Project and Enterprise Financing

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Lecture 2: Credit Financing

Content

1. Features, Role of debt financing

2. Rating

3. Long and short-term credit financing

1. Features, Role of debt financing

- **Debt** has **only a financing function**, in contrast to equity.

- **Additional functions of equity**:

- *Establishment function*: Capital companies (corporate enterprises; Kapitalgesellschaften) need to have a minimum amount of equity capital.
  (e.g. AG in Austria: €70,000)

- *Liability function*: Equity has (especially from the viewpoint of creditors) a buffer function. Losses are reducing a company's assets and profits increase them. A loss reduces reserves (Rücklagen) on the balance sheet, which reduces the amount of equity. Thus, the larger the amount of equity is the better creditors are protected.

The owners of **capital companies** (corporate enterprises) are only liable with their contribution (Einlage). On the contrary, owners of (business) **partnerships** (Personengesellschaften; OHG-Gesellschafter, Komplementäre of a KG) are also liable with their personal assets.

- *Profit distribution function:* The profit can be distributed among owners.

- *Solvency function*: Equity is typically a requirement that creditors are willing to provide funds. E.g., equity plays an important role in any credit assessment. In addition, equity also strengthens the confidence of others concerning a firm's performance capability. This relates to investors as well as sales and purchase markets. It is also easier for healthy firms to acquire good human capital.

- *Leadership function*: Equity investors have a leadership claim.

2. Rating (credit scoring, credit analysis; Bonitätsprüfung)

- **Uncertainty for creditors:**

Granting of credit Repayment (credit amount, interest)

- The uncertainty increases with a decreasing rating (PD ↑)
- Creditors (especially banks): Generate an internal rating (PD-estimation)
  - ↳ Also relevant for suppliers, customers, bondholders, equity investor

PD: Probability of Default

- **Man information sources used in rating systems:**

Hard Facts:

- Balance sheet, income statement (G&V)
- Finance and business plans (future oriented)
- Previous customer prepayments behavior
- Information from credit agencies (Auskunfteien), e.g. KSV (Kreditschutzverband) or Creditreform

Soft Facts:

- Quality of management and employees (education, past performance, etc.), position within the industry, etc., more important for smaller firms

- **Cost of debt are influenced**

  (1) by the general level of **interest rates** (i.e. a credit risk free interest rate term structure, like e.g. interest rates for German government debt), and

  (2) by the **rating** of the firm: The lower the rating, the higher the cost of debt.

- Firms that are borrowing money from a bank are **rated by** that **bank**.

- Firms that issue a bond (Anleihe) are (often) **rated by** rating **agencies**.

  Four main rating agencies: Moody's, Standard & Poor's (S&P), Duff & Phelps (D&P) und Fitch (see also Letures 3-5 (Corporate Bond Financing) for more details on bond ratings by rating agencies)

- **Factors** typically used by banks to rate **corporate customers**:
  - **Liquitity**: **Cash Flow** to sales ratio, Cash Flow to interest payments
  - **Financial Leverage**: **Debt**/Equity ratio, Debt/Cash Flow
  - **Profitability**: **R**OE, ROA
  - Information from credit reporting agencies (e.g. KSV, Creditreform)
  - Industry, Region
  - Management quality

- **Factors** typically used by banks to rate **retail customers**:
  - Job type
  - Family status
  - Children
  - Age
  - Region
  - Past debt service behavior

3. Long and short-term credit financing

Debt Financing - Overview

Long-run (> 1 year maturity)	short-run (≤ 1 year maturity)
♦ **Long-term bank loan**	♦ **Overdraft facility** (Kontokorrentkredit)
♦ **Bonds**	♦ Customer prepayments (Kundenanzahlungen)
• **Corporate Bond** (Unternehmensanleihe)	♦ Supplier credit (Lieferantenkredit)
• Bond with warrants (Optionsanleihe)	
• Convertible bond (Wandelanleihe)	

❍ Short term credit financing

• Customer prepayments (Kundenanzahlung)

If a customer makes a pre-payment before the company has delivered goods.

Different to other credit forms: customer pre-payments can be used without interest payments.

Customer pre-payments are common in industries with a longer time period to fulfill the order. E.g. large-scale plants, or production of ships and planes.

Customers take the additional risk that the (their) supplier cannot fulfill his obligations.

- **Supplier credit (Lieferantenkredit)**

A supplier credit is originated by granting an extended payment period. It is often used as a sales promotion tool.

