# CORPORATE FINANCE FOR LONG-TERM VALUE

## Chapter 13: Cost of capital

Part 4: Risk, return and impact

# Chapter 13: Cost of capital

# The BIG Picture



- How to calculate the cost of financial, social and environmental capital?

Methods

- A company uses the weighted average cost of capital (WACC) to assess the financial attractiveness of projects
- WACC is calculated as a weighted average of the cost of equity and the cost of debt
- The next step is to add the cost of social and environmental capital to calculate the cost of integrated capital
- S and E liabilities increase the cost of integrated capital (indicating S+E risk), while S+E assets decrease the cost of integrated capital
- In a dynamic setting, the interaction between the different types of capital can be derived

# Cost of equity capital



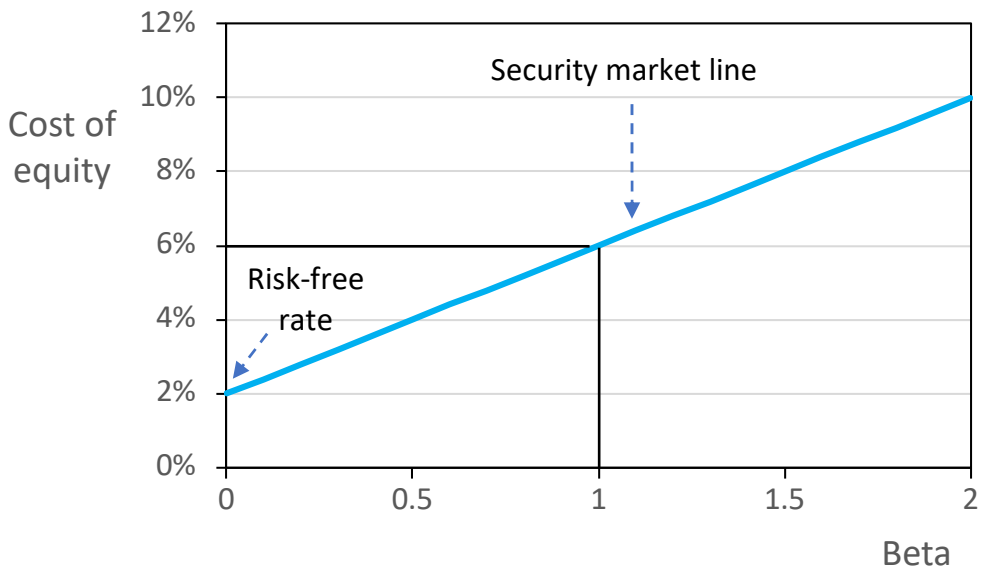
- The cost of equity is the return a company pays to its shareholders, to compensate for the risk of investing their capital
- This depends not only on the risk of the specific investment, but also:
  - The pricing of risk on similar and other investments
  - The degree of risk aversion
  - The supply and demand of capital
- The capital asset pricing model (CAPM) gives the cost of equity capital $r_i$ of security (company) $i$ given its systematic risk measured by beta $\beta_i$:

$$r_i = r_f + \beta_i \cdot \left(E[r_{MKT}] - r_f\right)$$

# The security market line



- From the cost of equity formula: $r_i = r_f + \beta_i \cdot (E[r_{MKT}] - r_f)$
  - The risk premium for security $i$: $\beta_i \cdot \left(E[r_{MKT}] - r_f\right)$
  - The market risk premium: $\left(E[r_{MKT}] - r_f\right)$
- Assuming or estimating the parameters above allows us to draw the security market line for security $i$




Difficulties in practice:

- What is the market portfolio?
- What is the risk-free rate?
- What is the beta of a specific security?
- What is the horizon of the expected return?
- To what extent are historical data representative of the future?

# Market risk premium



- The market risk premium is defined as the expected market return $E[r_{Mkt}]$ minus the risk-free rate $r_f$
  - The risk-free rate is derived from the government yield curve, which provides the safest asset in a country for a given maturity
  - The historical risk premium can only be estimated over a long period because markets fluctuate

Historical risk premium (in %). Source: Damodaran (2022)

| Market | United States | | Europe | World |
|---|---|---|---|---|
| **Period** | **1928-2021** | **1971-2021** | **1900-2017** | **1900-2017** |
| **Risk premium over 1-year government bonds** | 6.7% | 6.7% | 3.5% | 4.3% |
| **Risk premium over 10-year government bonds** | 5.1% | 4.5% | 3.0% | 3.2% |

The observed risk premium has declined over time

# Beta



- A company's beta is a measure of the company's stock price volatility relative to the market's volatility
  - Historical betas can be estimated using linear regression analysis on historical returns against the relevant index (i.e., S&P500, MSCI World Index)

- Example: Nike & Adidas
  - Betas are often calculated on a 5-year monthly basis (60 observations) or a 2-year weekly basis (104 observations)
  - Measuring shorter frequencies leads to higher volatility

