Business Valuation in Germany

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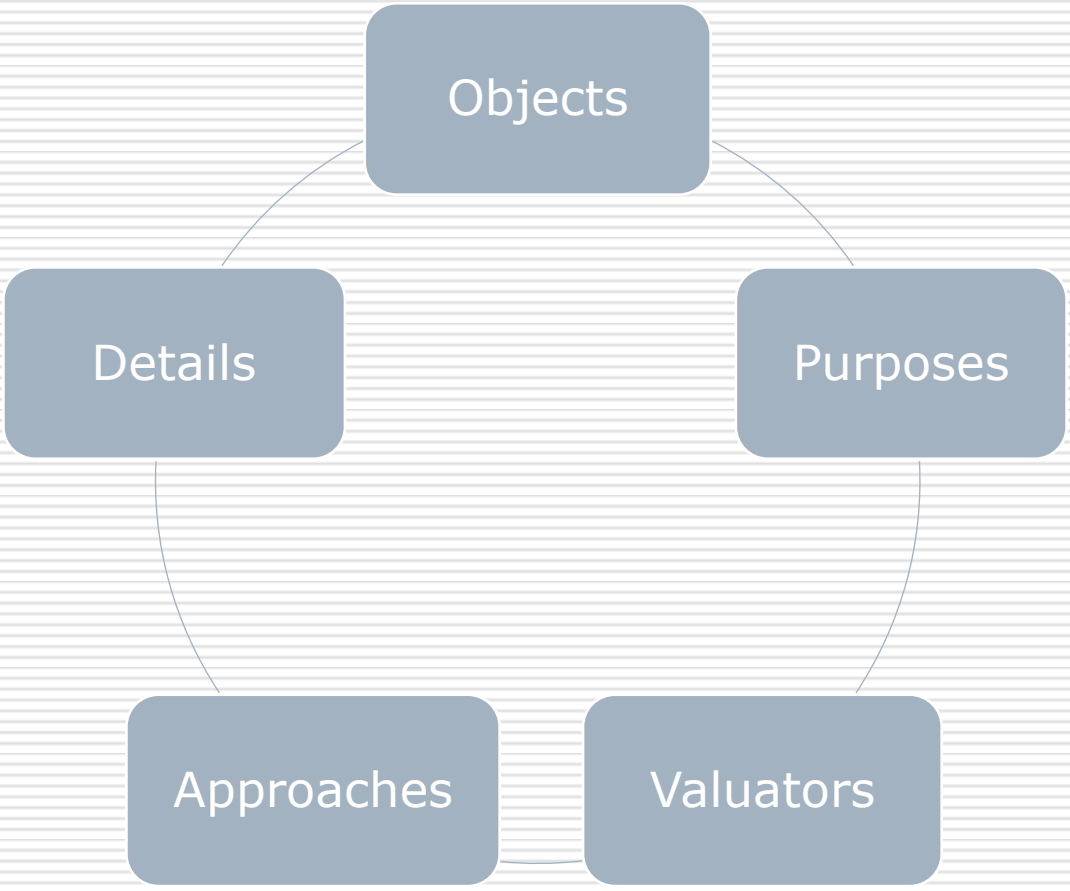
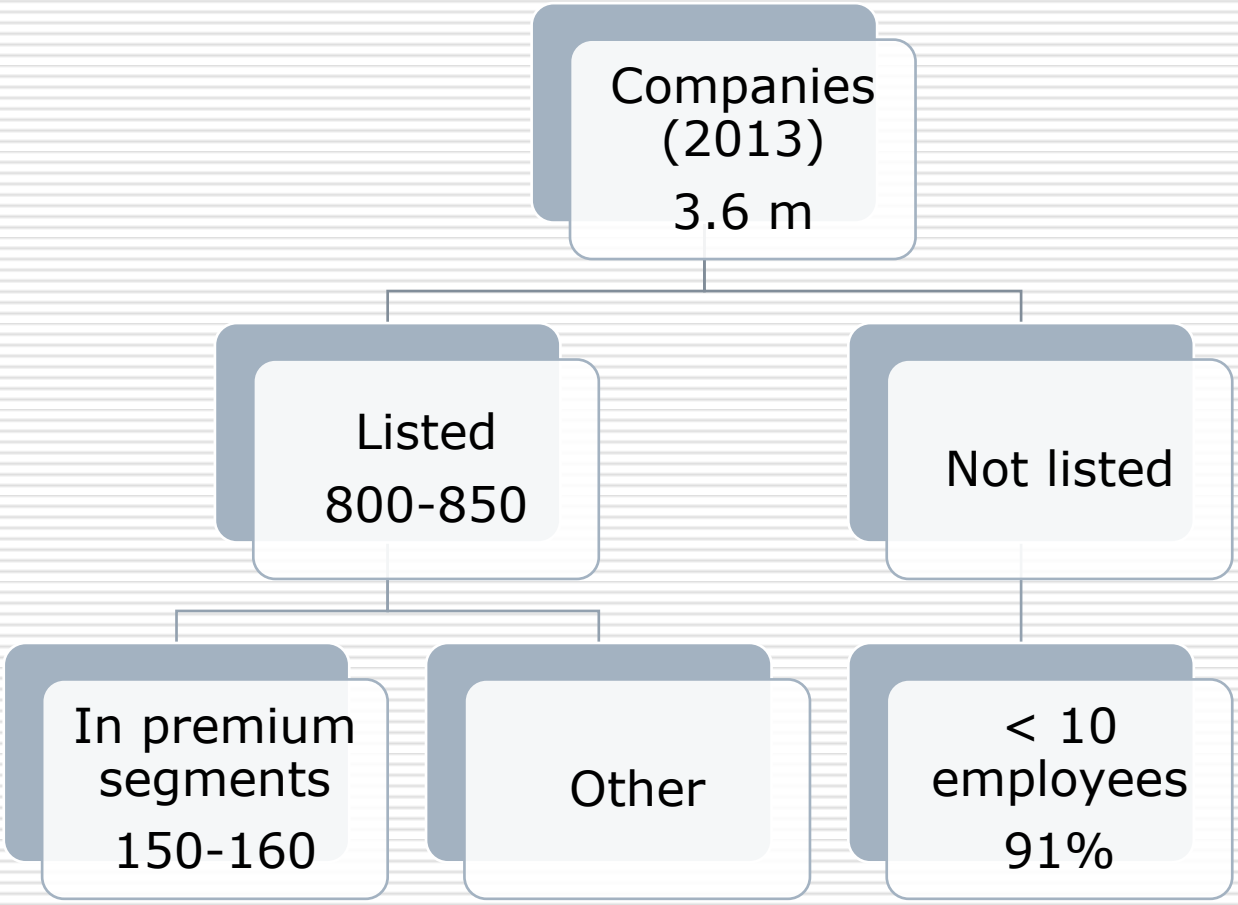
Functional business valuation