Advantage: formlessness; in most cases no credit rating

For firms that have exhausted all other credit lines, a supplier credit is typically the last possibility for short term financing funds.

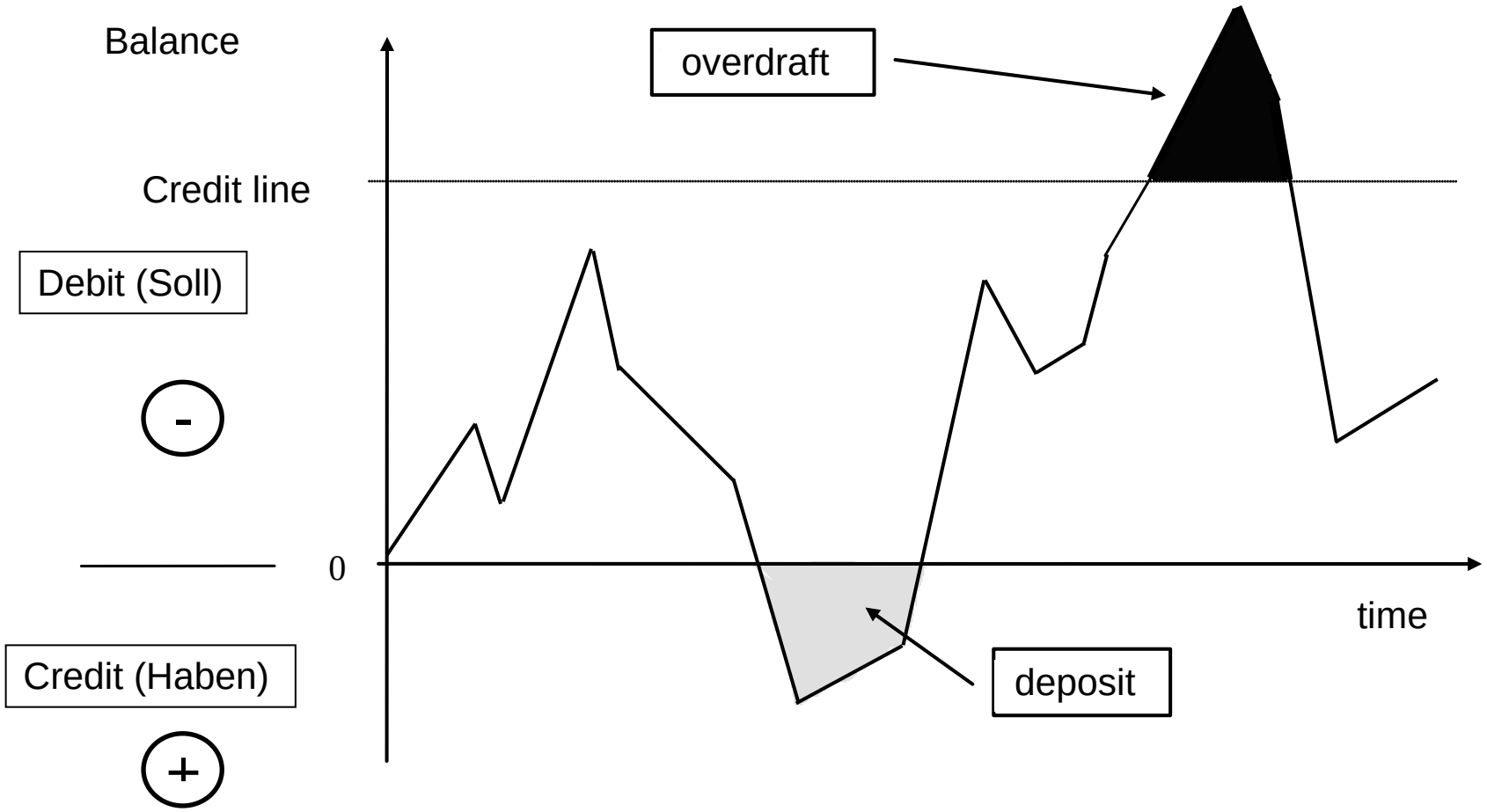
Although no direct interest payments exist in a supplier credit agreement, a supplier credit is typically very expensive. The reason is that the customer can deduct a particular amount (discount; Skonto) from the billed amount when payment is made immediately (within a short period of time).

- **Overdraft facility (Kontokorrentkredit)**

(a) Features

- Current account (Kontokorrentkonto)
- Current account credit line (Kontokorrentlinie)
- Short-term, in most cases continuously renewed.

