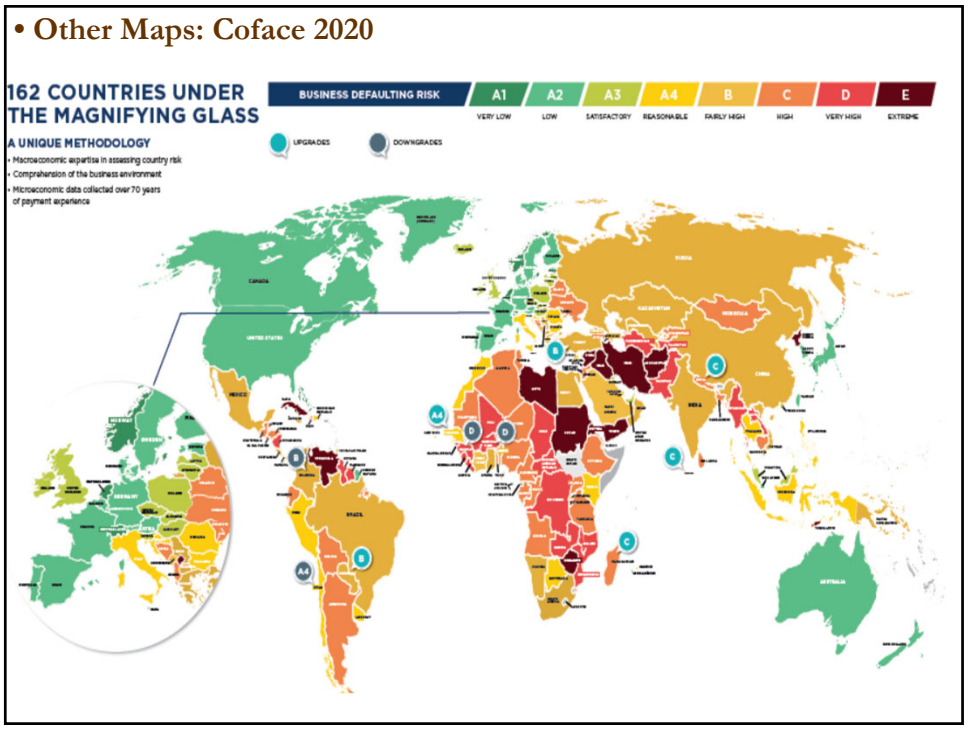
Example: World Composite Risk 1986



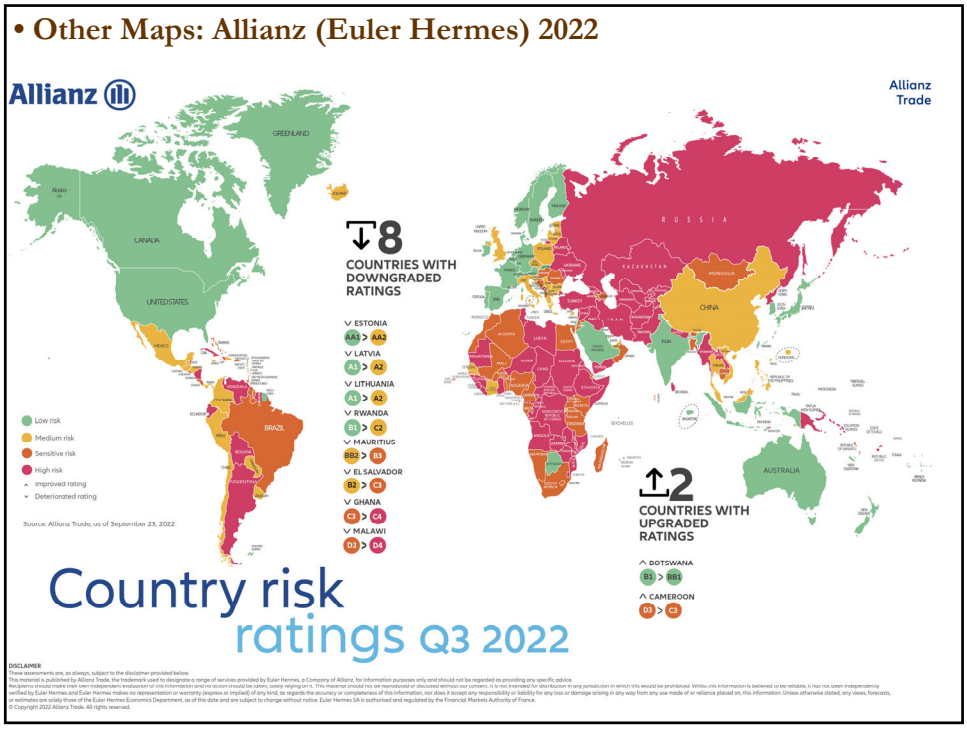
• Other Maps: Coface 2022



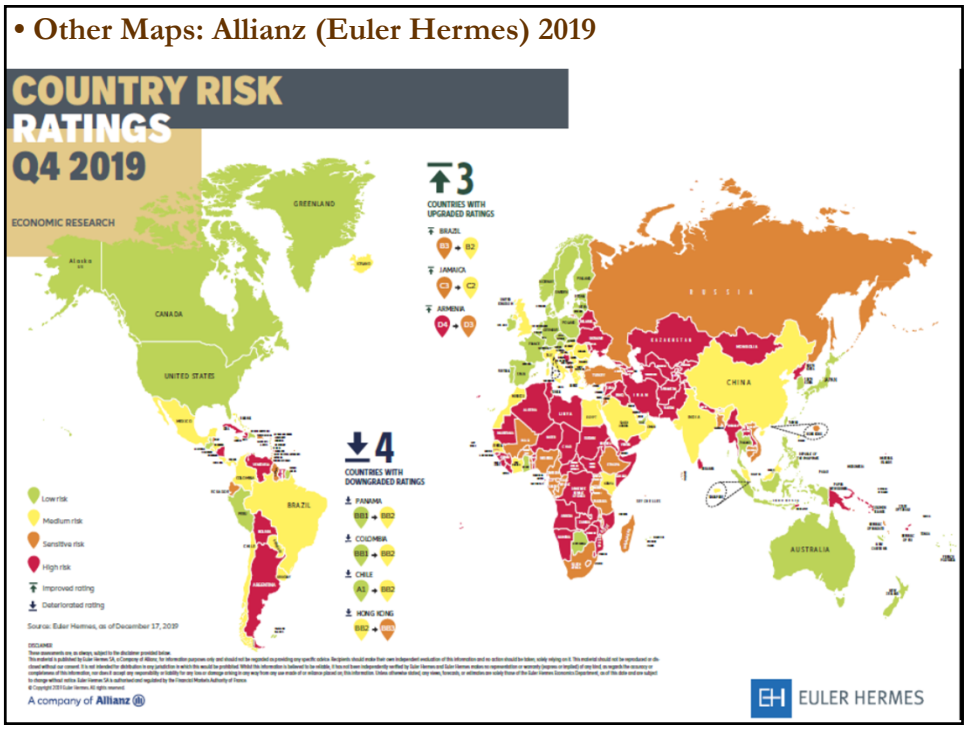
• Other Maps: Coface 2020



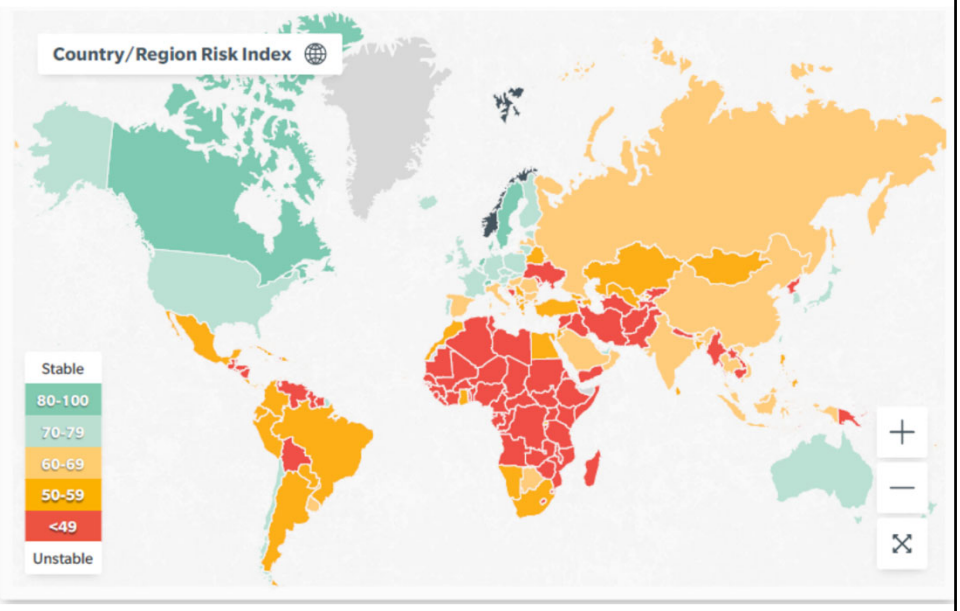
• Other Maps: Allianz (Euler Hermes) 2022



• 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 be 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**

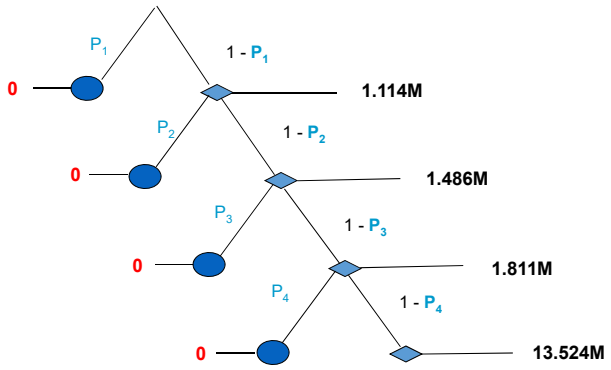
The MNC uses the usual **15%** discount rate for this type of project. Then,

$$\textbf{NPV (in M)} = -10 + \left\{\frac{1.114}{(1+.15)} + \frac{1.486}{(1+.15)^2} + \frac{1.811}{(1+.15)^3} + \frac{13.524}{(1+.15)^4}\right\}$$

$$= \textbf{USD 1.0155 M} > 0 \qquad \Rightarrow \text{Yes, HAL undertakes project.}$$