- The "real" business value is a fiction
- Business value depends on
  - the valuation function or purpose
  - the legal and contractual requirements of valuation
  - the information obtainable by the valuator
- In a rational world, the valuation purpose determines
  - the valuation approach and
  - the valuation details
- Even a market price is no "real" business value, since different values are precondition of market transactions
- Value equals price only by chance: "the price you pay, the value you get"

Valuation topics



Objects in Germany at a glance



Valuation process

Reason

- Valuation shall serve the purpose
- Reason does not automatically determine purpose

Purpose

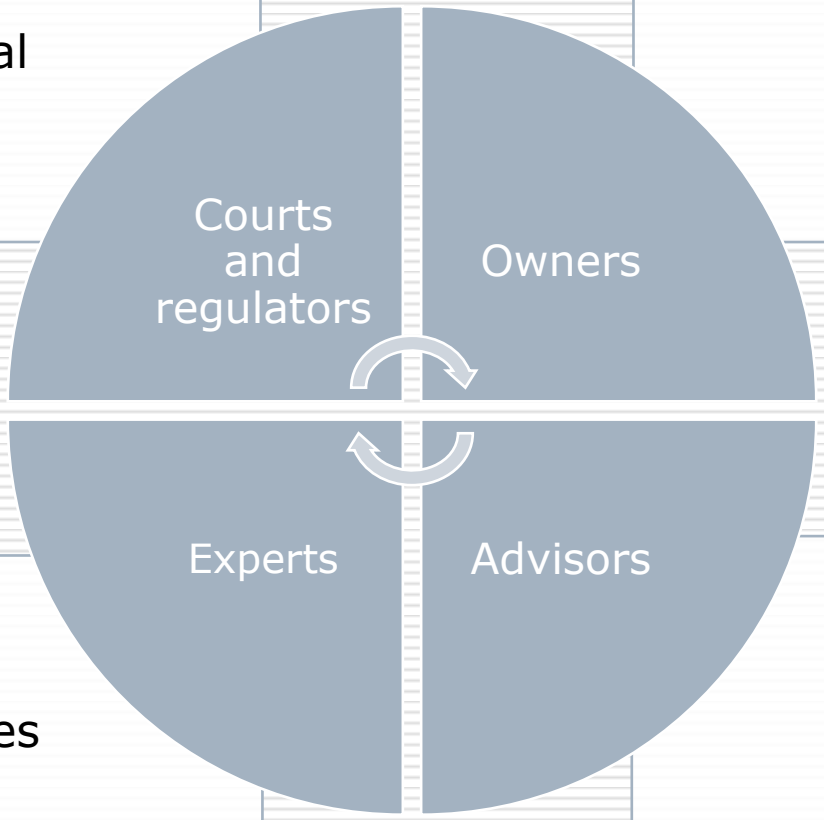
- Decision function, arbitration function, argumentation function, taxation function, financial reporting function, …

Approach

- Approach shall serve the purpose
- DCF, Multiples, Fair value according to IFRS, …