Example for the balance (Saldo) development of the current account of an Overdraft facility



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(b) Cost factors

- **Debit interest (Sollzinsen)**
- **Credit- / and provision commission (Kredit-/ und Bereitstellungsprovision)**
  - **Fixed addition** to debit interest
  - Calculated from **credit line** (‚idle costs‘ (Leerkosten) !)
  - Calculated from **peak demand** (Spitzenbedarf**)** per month (quarter, ...)
    ⇒ "shifted" (‚idle costs‘) if the peak demand corresponds not to the normal demand
  - Calculated from the **not used part**

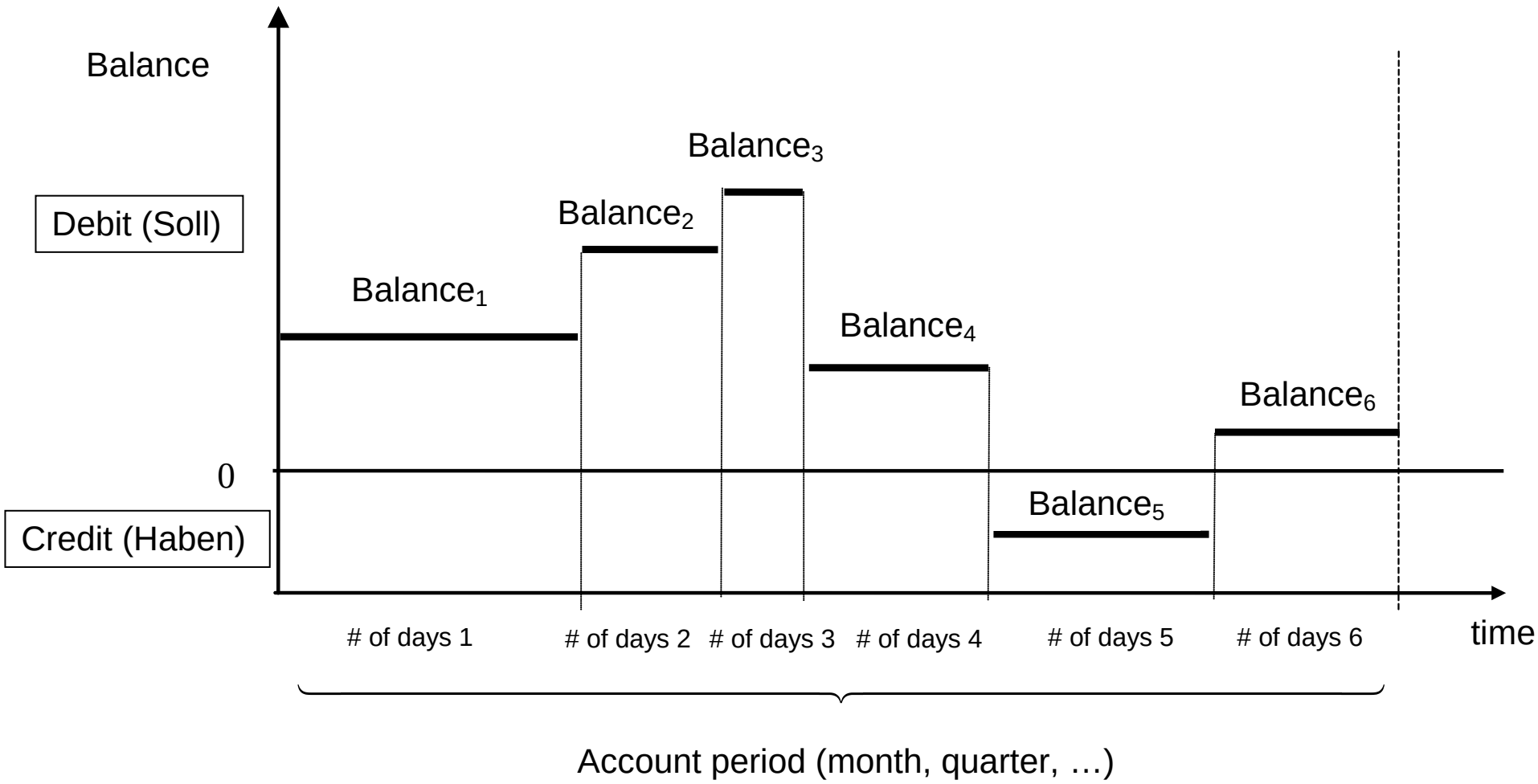
- **Overdraft commission (Überziehungsprovision)**

  ⇒ When the credit line is exceeded

(c) Calculation of the pure interest costs

The actually drawdown (Inanspruchnahme) of an overdraft facility is normally not constant.