Nike & Adidas betas

| Monthly beta | | | | |
|---|---|---|---|---|
| | Nike | | Adidas | |
| | vs S&P500 | vs MSCI World | vs DAX30 | vs MSCI World |
| **2-year** | 0.80 | 0.80 | 0.81 | 0.94 |
| **5-year** | 0.92 | 0.92 | 0.69 | 0.81 |
| **10-year** | 0.77 | 0.73 | 0.72 | 0.77 |
| **Average** | 0.83 | 0.82 | 0.74 | 0.84 |

| Weekly beta | | | | |
|---|---|---|---|---|
| | Nike | | Adidas | |
| | vs S&P500 | vs MSCI World | vs DAX30 | vs MSCI World |
| **2-year** | 1.16 | 1.20 | 1.22 | 1.17 |
| **5-year** | 1.05 | 1.12 | 1.07 | 1.00 |
| **10-year** | 1.01 | 1.00 | 0.94 | 1.02 |
| **Average** | 1.07 | 1.11 | 1.08 | 1.06 |

# Estimating beta for private companies



- Suppose a Norwegian salmon harvesting company will soon do an IPO
- The company's beta can be measured by considering the betas of other Norwegian salmon harvesters
- How to aggregate observations?
  - Average or Median?
  - Outliers? Norway Royal Salmon has a 5-year monthly beta of 0.00
  - Excluding Royal, the average 5-year monthly beta (0.54) is close to the median (0.55)

Industry betas for Norwegian salmon harvesting

| vs MSCI World | 5-year monthly beta | 2-year weekly beta | Average beta |
|---|---|---|---|
| **Bakkafrost** | 0.41 | 0.48 | 0.45 |
| **SalMar** | 0.31 | 0.21 | 0.26 |
| **Mowi** | 0.70 | 0.46 | 0.58 |
| **Leroy Seafood** | 0.55 | 0.58 | 0.57 |
| **Austevoll Seafood** | 0.64 | 0.59 | 0.62 |
| **Grieg Seafood** | 0.62 | 0.74 | 0.68 |
| **Norway Royal Salmon** | 0.00 | 0.34 | 0.17 |
| **Average** | **0.46** | **0.48** | **0.47** |
| **Median** | **0.55** | **0.48** | **0.57** |
| **Average (without Royal)** | **0.54** | **0.51** | **0.52** |

# Calculating the cost of equity capital



**Problem**

Suppose the risk-free rate is 2% and the market risk premium is 4%. What is the cost of equity capital $r_i$ for a Norwegian salmon farmer?

Industry betas for Norwegian salmon harvesting

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# Calculating the cost of equity capital



**Problem**

Suppose the risk-free rate is 2% and the market risk premium is 4%. What is the cost of equity capital $r_i$ for a Norwegian salmon farmer?

**Solution**

We choose the monthly beta, which is more stable

Next, we choose the industry average without the outlier, which gives a beta of 0.54

The cost of equity capital is then:

$$r_i = r_f + \beta_i \cdot \left(E[r_{MKT}] - r_f\right) = 2\% + 0.54 \cdot 4\% = \mathbf{4.2}\%$$

Industry betas for Norwegian salmon harvesting

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|---|---|---|---|
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# Cost of debt capital



- Debt betas can also be estimated using CAPM, although more difficult due to infrequent trading of most public debt
- The cost of debt $r_D$ is more commonly calculated using credit ratings:

$$E[y] = (1 - PD) \cdot y + PD \cdot (y - LGD) = y - PD \cdot LGD = r_D$$

$y$ = the yield ← **can be observed in the market**

$PD$ = the probability of default

$LGD$ = the loss given default

} ← **require estimates**

| Rating agency | Moody's | S&P's and Fitch | Long-term average default rate | Debt betas |
|---|---|---|---|---|
| **Type of bonds** | **Investment grade bonds** | | | |
| | Aaa | AAA | 0.00% | |
| | Aa | AA | 0.02% | |
| | A | A | 0.05% | <0.05 |
| | Baa | BBB | 0.16% | 0.10 |
| **Type of bonds** | **Junk or high yield bonds** | | | |
| | Ba | BB | 0.61% | 0.17 |
| | B | B | 3.33% | 0.26 |
| | Caa | CCC | | 0.31 |
| | Ca | CC | 27.08% | - |
| | C | C | | - |

Source: S&P Global Ratings (2020a) & Berk and DeMarzo (2020)

# Calculating the cost of debt capital



**Problem**

The Norwegian salmon farmer, SalMar, has a rating of BBB and a yield of 3.22% in June 2022. The loss given default is 60%. What is SalMar's cost of debt capital $r_D$?

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# Calculating the cost of debt capital



## Problem

The Norwegian salmon farmer, SalMar, has a rating of BBB and a yield of 3.22% in June 2022. The loss given default is 60%. What is SalMar's cost of debt capital $r_D$?