Prominent valuators

- Courts
- Federal Financial Supervisory Authority (BaFin)



- M&A parties
- Tax payers
- Expropriated people

- Arbitrators
- Court witnesses
- Professors

- Investment banks
- Public Auditors (WP)

Prominent valuation organisations (1)

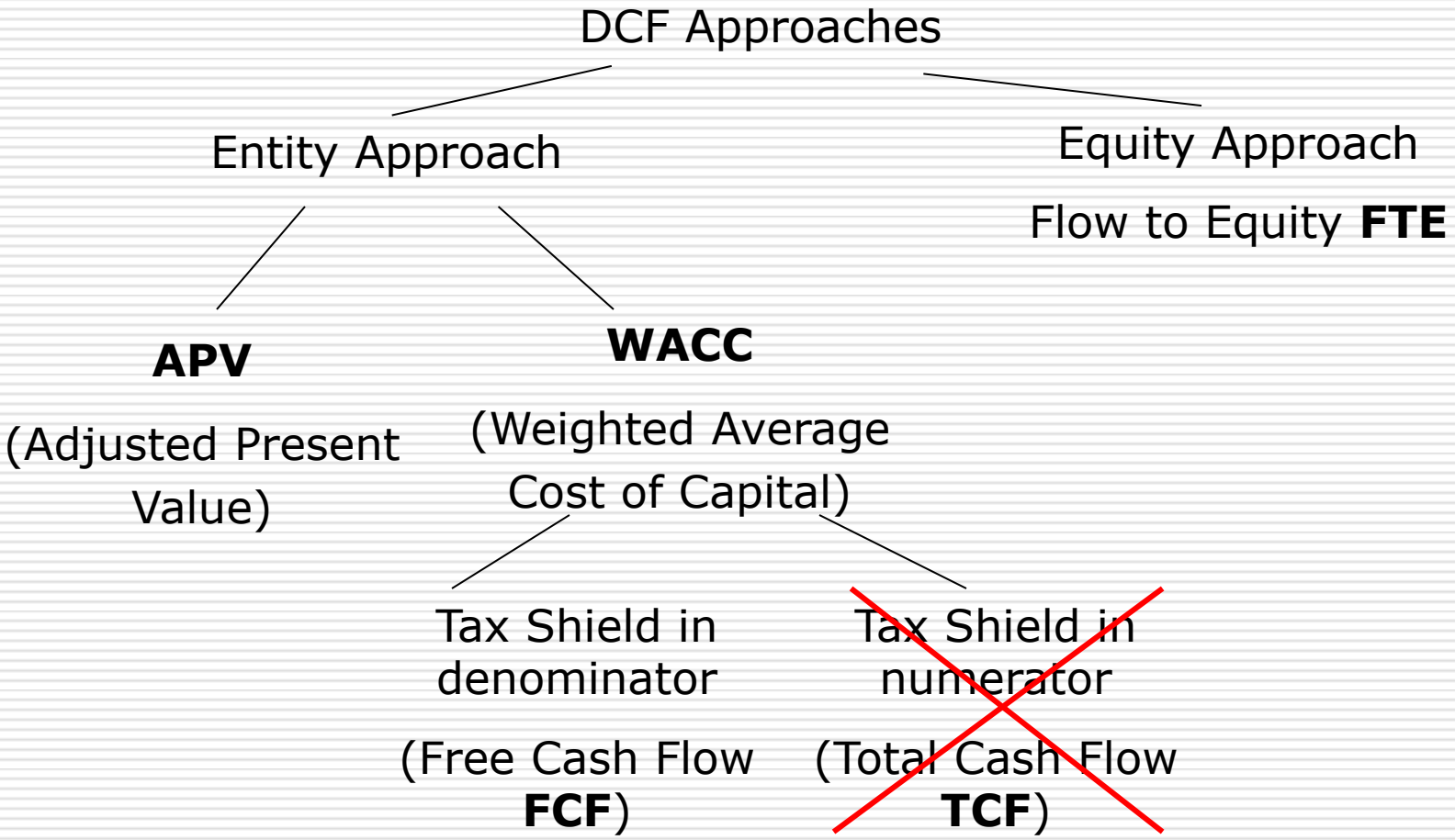
- **IDW** (Institut der Wirtschaftsprüfer in Deutschland) = Institute of Public Auditors in Germany
  - Issued **IDW Standard 1: Principles for the Performance of Business Valuations (IDW S 1) 2008**
- **DVFA** (Deutsche Vereinigung für Finanzanalyse und Asset Management)
  - Issued **Best Practice Recommendations Corporate Valuation, December 2012**
- **EACVA** (European Association of Certified Valuators and Analysts)
  - European partner of National Association of Certified Valuation Analysts (NACVA)
- **IVSC** (International Valuation Standards Council) **?**
  - Issues **Bases of Value, Valuation Approaches and Methods**, …