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,

NPV (in M) $= -10 + \{\frac{1.114}{(1+.15)} * .95 + \frac{1.486}{(1+.15)^2} * (.95)^2 + \frac{1.811}{(1+.15)^3} * (.95)^3 + \frac{13.524}{(1+.15)^4} * (.95)^4\}$ = **USD 1.0155 M** > 0 ⇒ Yes, HAL undertakes project.

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:

$$\textbf{NPV (in M)} = -10 + \{\frac{1.114}{(1+.15)} * (1-p_{BE}) + \frac{1.486}{(1+.15)^2} * (1-p_{BE})^2 + \frac{1.811}{(1+.15)^3} * (1-p_{BE})^3 + \frac{13.524}{(1+.15)^4} * (1-p_{BE})^4\}$$

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

$p_{BE} = 0.027964$

MNC's rule: If $p_{BE} < .03$ ⇒ 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,

$$\textbf{NPV (in M)} = -10 + \left\{ \frac{1.114 * .985}{(1+.15)} + \frac{1.486 * .985}{(1+.15)^2} + \frac{1.811 * .985}{(1+.15)^3} + \right.$$
$$\left. + \frac{13.524 * .985}{(1+.15)^4} \right\} = \textbf{USD 0.8502} > 0$$

$\Rightarrow$ Yes! HAL undertakes project. ¶

• 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,

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

• **Country Risk: Insurance**

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

Country Analysis

• Active allocation strategy requires the forecast of changes in macroeconomic variables: currencies, interest rates, & stock markets.

Key variable: Choice of a country (currency).

⇒ But currency forecasting is difficult.

• Q: How do we **select** a country to invest?

To help this process, economists monitor a large number of variables:

- **anticipated real growth** (probably major influence on a national mkt.)
- monetary and fiscal policy
- wage and employment rigidities
- social and political situations
- competitiveness

• Investment banks and consulting firms produce "*Country Reports*," trying to summarize all the relevant information that an investor/firm needs to make an investment decision in a given country.

• **Country reports** are **brief** and they give an investor an **overall idea** of the business, political, and economic climate.

• This is the **Class Project**: Write a professional country report.

Country Report

• Country Report: Due on April 6

Goal: Learn about investment environment in a country.
Target of Report: A busy U.S. investor.

Usual style:
(1) Very brief historical & current political details of chosen country.
(2) Description of economic, financial environment, & investment opportunities (usually, competitive sectors).
(3) Based on analysis, a couple of recommendations.

A. Necessary Information
• GDP or GNP growth.
• Monetary policy: Evaluation of inflationary prospects and interest rates.
• Wages & employment conditions: Productivity and Health of economy.
• Social and political situation: Goal is to evaluate political/country risk.
• Fiscal situation and taxes: Implications government budget situation.
• Sector analysis: Competitiveness of sectors in world/region.

• Country Report

B. Figures or Graphs

1. Macroeconomic Indicators (**4 years of history** + **forecasts**):
• GDP growth (GDP forecast is a must)
• Inflation & Government interest rates (yields)
• Trade Account (imports, exports and current account balance)
• Exchange rate against the USD
• Unemployment

2. Market Indicators (**4 years of history** + forecasts, if available):
• Stock Market Index (level, returns, P/E, if available)
• Government Bond yields (short-term and long-term)

3. Stocks (**4 years of history** for individual stocks + analysts' forecasts, if available): **10 largest stocks** (price, PE or EPS, if available)

• Country Report

C. Text

Report should include:

- Current events
- Macroeconomics (economic growth, monetary policy, government deficit, labor markets, etc.)
- Sectorial analysis
- Country risk
- Taxes
- Exchanges rates
- Equilibrium P/E (fair valuation)

D. Practical Issues

- The text cannot have more than **five pages**.
- Do not include irrelevant information as appendices.
- There are over 3,000 ADRs in the U.S.
- Need to include **fair P/E Valuation**
- Provide and justify **two stock recommendations**.

• Country Report

E. Some Grading Issues

Maximum Grade: 5 points.

- Incomplete discussion will be penalized. (Up to 2 points off.)
- Incomplete information -info suggested above-- up to 2 points off.
- Irrelevant information will be penalized. (1/2 point off).
- Current data is a must. If your latest data is from 2017, you lost 1 point.
- If current news is important (covid-19 or a recent devaluation), you should include it in your report. (Up to 1 point off.)
- If no equilibrium P/E calculated included, you'll lose 1/2 point.
- Long papers are penalized (1/2 point off, though if the paper is long because of irrelevant info, you'll be penalized only once.)
- Recommendations should come out logically from your country analysis.
- Copying a professionally written report is considered cheating.