Thus, in a first step it is necessary to divide the account period (Abrechnungs-periode) into intervals with a constant balance amount.



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To calculate interest costs two more details are necessary: the interest rate and the **interest calculation practice** (Zinsverrechnungsusance), calculated as:

$$\frac{\text{\# of days for each period}}{\text{\# of days per year}}$$

Possibilities:

- 30/360
- Actual/360
- Actual/actual

A new balance is (normally) computed <u>from</u> the <u>day of using the funds</u>. Interest costs are calculated for **each account period**. They correspond to the sum of interest costs of each sub-period. Interest costs Z_t of sub-period t (r ... interest rate (debit and credit, respectively) in % p.a.):

$$Z_t = \frac{\text{Balance}_t \cdot r \cdot (\text{\# of days})_t}{100 \cdot 360\ (365, 366)}$$

$$Z_t = \frac{\text{Balance}_t \cdot r \cdot (\#\text{ of days})_t}{100 \cdot 360\ (365, 366)} = \frac{\frac{\text{Balance}_t}{100} \cdot (\#\text{ of days})_t}{\frac{360\ (365, 366)}{r}}$$

$$\text{ZZ (Zinszahl)}_t = \frac{\text{Balance}_t}{100} \cdot (\#\text{ of days})_t$$

$$\text{ZT (Zinsteiler)} = \frac{360\ (365, 366)}{r}$$

Sum of the pure **interest costs** for the **account period**:

$$\text{Interest costs} = \frac{\sum_t ZZ_t}{ZT}$$

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❍ Long-term credit financing

Components of credit contracts

- Amount paid out (nominal value, face value; Auszahlungsbetrag) and debt service payments (Kapitaldienstzahlungen)
- Repayment structure (Tilgungsstruktur)
- Interest rate
- Duration: long-term (5 - 10 years, sometimes longer)
- Collateralization (Besicherung): Often mortgage-backed (hypothekarisch besichert), notarial documentation of the mortgage (notarielle Beurkundung) and inclusion in the land registry (Eintragung im Grundbuch))

(a) Amount paid out and debt service payments:

- Nominal (face) amount = nominal value of the credit
  = Benchmark for other components of the contract (e.g. interest, some external service costs (ESC, Fremdleistungskosten))

- **Amount paid out**
  = Amount actually paid out to the borrower (debtor)