Prominent valuation organisations (2)

Approaches

- Prominent use of **multiple approaches** by M&A parties
- Dominant use of **DCF approaches for compensation of minority shareholders** according to Aktiengesetz (AktG = Stock Corporation Act) or Umwandlungsgesetz (UmwG = Transformation Act)
  - AktG § 304 and 305: profit transfer agreement or contract of domination (Gewinnabführungs- oder Beherrschungsvertrag)
  - AktG § 320b: incorporation (Eingliederung)
  - AktG § 327a: squeeze-out
  - Various sections of UmwG: mergers
- **Average stock price as mimimum compensation** in case of AktG (average of three months before first market information about planned measure)
- **Different approaches** in tax law (BewG = Bewertungsgesetz) or commercial law for financial reporting (HGB, IFRS)

Details – DCF approaches



Details – DCF Example (1)

- **P&L forecast, perpetuity model, expectation values**

Revenues		2,000.00	**Taxes**
Expenses		1,400.34	
EBITDA		599.66	
Depreciation		280.00	
EBIT		319.66	
Interest	**8% of 1,400**	**112.00**	
EBT		207.66	
Local bus tax	Tax factor 408%	33.65	
Corp inc tax	15.825%	32.86	**66.51**
Net income	Dividend	141.15	

Details – DCF Example (2)

- **P&L forecast, perpetuity model, expectation values**

Revenues		2,000.00	**Taxes**
Expenses		1,400.34	
EBITDA		599.66	
Depreciation		280.00	
EBIT		319.66	
Interest		**0.00**	
EBT		319.66	
Local bus tax	Tax factor 408%	45.65	
Corp inc tax	15.825%	50.59	**96.23**
Net income	Dividend	**223.43**	

Tax Shield TS
96.23 – 66.51
= **29.72**

Details – DCF Example (3)

