Financial Statements Analysis

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Uhrenturm der TUM

What is it all about?

Accounting Policy	Financial Statement Analysis
Content: Influence on the annual financial statements within the legal limits	**Content**: Analysis of published data (e.g. annual/ consolidated financial statements)
Purpose: Judgment of the addresses of the information/legal consequences.	**Purpose:** Judgment on the economic situation and future development of the company
→ Expectations must be anticipated	→ Accounting policy must be decoded
Module 03 AP	**Module 02 FSA**

Financial Statements (F/S) Analysis

1	**Basics of F/S Analysis**
2	**Financial-based analysis**
3	**Performance-based analysis**
	Strategic-based analysis (not relevant)

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Case Study: BMW Group and Daimler Group

BMW AG – Group:	Mercedes-Benz – Group:
— Headquarter: Munich	— Headquarter: Stuttgart
— Key figures 2023:	— Key figures 2023:
- revenues: €155,498 millions	- revenues: €153,218 millions
- net profit: €12,165	- net profit: €14,531 million
- employees: 154,950	- employees: 166,056
— BMW Group	— Home	Mercedes-Benz Group

Financial Statements (F/S) Analysis

1	**Basics of F/S Analysis**
2	**Financial-based analysis**
3	**Performance-based analysis**

Strategic-based analysis (not relevant)

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Breakout No. 2: Components of Financial Statements

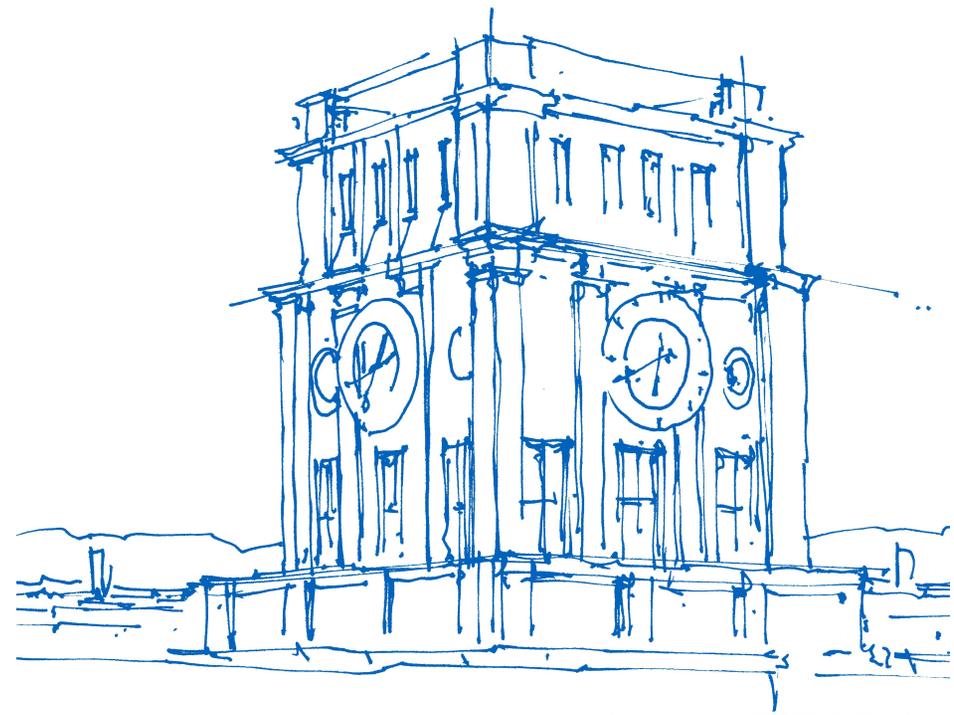|	
1	**Basics of F/S Analysis**
2	**Financial-based analysis**
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1
Basics of
F/S Analysis

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Financial Statements (F/S) Analysis

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Overview

Financial Statements (F/S) Analysis			

1	**Basics of F/S Analysis**		

Purpose & function	**Types of key figures**	**Preparation of F/S analysis**	**Objects of F/S analysis**

2	**Financial-based analysis**

3	**Performance-based analysis**

Term "balance sheet analysis"