Nominal amount
- Disagio (discount)
- One-time ESC at t = 0

= Amount paid out

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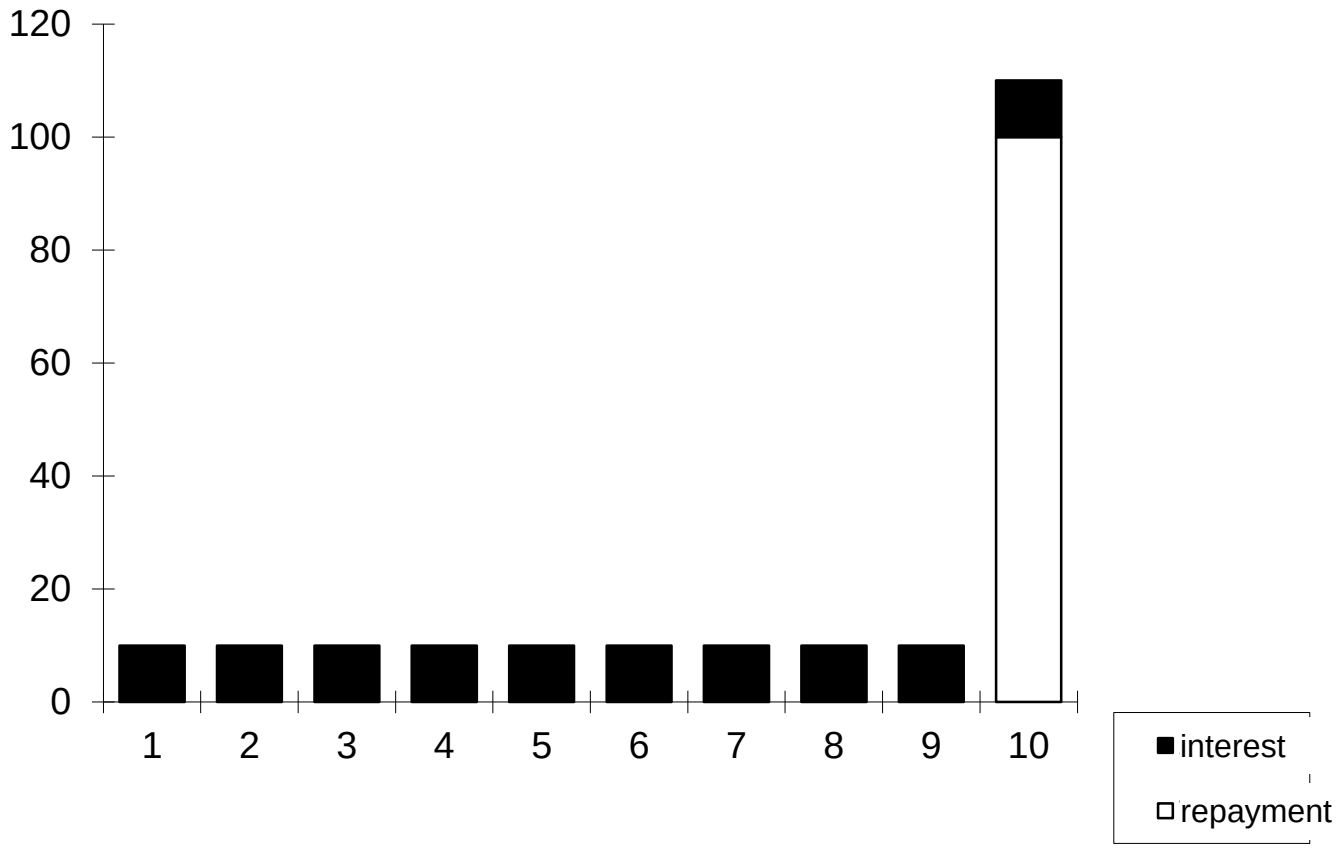
- **Debt service payments**

  = Amount the borrower has to pay in period t

	Repayment in period t
+	debit interest (Sollzinsen) in period t
+	Agio (premium) in period t
+	Some ESC in period t
=	debt servicing in period t

(b) Repayment structures:

(A) Repayment at the end



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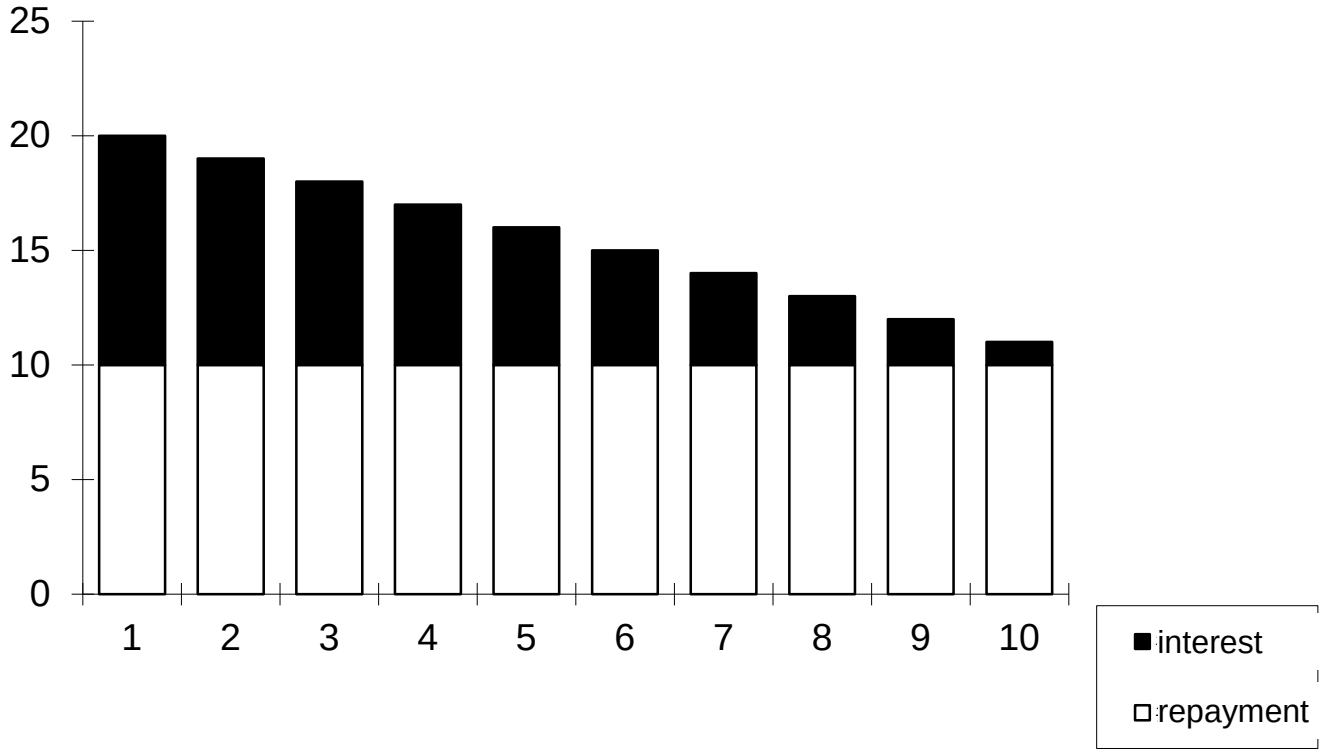
(B) Installment repayment (Ratentilgung)