## Solution

A BBB rating implies a probability of default of 0.16%

Therefore, the cost of capital of SalMar is:

$$r_D = y - PD \cdot LGD = 3.22\% - 0.16\% * 60\% = \mathbf{3.12}\%$$

| Rating agency | Moody's | S&P's and Fitch | Long-term average default rate | Debt betas |
|---|---|---|---|---|
| **Type of bonds** | **Investment grade bonds** | | | |
| | Aaa | AAA | 0.00% | |
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| | C | C | | - |

Source: S&P Global Ratings (2020a) & Berk and DeMarzo (2020)

# Weighted average cost of capital (WACC)



- The company's overall cost of capital $r_U$, also known as the weighted average cost of capital ($WACC$) is a weighted average of the cost of equity $r_E$ and the cost of debt $r_D$
- Use the equation for enterprise value: $V = E + D$ to calculate the weights

$$WACC = r_U = \frac{E}{V} \cdot r_E + \frac{D}{V} \cdot r_D$$

| | Value | Discounted at | | Value | Discounted at |
|---|---|---|---|---|---|
| **Assets** | 100 | ?% | **Debt** | D = 40 | 2.5% |
| | | | **Equity** | E = 60 | 10% |
| **Enterprise value** | V = 100 | ?% | **Enterprise value** | V = 100 | ?% |

$$WACC = 0.6 \cdot 10\% + 0.4 \cdot 2.5\% = 7.0\%$$

# After-tax WACC



- As interest expenses can be deducted from taxable income, the after-tax interest rate is relevant for a company's net cost of debt capital: $r_D \cdot (1 - \tau_C)$
- Whereby $\tau_C$ is the company's tax rate. The tax-adjusted WACC formula becomes:
- After−tax $WACC = \frac{E}{V} \cdot r_E + \frac{D}{V} \cdot r_D \cdot (1 - \tau_C)$
- The tax savings reduce the cost of capital of a levered company in comparison to the cost of capital of an unlevered company $r_U$
- After−tax $WACC = r_U - \frac{D}{V} \cdot r_D \cdot \tau_C$
- Assuming a 20% tax rate in the previous example:
  - The after-tax $WACC$ is $0.6 \cdot 10\% + 0.4 \cdot 2.5\% \cdot (1 - 0.20) = 6.8\%$
  - The tax saving is $\frac{D}{V} \cdot r_D \cdot \tau_C = 0.4 \cdot 2.5\% \cdot (1 - 0.20) = 0.2\%$

# Calculating the WACC



**Problem**

Company Y has a cost of equity capital of 8% and a cost of debt capital of 3%. The company's market capitalisation is € 200 million and its outstanding debt € 70 million. The corporate tax rate is 25%. What is the unlevered cost of capital and what is the after-tax WACC for company Y?

**Solution**

The unlevered cost of capital $r_U = \frac{E}{V} \cdot r_E + \frac{D}{V} \cdot r_D = \frac{200}{270} \cdot 8\% + \frac{70}{270} \cdot 3\% = 6.7\%$

The after−tax $WACC = \frac{E}{V} \cdot r_E + \frac{D}{V} \cdot r_D \cdot (1 - \tau_C) = \frac{200}{270} \cdot 8\% + \frac{70}{270} \cdot 3\% * (1 - 0.25) = 6.5\%$

# Project cost of capital



- Company betas reflect the market risk of the average project in a company, but project risk can deviate substantially from company risk
- Company betas $\beta_E$ are levered (i.e., they reflect the leverage of the companies), to get the unlevered beta $\beta_U$:

$$\beta_U = \frac{E}{E+D} \cdot \beta_E + \frac{D}{E+D} \cdot \beta_D$$

$\beta_U$

**Industry betas for Norwegian salmon harvesting**

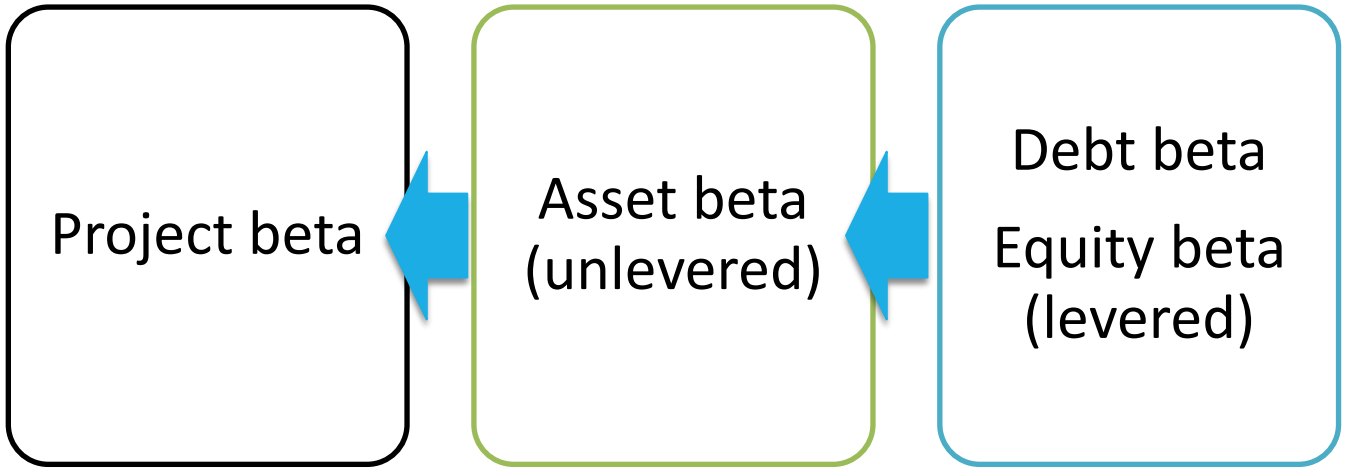
| vs MSCI World | 5-year monthly beta | 2-year weekly beta | E / (E + D) | Unlevered 5-year monthly beta | Unlevered 2-year weekly beta | Average beta |
|---|---|---|---|---|---|---|
| **Bakkafrost** | 0.41 | 0.48 | 0.77 | 0.32 | 0.37 | 0.34 |
| **SalMar** | 0.31 | 0.21 | 0.67 | 0.21 | 0.14 | 0.17 |
| **Mowi** | 0.70 | 0.46 | 0.63 | 0.44 | 0.29 | 0.36 |
| **Leroy Seafood** | 0.55 | 0.58 | 0.71 | 0.39 | 0.41 | 0.40 |
| **Austevoll Seafood** | 0.64 | 0.59 | 0.55 | 0.35 | 0.32 | 0.34 |
| **Grieg Seafood** | 0.62 | 0.74 | 0.64 | 0.39 | 0.47 | 0.43 |
| **Norway Royal Salmon** | 0.00 | 0.34 | 0.58 | 0.00 | 0.20 | 0.10 |
| **Average** | **0.46** | **0.48** | **0.65** | **0.30** | **0.31** | **0.31** |
| **Median** | **0.55** | **0.48** | **0.64** | **0.35** | **0.32** | **0.34** |
| **Average (without Royal)** | **0.54** | **0.51** | **0.66** | **0.35** | **0.33** | **0.34** |