- **Indirect FCF calculation**

Net income	141.15
+ Interest I	112.00
- Tax shield TS	29.72
+ Depreciation D	280.00
- Revenues without cash flow	0.00
- Investment	280.00
+ Disinvestment	0.00
Free Cash Flow FCF	**223.43**

Details – DCF Example (4)

- **APV**

$$\text{Equity Value} = \text{Entity Value} - \text{Debt}$$

$$= \frac{FCF}{r_E^u} + \frac{TS}{r_D} - D$$

$$= \frac{223.43}{0.1101453} + \frac{29.72}{0.08} - 1{,}400 = 1{,}000$$

Based on CAPM with unlevered beta

Details – DCF Example (5)

- **FCF**

$$\text{Equity Value} = \text{Entity Value} - \text{Debt} = \frac{\text{FCF}}{\text{WACC}} - D$$

$$WACC = r_E^l \frac{E}{E+D} + r_D(1-t)\frac{D}{E+D}$$

$$WACC = 0.14115\frac{1{,}000}{2{,}400} + 0.08(1-0.26535)\frac{1{,}400}{2{,}400} = 9.30962\%$$

$$E = \frac{223.43}{0.0930962} - 1{,}400 = 1{,}000$$

Based on CAPM with levered beta

Details – DCF Example (6)

- **What if we do not know the equity value of 1,000?**

$$\text{Entity Value} = E + D = \frac{FCF}{WACC} \Rightarrow (E + D)WACC = FCF$$

$$(E + D)(r_E^l \frac{E}{E + D} + r_D(1 - t)\frac{D}{E + D}) = FCF$$

$$r_E^l E + r_D(1 - t)D = FCF$$

$$r_E^l E = FCF - r_D(1 - t)D$$

$$E = \frac{FCF - r_D(1 - t)D}{r_E^l}$$

$$E = \frac{223.43 - 0.08(1 - 0.26535)1{,}400}{0.14115} = 1{,}000$$

Details – DCF Example (7)

- **FTE**

$$E = \frac{FTE}{r_E^l} = \frac{141.15}{0.14115} = 1{,}000$$

Details – DCF Example (8)

- In the setting of perpetuity, identical values only result when the **Modigliani-Miller (1963) equation** is fulfilled

$$r_E^l = r_E^u + (r_E^u - r_D)(1-t)\frac{D}{E}$$

$$0.14115 = 0.1101453 + (0.1101453 - 0.08)(1-0.26535)\frac{1{,}400}{1{,}000}$$

- Other settings have other implications and requirements to get an identical business value

Details – German reality of DCF (1)

- In Germany, the **FTE approach („Ertragswert“)** is dominant, especially used by Big 4 companies, though other approaches are well known and used in the back office
- Strategy advisors usually prefer the **APV approach**
- Companies normally prefer the **WACC-FCF approach**, since it can be easily combined with value reporting (e.g., EVA) and financial reporting rules (IFRS or HGB)
- All approaches are accepted in jurisdiction

Details – German reality of DCF (2)

- In practice, the calculation is much more complex
- In most cases, forecasts are carried out in two phases, a detailed planning phase (1 to 3 or 4 years) and a second phase which is usually based on long-term projections, leading to a terminal value – three phases are rare
- The weight of terminal value is high
- Only in **valuations according to AktG or UmwG** personal taxes are integrated
- Fiction of all owners being natural persons residing in Germany liable to unlimited domestic taxation
- **Those valuations are dominated by IDW S 1**, the business valuation standard of Public Auditors
- IDW S 1 is no law, but a safe haven, since Public Auditors have to give reasons in case of deviation

Details – German reality of DCF (3)

Acquirer (parent company)	Vendor (subsid-iary)	Valuation date	Equity value EV	DPP	PV of TV	Per-cent of EV	g
RAG	Degussa	1/1/2006	8.194bn	2006-2008	7.705bn	94%	1.5%
ALBA	Inter-seroh	12/31/2010	435.9m	2011-2013	410.1m	94%	1.1%
Deutsche Bank	Deutsche Postbank	12/31/2014	5.344bn	2015-2019	5.152bn	92%	1.0%
Endress+ Hauser	Analytik Jena	12/31/2014	87.28m	2016-2019	85.5m	98%	1.33%
Bourso-rama	OnVista	1/1/2015	18.228m	2015-2019	24.091m	132%	1.0%