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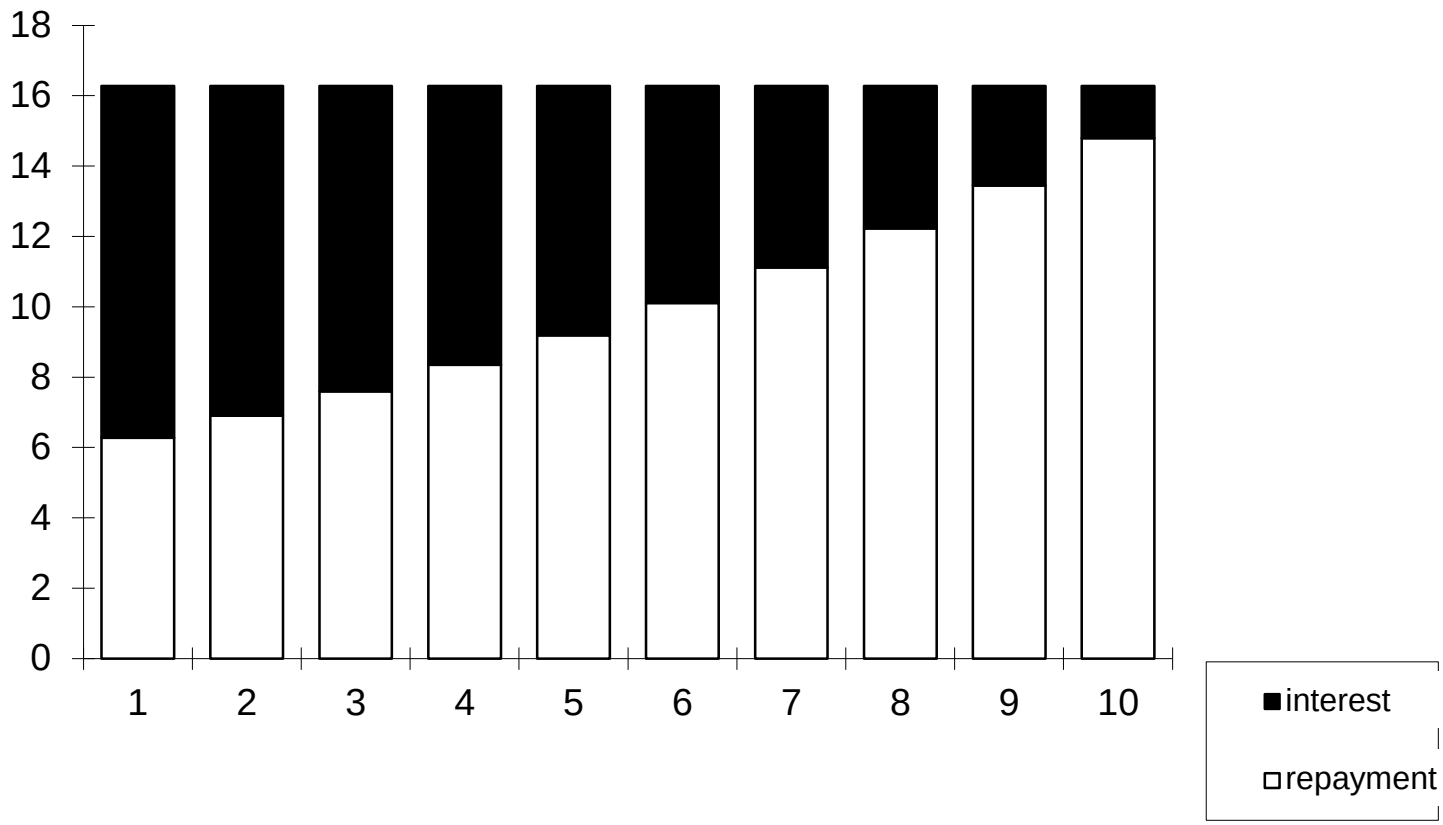
(C) Annuity payments (Annuitätentilgung)