# Project cost of capital



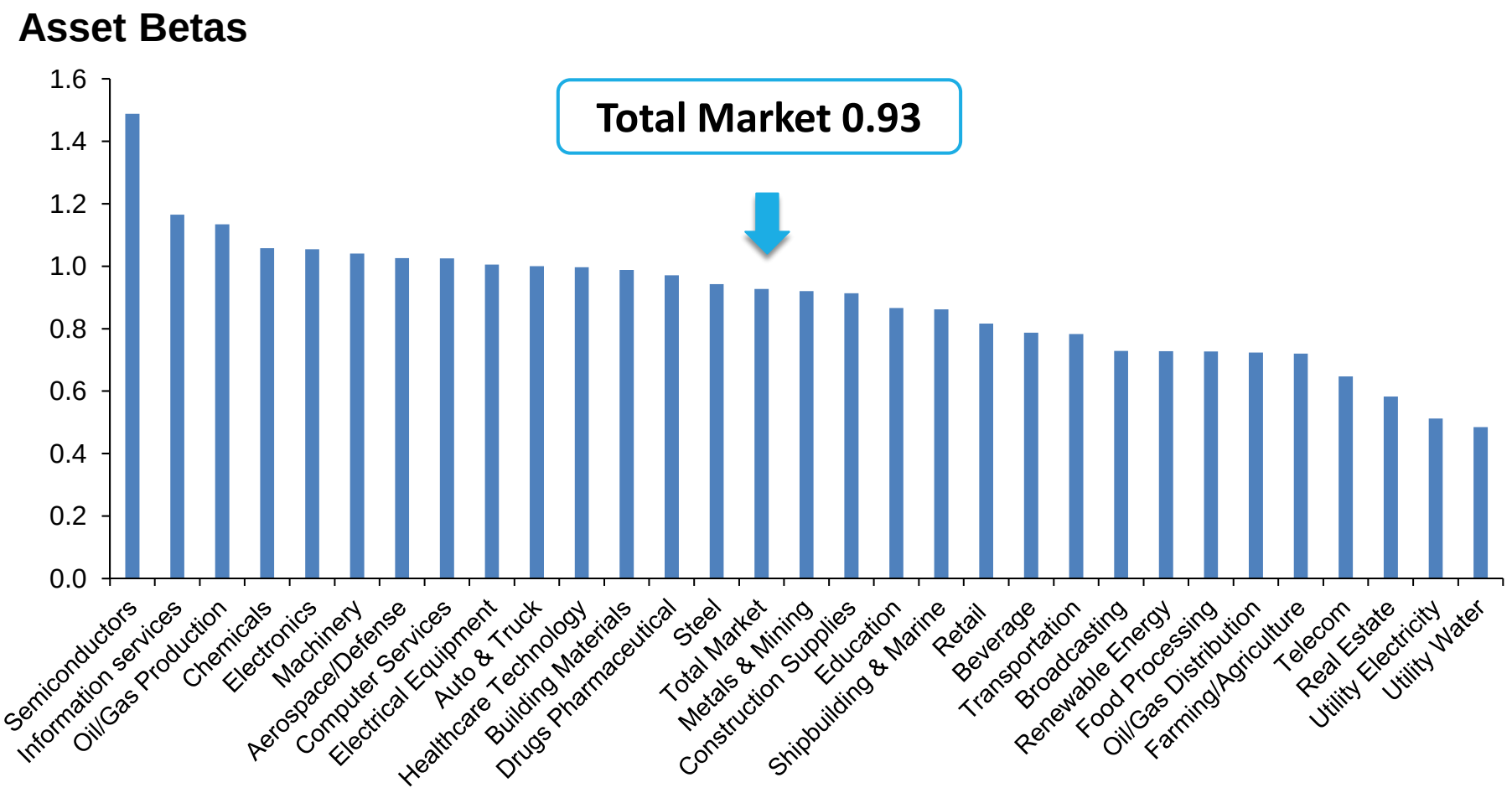
To calculate the project cost of capital

- The first step is to find the relevant equity beta (from the specific industry)
- The next step is from levered equity beta to unlevered asset beta (previous slide)
- The final step is to select the relevant asset beta for the project



# Asset betas






Source: Data from Damodaran (2022)

# Calculating the project cost of capital



**Problem**

Pharma company X wants to build a new headquarters. It is fully financed with equity. The risk-free rate is 3% and the market risk premium is 4%. What is the project's cost of capital?