In some cases, using three phases instead of two reduces the weight of terminal value to about 60 % of equity value

Details – IDW S 1 (1)

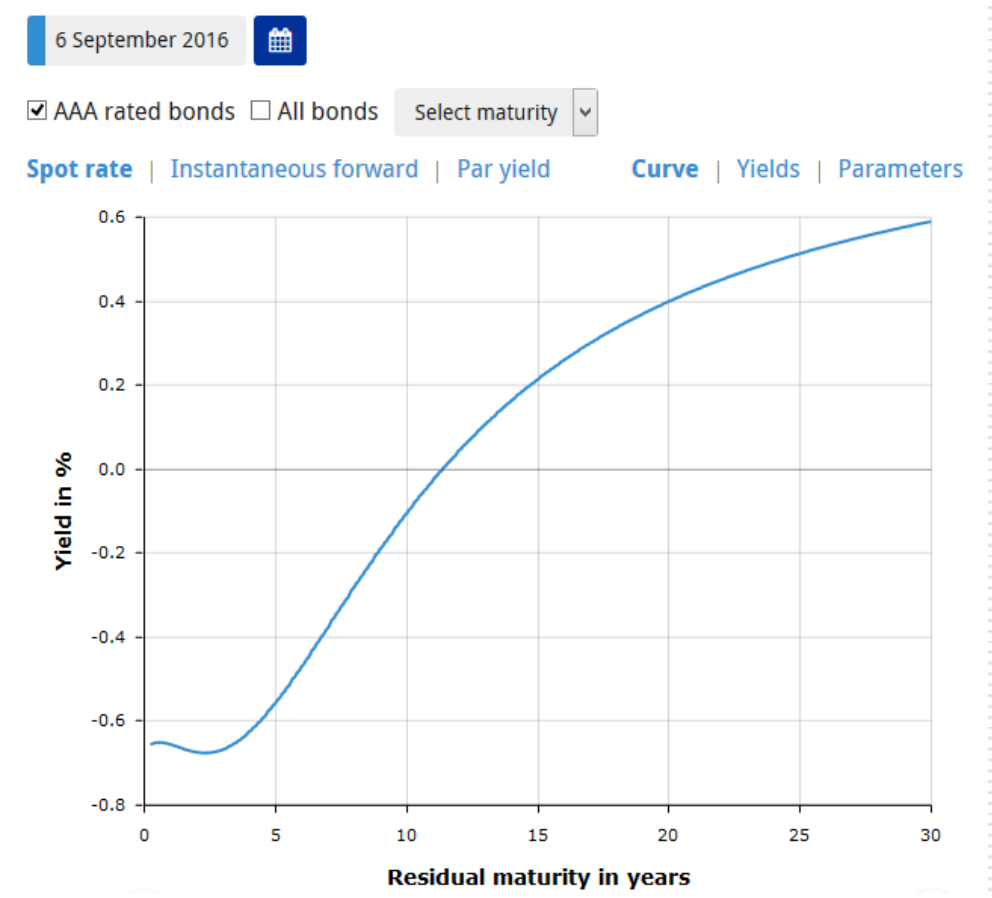
- In the function of a **neutral valuer**, a Wirtschaftsprüfer acts as an expert who, by means of comprehensible methods, determines a value of the business, independent of the individual ideals of the parties concerned – the **objectified business value**
- In the function of an **advisor**, the Wirtschaftsprüfer determines a subjective value for decision-making purposes, which can indicate to a specific investor the maximum amount he could invest in a business (**upper price limit**) or the minimum amount a seller must demand (**lower price limit**) without his economic position deteriorating as a result of the transaction
- In his function as **arbitrator/intermediary** in the event of conflict, giving due consideration to the various subjective value ideals of the parties concerned, the Wirtschaftsprüfer works to arrive at an **arbitration value**

Details – IDW S 1 (2)