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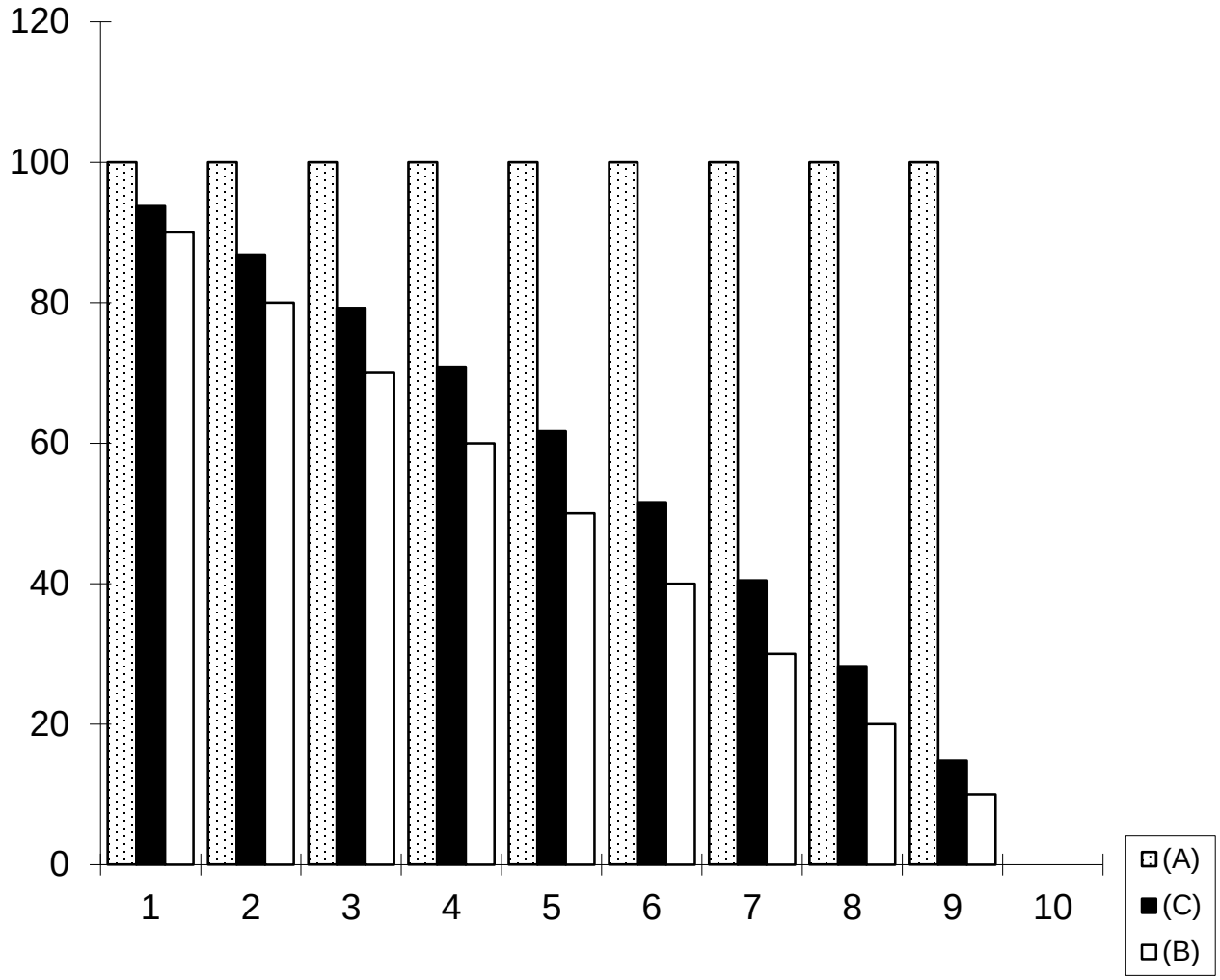
Balance due (Restschuld) for (A), (B), and (C):