# Calculating the project cost of capital



**Problem**

Pharma company X wants to build a new headquarters. It is fully financed with equity. The risk-free rate is 3% and the market risk premium is 4%. What is the project's cost of capital?

**Solution**

Since it's a real estate project, we take the real estate asset beta of 0.58 instead of the pharma beta of 0.97

Since the project is fully-equity financed we use the unlevered beta:

$$r_u = r_E = r_f + \beta_i \cdot \left(E[r_{MKT}] - r_f\right) = 3\% + 0.58 \cdot 4\% = \mathbf{5.3}\%$$

# Adjusted cost of equity capital



- There is empirical evidence that S and E affect the cost of equity and the cost of debt
  - Companies with better sustainability scores tend to have cheaper financing and better access to finance
- Companies with better sustainability performance have lower betas for social risk $\beta_i^{SF}$ and/or environmental risk $\beta_i^{SF}$

Adjusted cost of equity capital: $r_i = r_f + \beta_i^{MKT} \cdot RP_{MKT} + \beta_i^{SF} \cdot RP_{SF} + \beta_i^{EF} \cdot RP_{EF}$

$RP$ = risk premium

- The challenge is to estimate company betas for social and environmental risk

| Type of risk premium | Risk premium (in %) |
|---|---|
| **Social risk premium $RP_{SF}$** | 1% - 1.5% |
| **Environmental risk premium $RP_{EF}$** | 1.9% |

# Estimating social and environmental betas



- The challenge is to estimate company betas for social and environmental risk
  - We cannot derive historical betas like those for the market risk, as there is no reliable history of the social and environmental index
  - A comprehensive approach is a value-based approach using estimates for $SV$ and $EV$ based on material social and environmental factors
- $SV$ and $EV$ are negatively related to the social and environmental betas
  - Negative values for $SV$ and $EV$ indicate that a company causes social and environmental problems, meaning it is exposed to social and environmental risks, which implies a positive beta $\beta_i^{SF}, \beta_i^{EF} > 0$
  - Positive values for $SV$ and $EV$ show that a company contributes to solving social and environmental challenges, implying a negative beta $\beta_i^{SF}, \beta_i^{EF} < 0$
- A pragmatic method to gauge the effect of a company's social and environmental risks on its financial risk-profile is to relate $SV$ and $EV$ to $FV$

$$\text{Factor betas: } \beta_i^{SF} = -\frac{SV}{FV} \quad \text{and} \quad \beta_i^{EF} = -\frac{EV}{FV}$$

# Alternatives for estimating social and environmental betas



- When data are not available to perform a complete calculation of SV and EV, you can make ad hoc assessments of the factor betas according to S and E exposures

- Another approach uses ESG ratings:
  - Low S and E scores indicate poor performance and higher exposure to S and E risks, so high betas, and vice versa: high S and E scores lead to low or even negative betas
  - Given availability ESG ratings, this method is tempting

- But ESG ratings have several drawbacks
  - ESG ratings cannot be compared across industries
  - No universal framework to define which ESG risks are material and should therefore be included
  - Ratings only measure inward impact (single materiality) and not outword impact (double materiality)

# Adjusted cost of debt capital



- There is also evidence that sustainability concerns lead to higher cost of debt capital (Chava, 2014)

  Adjusted cost of debt capital: $r_D = y - PD \cdot LGD$

- Sustainability risks can increase the probability of default $PD$, which translates to a higher contractual interest rate $y$
  - Example: ING's sustainability linked loan with Philips in 2017 (see next slide)

- The adjustment for sustainability risks is small for investment grade debt, while riskier junk bonds can have bigger adjustments

# Loan facility to Philips

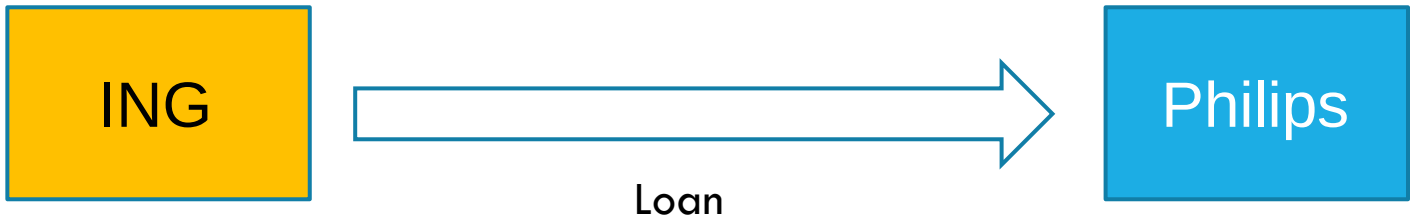


Lead arranger of five-year loan facility

- Has conducted credit risk assessment; and
- Acts as sustainability coordinator in loan syndicate