- Calculation of the **objectified business value** using FTE DCF ("Ertragswert")
  - Forecasting is principally carried out in two or more phases
  - Valuation is based on the earning power as at the valuation date
  - So-called pseudo synergy effects – characterised by the fact that they can be realised without undertaking the measures underlying the reason for the valuation – have to be taken into account
  - Stock portfolio is taken as an alternative for having ownership of the business
  - Discount rate is constructed modularly: risk-free rate of return, equity risk premium, personal income tax rate, growth rate
  - Yield curve is used for estimation of risk-free rate of return
  - CAPM or Tax-CAPM is used for estimation of equity risk premium

Details – IDW S 1 (3)

- Yield curve for estimation of risk-free rate of return using Svensson method



https://www.ecb.europa.eu/stats/money/yc/html/index.en.html

Details – IDW S 1 (4)

- Svensson method in simultaneous time

$$i_s(t,t+T,b) = \beta_0 + \beta_1 \frac{1-e^{(-T/\tau_1)}}{T/\tau_1} + \beta_2 \left(\frac{1-e^{(-T/\tau_1)}}{T/\tau_1} - e^{(-T/\tau_1)} \right) +$$

$$\beta_3 \left(\frac{1-e^{(-T/\tau_2)}}{T/\tau_2} - e^{(-T/\tau_2)} \right)$$

$$b = (\beta_0, \beta_1, \beta_2, \beta_3, \tau_1, \tau_2)$$

- Estimation of parameter vector b is based on daily market prices of coupon bonds
- Parameter vector is published daily by ECB and Deutsche Bundesbank

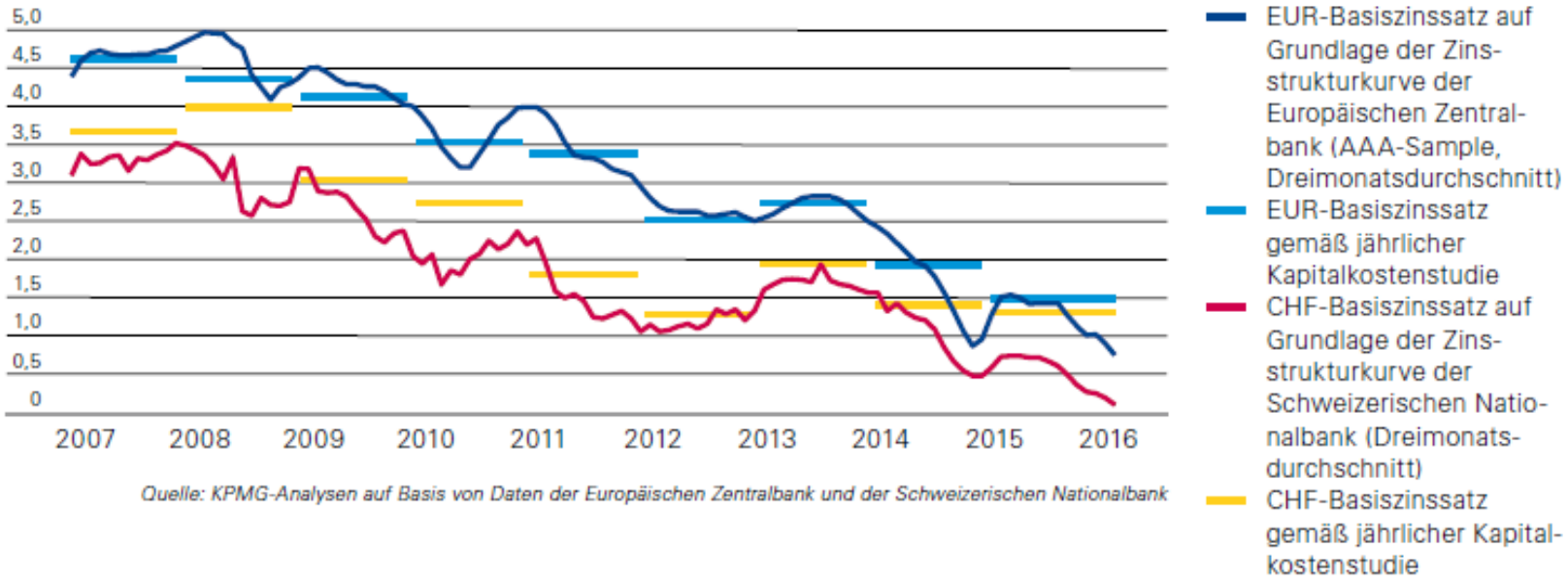
Details – IDW S 1 (5)