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- **Repayment calculation**

T_t ..... Repayment amount in period t
Z_t ..... Interest amount in period t
A_t ..... Debt service amount in period t (= $T_t + Z_t$)
i ..... Interest rate p.a.
n ..... Duration of the credit
K_0 ..... Amount paid out

(a) Installment repayment (Ratentilgung)

Characteristic: Constant repayment amounts

$T_1 = T_2 = ... = T_n = T$

$$K_0 = \sum_{t=1}^{n} T_t = n \cdot T \qquad T = \frac{K_0}{n}$$

For period t:

- Balance due (Restschuld): $K_t = K_0 \cdot \left(1 - \frac{t}{n}\right)$
- Interest amount: $Z_t = i \cdot \left(1 - \frac{t-1}{n}\right) \cdot K_0$
- Debt service amount: $A_t = \left[i \cdot \left(1 - \frac{t-1}{n}\right) + \frac{1}{n}\right] \cdot K_0$

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(b) Annuity payments (Annuitätentilgung)

Feature: constant annuity payments (debt service amount):

$A_1 = A_2 = ... A_n = A$

$A = K_0 \cdot \text{Annuity Factor}$

$$\boxed{A = \frac{i \cdot q^n}{q^n - 1} \cdot K_0}$$

$q = 1 + i$

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❍ Cost of debt calculation

- Simple and widely used approach: **yield to maturity** of the firm's **debt**.
- First step: **Payment flow** of a firm's **debt positions** has to be generated (timely recognition of cost components):

	t = 0	t = 1	t = 2	...	t = T
Face value Repayment Interest Payments Agio (premium) Disagio (discount) One-time ESC Regular ESC					
Cash flow					

Financing costs include **all expenses** (cash outflows) (depart from redemption payments) a company has to accept to get (external) financing means.

♦ **Main elements of costs:**

- Cost for **using** credit funds (**interest** on debt; Sollzinsen)

- Cost for acquiring capital:

  One-time external service costs (Fremdleistungskosten, ESC)

  e.g. provision of collateral

  Regular external service costs (ESC)

  e.g. account management fee

- If a **market value** is **available** (e.g. for an issued bond):

$$MV_j = CF(1)_j \cdot (1+y_j)^{-1} + CF(2)_j \cdot (1+y_j)^{-2} + \ldots + CF(T)_j \cdot (1+y_j)^{-T}$$

MV_j Market value of debt position j

$CF(1)_j$ Cash flow (debt service payment) at t = 1 of debt position j

y_j **Yield to maturity** of debt position j

- If a **market value** is **not available** (e.g. a bank loan):

$$100 = CF(1)_j \cdot (1+y_j)^{-1} + CF(2)_j \cdot (1+y_j)^{-2} + \ldots + CF(T)_j \cdot (1+y_j)^{-T}$$

- **Commercial Method (Kaufmännische Methode): Approximative Yield to maturity (capital cost) calculation**

$$i_e = \frac{\dfrac{\sum \text{total costs}}{\text{mean time to maturity}}}{\text{available funds } (t = 0)}$$ = yield to maturity = cost of capital

	Σ interest costs
+	Σ external service costs
+	Disagio
+	Agio
=	**Total costs**

	Loan face value
-	Disagio
-	External service costs at t=0
=	**Available funds (t=0)**

$$\text{mean time to maturity} = \text{periods without repayment} + \frac{\text{repayment periods} + 1}{2}$$

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Example:

SolarWorld obtains the following loan offer from a bank:

Nominal value	€20 Mio
Interest rate p.a.	7 %
Disagio (=Abschlag)	1.5 %
Agio (=Aufschlag)	0.5 %
Time to maturity	2 years
Repayment type	2 annual installments
Fee: inclusion of mortage in land registry (from nominal value) (=Eintragung im Grundbuch)	0.5 %
Fee: exclusion of mortage in land registry (from nominal value) (=Löschung im Grundbuch)	0.1 %
Account management charge (of the remaining debt) (=Kontoführungsgebühr)	0.2 % p.a.

(a) Calculate the cash flow for the loan offer.

(b) How large are the cost of capital for the loan?