A leading sustainable corporate

- 'Healthy People, Sustainable Program'




- If sustainability performance up, interest rate goes down (and vice versa)
  - Measured by Sustainalytics
  - Up to 5-10% of credit spread (if spread 50 bps -> 2 to 5 bps)

# The cost of social and environmental capital



- S and E also have their own cost of capital, which tend to be much lower than the cost of financial capital
  - Low social discount rates imply that current and future generations are treated more or less equally (time preference $\delta \approx 0$)

| Social discount rate $r^s = \delta + \eta \cdot g + L$ with $g = 1.3\%$ | | | |
|---|---|---|---|
| **Time preference $\delta$** | **Elasticity $\eta$** | **Risk parameter $L$** | **Discount rate $r^s$** |
| 0% | 1.5 | 0.2% | 2.2% |

Growth rate driven by growth in consumption

Reflects the extreme element of macroeconomic risk of rare disasters or society collapse

- Use social discount rate for both SV and EV
  - 2% (= 0% + 1.5 * 1.3%) without risk parameter
  - 2.2% (= 0% + 1.5 * 1.3% + 0.2%) with risk parameter

# Applying the social discount rate



- What does such a low cost of social and environmental capital mean?
  - A lower cost of capital leads to a higher present value of social and environmental flows

| Medtech company | Value in EUR millions |
|---|---|
| **Financial flows** | |
| **Annual cash flows (in EUR millions)** | 450 |
| **Discount factor** | 6.6% |
| **Financial value (PV in EUR millions)** | **6,818** |
| **Social flows** | |
| **Quality life years extended annually** | 2,000 |
| **Quality life year in EUR** | 75,000 |
| **Annual social flows (in EUR millions)** | 150 |
| **Discount factor** | 2.2% |
| **Social value (PV in EUR millions)** | **6,818** |
| **Company value (in EUR millions)** | **13,636** |

Social flows are 3x smaller than financial flows

Social value is equal to financial value

Positive SV leads to higher company value

| Oil company | Value in EUR millions |
|---|---|
| **Financial flows** | |
| **Annual cash flows (in EUR millions)** | 800 |
| **Discount factor** | 6.6% |
| **Financial value (PV in EUR millions)** | **12,121** |
| **Environmental flows** | |
| **Carbon emissions (thousands of tonnes $CO_2$)** | 1,800 |
| **Shadow price of emissions, EUR/tonne** | 200 |
| **Annual environmental flows (in EUR millions)** | -360 |
| **Discount factor** | 2.2% |
| **Environmental value (PV in EUR millions)** | **-16,364** |
| **Company value (in EUR millions)** | **-4,242** |

Environmental flows are 2x smaller than financial flows

Environmental value is larger than financial value

Negative EV leads to lower company value

# The cost of integrated capital



- Putting together $r_i^{FV}$ (adjusted WACC), $r^{SV}$ and $r^{EV}$ in the cost of integrated capital $r_i^{IV}$ gives the return demanded on all types of capital combined:

$$r_i^{IV} = \frac{FV}{IV} \cdot r_i^{FV} + \frac{SV}{IV} \cdot r^{SV} + \frac{EV}{IV} \cdot r^{EV}$$

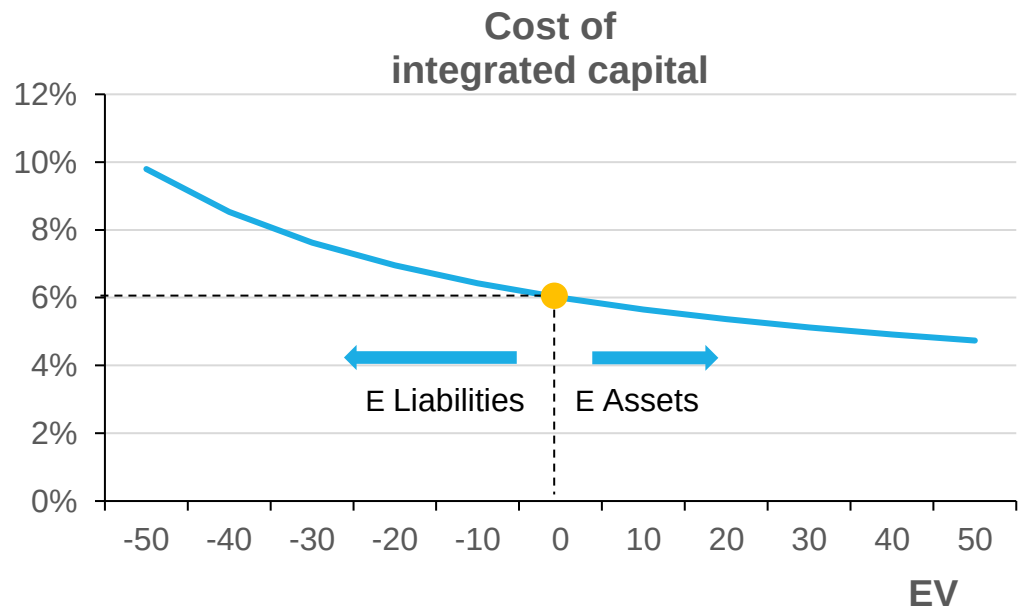
- The cost of integrated capital $r_i^{IV}$ is a weighted average of the cost of financial, social and environmental capital
- The weights are the size of each capital: $IV = FV + SV + EV$
- Remember: the cost of S + E capital is the social discount rate $r^{SV} = r^{EV} = r^{s}$

