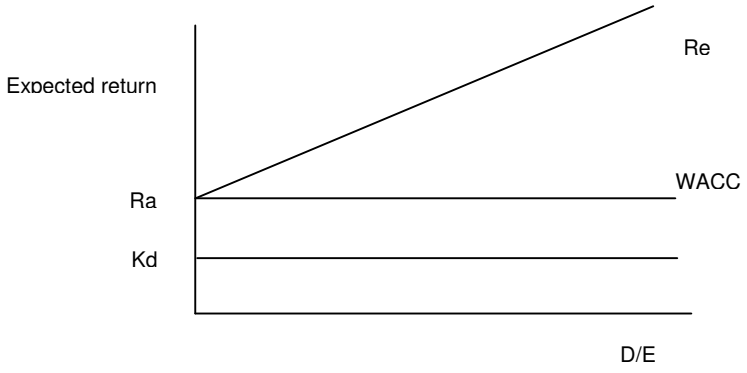


NPV= - Investments$_{t0}$ + PV(FCF) - D

NPV: net cashflows of the project **Net**: including upfront investments; Δ Net Working Capital; cleanup costs; cannibalization

IRR:Discountrate such that the present value of cash flows equals zero

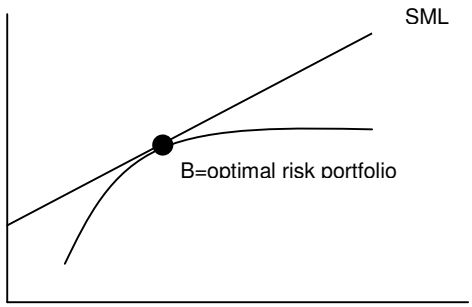
Hurdle rate: Discountrate appropriate for the project based on project's risk and taxshield potential from interest payments

If financing is scarse use the hurdle rate of return of the best alternative

Profitability index: Project NPV / Upfront Investment >benchmark

Equity is **the value** of the company

Discountrate depends on the risk of the assets



<u>Types of markets</u>

- **Perfect Capital market**
- **Almost perfect market (tax deductability of debt)**
- **Real World (no conflicts of interest and asymetric information)**

Cash flow wordt niet beïnvloed door de wijze van afschrijven

NOPLAT=EBIT (1-t)

Gewogen gemiddelde Beta's : ß assets = E/V * ß equity + D/V * ß debt * (1-t)

ß$_{unlevered}$ = Beta bij 100% equity = ß$_{assets}$ ⇒ ß$_{debt}$ = 0

Accept project if: NPV > 0 **and** IRR > hurdle rate

Assumptions WACC: similar projects;optimal capital structure; no financial constraints

WACC: D/V * rate$_{debt}$ (1-t) + E/V * rate$_{equity}$ (**notice: use market values; A/P is not included in WACC but included in NWC)**

Net Working Capital = Cash + investm + AccReceiv. - Acc. Payables

Total portfolio risk = Variance of the returns on the portfolio

ß$_{stock}$ = Covariance(rstock,rpotfolio)/Var(rportfolio)

Total risk of security = systematic risk + firmsystematic risk

Diversification gets rid of firmspecific risk

Security Market Line (SML): The required rate of return rises linearly with the security beta

Market riskpremium = (R_m - R_f)

CAPM & MM determine the required rate of return on investments when the company is not in its optimal capital structure or has different projects

CAPM: all inverstors are risk averse; no transaction costs; homogeneous expectations

CAPM doesn't work when: financially constrained firms ; poorly diversified investors; projects with risks different from assets;capital structure is not optimal

Debt is cheaper than equity so increasing leverage will raise the stockprises

Beyond some point, potential bankruptcy costs limit debt capacity

M&M three situations:

- **<u>Heaven (twee theorieën)</u>** (no taxes, no friction costs, perfect information, no bankruptsy costs, no costs of financial distress)
  1. M&M: Total value of firm is determined by the cashflows generated by the assets, so capital structure is irrelevant
  2. M&M: The required rate of return is determined by the assets

     leverage only redistributes risk from debt to equity thereby raising the required return on equity, leaving the WACC unchanged

     The lefthandside of thebalance determines the WACC

     Rassets = Rd * D/V + Re * E/V = WACC ⇒ (*V/E) ⇒ Re = Ra + (Ra-Rd)*D/E = WACC + (WACC-Rd) * D/E

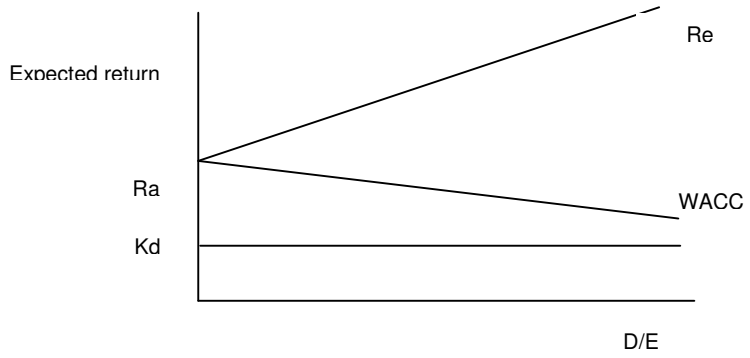
     Required rate of return on equity rises linearly with leverage (D/E) while WACC stays the same