- Recommendation since 2005 and 2016, resp.
  - Use parameters of vector b presented by Deutsche Bundesbank or European Central Bank (ECB)
  - Estimate spot rate curve for three months before and up to valuation date
  - Calculate arithmetic means of spot rates
  - Calculate flat rate which ensures an identical present value to using mean spot rate curve
  - Round flat rate to next 1/4 % value
  - If flat rate is less than 1 %, round flat rate to next 1/10 % value

Details – IDW S 1 (6)

18 **Zinsstrukturkurve**

Europäische Zentralbank versus Schweizerische Nationalbank (Angaben in Prozent)



Quelle: KPMG-Analysen auf Basis von Daten der Europäischen Zentralbank und der Schweizerischen Nationalbank

Source: KPMG Kapitalkostenstudie 2016, p. 24

Details – IDW S 1 (7)

- CAPM

$$\mu(r_j) = r_f + \beta_j \cdot [\mu(r_M) - r_f]$$

$$\beta_j = \frac{cov(r_j, r_M)}{var(r_M)} = \frac{\sigma_{jM}}{\sigma_M^2} = \frac{\sigma_j \cdot \sigma_M \cdot \rho_{jM}}{\sigma_M^2}$$

Theory

$$r_{jt} = r_{ft} - \beta_j r_{ft} + \beta_j r_{Mt} + e_{jt} \Rightarrow a_j + b_j r_{Mt} + e_{jt}$$

Market model

- **IDW 2012 recommends equity risk premium without personal taxes in a range of 5.5 % to 7.0 %**

Details – IDW S 1 (8)

- Tax-CAPM

$$\mu(r_j)(1-t_p) = \left(r_f + \beta_j \left[\mu(r_M) - r_f\right]\right)(1-t_p)$$

- **IDW 2012 recommends equity risk premium after personal taxes in an range of 5.0 % to 6.0 %**

Details – IDW S 1 (9)

- **Example:** Interseroh – valuation date 12/31/2010

	2011	2012	2013	2014 ff.
Basiszins vor pers. Ertragsteuern	3,50%	3,50%	3,50%	3,50%
Pers. Ertragsteuern	0,92%	0,92%	0,92%	0,92%
Basiszins nach pers. Ertragsteuern	**2,58%**	**2,58%**	**2,58%**	**2,58%**
Marktrisikoprämie nach pers. Ertragsteuern	4,5%	4,5%	4,5%	4,5%
Beta unverschuldet	1,2	1,2	1,2	1,2
Verschuldungsgrad zu Marktwerten	23%	26%	16%	7%
Beta verschuldet	1,48	1,51	1,39	1,28
Risikoprämie nach pers. Ertragsteuern	**6,66%**	**6,80%**	**6,26%**	**5,76%**
Wachstumsabschlag				**1,1%**
Kapitalisierungszinssatz nach pers. Ertragsteuern	**9,24%**	**9,37%**	**8,83%**	**7,27%**

Source: Bericht (2011), p. 86

Details – IDW S 1 (10)

- IDW S 1 does **not** support additional risk premiums as part of discount rate for
  - Illiquidity risk (illiquidity premium)
  - Small size (small stock risk premium)
  - Insolvency risk (insolvency premium)
  - Missing diversification of owner ("total beta" instead of CAPM beta)

Details – IDW S 1 (11)

- IDW S 1, para. 164:

  "Simplified price determinations are sometimes used for entities in practice. These include, in particular, the use of earnings multiples or sales or product quantity-oriented multiples."

- IDW S 1, para. 167:

  "… simplified pricing methods can form a basis for plausibility checks of the results of the valuation using dividend discount or DCF methods."

Developments

- Criticism is offered against the domination of DCF methods over multiples in IDW S 1, e.g. by DVFA
- Actually, a few courts require expert reports of court witnesses to use multiple approaches besides DCF methods in case of shareholder compensation according to AktG or UmwG
- But up to now, multiples are not accepted in the Supreme Courts, Bundesgerichtshof (BGH) and Bundesverfassungsgericht (BVerfG), resp.

Literature

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Thank you very much! Questions welcome!

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