# Cost of integrated capital in static setting



- The cost of integrated capital: $r_i^{IV} = \frac{FV}{IV} \cdot r_i^{FV} + \frac{SV}{IV} \cdot r^{SV} + \frac{EV}{IV} \cdot r^{EV}$

| FV | SV | EV | IV | FV/IV | SV/IV | EV/IV | $r^{FV}$ | $r^{SV}$ | $r^{EV}$ | $r^{IV}$ |
|---|---|---|---|---|---|---|---|---|---|---|
| 100 | 0 | -50 | **50** | 2.0 | 0.0 | -1.0 | 6.0% | 2.2% | 2.2% | **9.8%** |
| 100 | 0 | -40 | **60** | 1.7 | 0.0 | -0.7 | 6.0% | 2.2% | 2.2% | **8.5%** |
| 100 | 0 | -30 | **70** | 1.4 | 0.0 | -0.4 | 6.0% | 2.2% | 2.2% | **7.6%** |
| 100 | 0 | -20 | **80** | 1.3 | 0.0 | -0.3 | 6.0% | 2.2% | 2.2% | **7.0%** |
| 100 | 0 | -10 | **90** | 1.1 | 0.0 | -0.1 | 6.0% | 2.2% | 2.2% | **6.4%** |
| 100 | 0 | 0 | **100** | 1.0 | 0.0 | 0.0 | 6.0% | 2.2% | 2.2% | **6.0%** |
| 100 | 0 | 10 | **110** | 0.9 | 0.0 | 0.1 | 6.0% | 2.2% | 2.2% | **5.7%** |
| 100 | 0 | 20 | **120** | 0.8 | 0.0 | 0.2 | 6.0% | 2.2% | 2.2% | **5.4%** |
| 100 | 0 | 30 | **130** | 0.8 | 0.0 | 0.2 | 6.0% | 2.2% | 2.2% | **5.1%** |
| 100 | 0 | 40 | **140** | 0.7 | 0.0 | 0.3 | 6.0% | 2.2% | 2.2% | **4.9%** |
| 100 | 0 | 50 | **150** | 0.7 | 0.0 | 0.3 | 6.0% | 2.2% | 2.2% | **4.7%** |



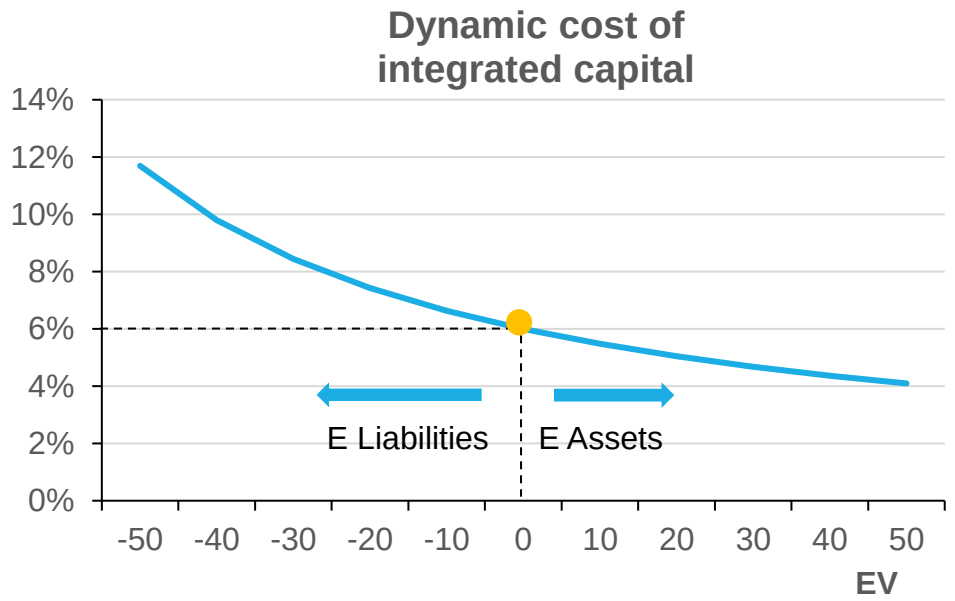

- The cost of integrated capital declines with higher amounts of social and environmental capital (assets) and rises when social and environmental capital falls and goes negative (liabilities)