     Portfolio beta is equal to the weighted average of the betas of the securities of the portfolio

     ß$_a$ = D/D+E * ß$_d$ + E/D+E * ß$_e$ ⇒ ß$_e$ = ß$_a$ + D/E (ß$_a$ - ß$_d$)

     The risk of the project determines the hurdle rate

- **Sky** (taxes, no friction costs)
  WACC = Rd (1-t) D/V + Re E/V



Return on equity raises because more leverage puts more asset beta-risk
Tax shield is low risk asset, so beta-risk of equity lowers
Net effect: Equity beta rises and therefore its required rate of return, but not as fast as before without taxes
Now $R_e = WACC_{all\ equity\ financed} + D/E(1-t)(WACC_{all\ equity\ financed} - R_d)$
The projects hurdle rate:

1. Determine the optimal capital structure and the equity beta at current capital structure
2. Apply Hamada formula to determine asset beta: $ß_a = ß_{equity,current\ capital\ structure} / (1+(1-T)(D/E)_{current}$
3. Use Hamada to determine equity beta at optimal capital structure: $ß_{e\ equity\ optimal\ capital\ structure} = ß_a / (1+(1-T)(D/E)_{optimal}$
4. Determine the required rate of return on debt and equity at the optimal capital structure: $Re_{optimal} = R_{riskfree} + ß_{e\ optimal}$ (Rm-Rf)
5. $R_{hurdle} = D/(D+E)_{optimal} * R_d(1-T) + E/(D+E)_{optimal} * R_{e\ optimal}$

- **Real world** (taxes and friction)
  Companies behave as if they have a target D/E leverage which is different across industries; changes over the life-cycle; is affected by changes in corporate governance and developments & innovations in the financial markets.

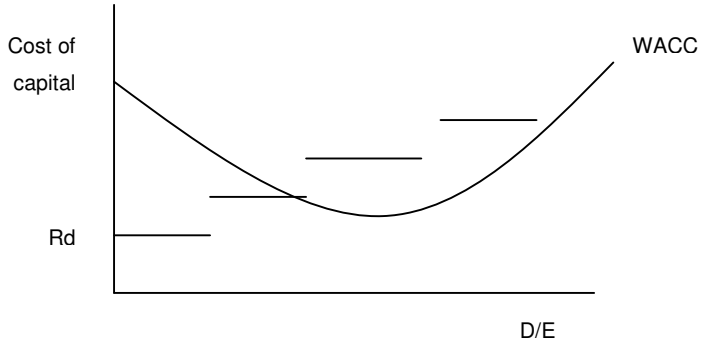
Low target D/E leverage	**High Target D/E leverage**
Facing growth	Low growth
Few tangible assets	Lots of tangible assets
High fixed costs	Low fixed cots
Volatile earnings	Stable earning
Young, many growth opportunities	Old, few growth opportunities
Weak lenders	Strong lenders
Poorly diversified financers	Well-diversified financers

Beta of equity (levered) depend on business risk (unlevered) an financial leverage $\beta_L = \beta_u (1+ (1-T)D/E)$
A company should reject projects below the SML (because IRR<hurdle rate) and accept projects above the SML(because IRR>hurdle rate)

Market Value Added (MVA) = Market value - Capital Invested (Capital Invested = bookvalue +adjustments of depreciation,intangibles,paid premiums)
Economic Value Added (EVA) = (ROI-WACC) * Invested Capital (ROIC = NOPLAT / Invested Capital)
Economic depreciation is equal to the excess of cashflows after payment of the IRR
Strengths EVA: Simple; no need for stock information; allows internal benchmarking; linkage between shareholdervalue creation and operating and financing decisions
Weakness EVA: backward looking; static figure; shortterm bias; definition of invested capital
Casino-strategy: invest in projects with a negative NPV

The cost of financial distress

- Bankruptcy cost
- Stakeholders withdrawal of loyalty
- Relation between leverage an cost of capital



Agency problems:

Management has different interests than shareholders

Management has different interests than financers

Asymetric information (firm has attractive projects)

Financial distress: Shareholders benefit by gains; financers pay for a fall (low leverage D/E avoids conflict of interest)

In times of financial distress company value is distroyed through:

- casino strategy
- underinvestment problem (reject projects with low risk an positive NPV)
- milking the property extra dividends
- playing for time (destroying value in time)
- issue senior debt (mostly protected by a debt convenant)

Banks view on credit risk:

1. What is the likelihood of distress?
    - Competitive dynamics (technical change; taste shifts)
    - Cost structure
    - Cyclicality
2. If financial distress occurs, how costly is it?
    - Consumers,suppliers, employees leeving
    - Management trics
    - Financers (underinvestmentproblem)