# Cost of integrated capital in dynamic setting



- The **adjusted** cost of financial capital $r^{FV}$ rises with increasing social and environmental risks
  - The dispersion in the cost of integrated capital widens in a dynamic simulation

| FV | SV | EV | IV | $\beta^{SF}$ | $\beta^{EF}$ | $r^{FV}$ | $r^{SV}$ | $r^{EV}$ | dynamic $r^{IV}$ | static $r^{IV}$ |
|---|---|---|---|---|---|---|---|---|---|---|
| 100 | 0 | -50 | **50** | 0 | 0.5 | **7.0%** | 2.2% | 2.2% | **11.7%** | **9.8%** |
| 100 | 0 | -40 | **60** | 0 | 0.4 | **6.8%** | 2.2% | 2.2% | **9.8%** | **8.5%** |
| 100 | 0 | -30 | **70** | 0 | 0.3 | **6.6%** | 2.2% | 2.2% | **8.4%** | **7.6%** |
| 100 | 0 | -20 | **80** | 0 | 0.2 | **6.4%** | 2.2% | 2.2% | **7.4%** | **7.0%** |
| 100 | 0 | -10 | **90** | 0 | 0.1 | **6.2%** | 2.2% | 2.2% | **6.6%** | **6.4%** |
| 100 | 0 | 0 | **100** | 0 | 0 | **6.0%** | 2.2% | 2.2% | **6.0%** | **6.0%** |
| 100 | 0 | 10 | **110** | 0 | -0.1 | **5.8%** | 2.2% | 2.2% | **5.5%** | **5.7%** |
| 100 | 0 | 20 | **120** | 0 | -0.2 | **5.6%** | 2.2% | 2.2% | **5.1%** | **5.4%** |
| 100 | 0 | 30 | **130** | 0 | -0.3 | **5.4%** | 2.2% | 2.2% | **4.7%** | **5.1%** |
| 100 | 0 | 40 | **140** | 0 | -0.4 | **5.2%** | 2.2% | 2.2% | **4.4%** | **4.9%** |
| 100 | 0 | 50 | **150** | 0 | -0.5 | **5.1%** | 2.2% | 2.2% | **4.1%** | **4.7%** |




- Social and environmental factors influence the adjusted cost of financial capital $r^{FV}$ in a limited way (5.1% to 7.0%), while the cost of integrated capital $r^{IV}$ varies from 4.1% to 11.7%

# Inditex's cost of integrated capital



- Cost of financial capital:
  - $r_E = r_f + \beta_i \cdot (E[r_{MKT}] - r_f) = 1.5\% + 1.21 * 5\% = 7.6\%$
  - $r_D = r_f + CRP = 1.5\% + 1.0\% = 2.5\%$
  - $WACC = \frac{E}{V} \cdot r_E + \frac{D}{V} \cdot r_D = \frac{82}{79} * 7.6\% - \frac{3}{79} * 2.5\% = \mathbf{7.8}\%$

| IV calculation | Value |
|---|---|
| **FV (enterprise value)** | 79 |
| **Negative SV** | -137 |
| **Positive SV** | 283 |
| **Negative EV** | -183 |
| **IV** | 42 |

| | |
|---|---|
| Risk-free rate, $r_f$ | 1.5% |
| Mkt. risk premium, $RP_{MKT}$ | 5% |
| Company beta, $\beta_i^{MKT}$ | 1.21 |
| Credit risk premium, $CRP$ | 1% |
| Social risk premium, $RP_{SF}$ | 1.25% |
| Env. risk premium, $RP_{EF}$ | 1.9% |

- **Adjusted** cost of financial capital
  - $\beta_i^{SF} = -\frac{SV}{FV} = -\frac{146}{79} = -1.84$
  - $\beta_i^{EF} = -\frac{EV}{FV} = -\frac{-183}{79} = 2.31$
  - $r_E = r_f + \beta_i^{MKT} \cdot RP_{MKT} + \beta_i^{SF} \cdot RP_{SF} + \beta_i^{EF} \cdot RP_{EF} = 1.5\% + 1.21 * 5\% - 1.84 * 1.25\% + 2.31 * 1.9\% = 9.6\%$
  - $WACC = \frac{E}{V} \cdot r_E + \frac{D}{V} \cdot r_D = \frac{82}{79} * 9.6\% - \frac{3}{79} * 2.5\% = \mathbf{9.9}\%$
- Cost of integrated capital
  - $r_i^{IV} = \frac{FV}{IV} \cdot r_i^{FV} + \frac{SV}{IV} \cdot r^{SV} + \frac{EV}{IV} \cdot r^{EV} = \frac{79}{42} \cdot 9.9\% + \frac{146}{42} \cdot 2.2\% + \frac{-183}{42} \cdot 2.2\% = \mathbf{16.6}\%$

# Inditex's cost of integrated capital - interpretation



- Cost of financial capital: $WACC = 7.8\%$
- **Adjusted** cost of financial capital: $WACC = 9.9\%$
- Cost of integrated capital: $r_i^{IV} = 16.6\%$

| IV calculation | Value |
|---|---|
| **FV (enterprise value)** | 79 |
| **Negative SV** | -137 |
| **Positive SV** | 283 |
| **Negative EV** | -183 |
| **IV** | 42 |

- Step 1: from cost of F capital to adjusted cost of F capital: 9.9% - 7.8% = 2.1%
- Step 2: from adjusted cost of F capital to I capital: 16.6% - 9.9% = 6.7%
- $r_i^{IV} > WACC$ , because of net social and environmental liabilities

# Conclusions



- The cost of financial capital $r^{FV}$ is the required minimum return on financial capital that is used in investment decisions
- S (social) and E (environmental) risks impact the cost of financial capital
- The cost of social capital $r^{SV}$ and environmental capital $r^{EV}$ tend to be much lower than a company's cost of financial capital
- The cost of integrated capital $r^{IV}$ gives an indication of the overall risk of the company, which can differ substantially from a purely financial or an ESG integrated perspective