„Balance sheet analysis consists of the **breaking up of the annual accounts** into its components and an assessment [of the economic situation and future economic development] of the undertaking on the basis of the information obtained in this way."
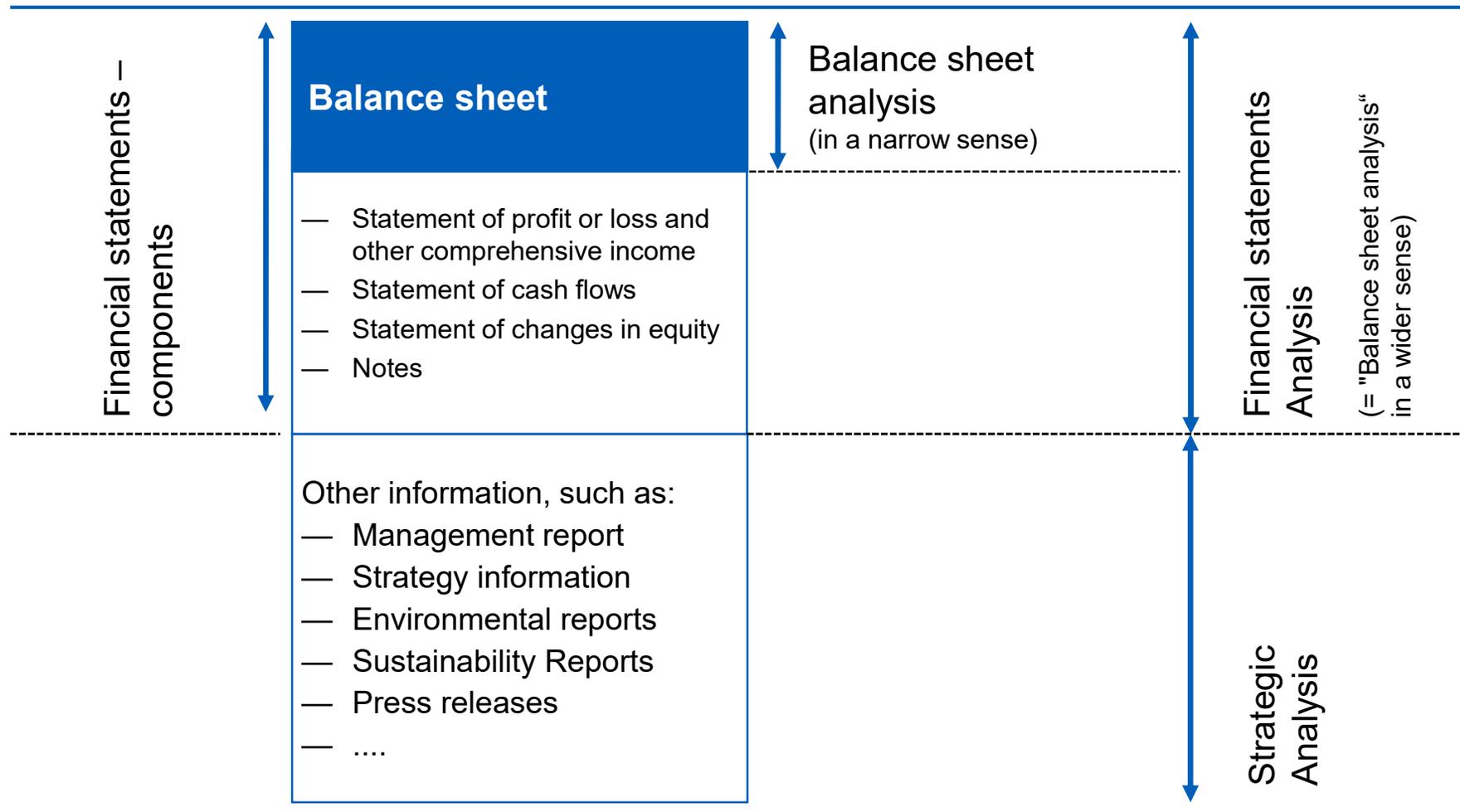
[Source: Leffson: Bilanzanalyse, 3. Aufl., Stuttgart 1984, p. 3.]

„Balance sheet analysis is the **methodological analysis of the annual accounts and the management report** with the aim of obtaining decision-relevant information on the current economic situation and the future economic development of a company."

[Source: Baetge/Kirsch/Thiele: Bilanzanalyse, 2. Aufl., Düsseldorf 2004, p. 1.]

Term "balance sheet analysis"

Financial statements – components

Balance sheet	Balance sheet analysis (in a narrow sense)

— Statement of profit or loss and other comprehensive income
— Statement of cash flows
— Statement of changes in equity
— Notes

Other information, such as:
— Management report
— Strategy information
— Environmental reports
— Sustainability Reports
— Press releases
— ....

Financial statements Analysis

(= "Balance sheet analysis" in a wider sense)

Strategic Analysis

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Purpose and function 1/2

— Shareholders, creditors, suppliers, customers and other stakeholders are able to access the content of published financial statements (including the management report) through detailed **financial statements analyses**, which are usually briefly referred to as balance sheet analyses.

— The financial statements analysis is strongly based on **key figures** and **key figure systems** as evaluation and presentation tools for time comparisons, business comparisons, industry comparisons and target-actual comparisons.

Purpose and function 2/2

— The financial statement analysis is concerned with the **company-specific analysis of the net assets**, **financial position** **and** **results of operations** and the decoding of the accounting policies applied by the company.

— The **analysis of the net assets** is used to obtain information on the development of the asset structure, asset turnover and business growth, while the analysis of the capital structure provides information on forms of financing and financing risks.

— The **analysis of the financial position** and liquidity sheds light on the current and future solvency of a company.

— The **analysis of the results of operations** is intended to show the company-specific earnings potential, in particular the return on equity generated by an enterprise and the total return on capital.

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Groups of stakeholders

External stakeholders

Stakeholders with contract income

    Creditors

    Suppliers   Focus on financial stability (credit risk)

    Employees

Stakeholders with residual income

    Shareholders

    Stock options eligible   Focus on profitability (income risk)

Internal stakeholders

Management boards

Supervisory boards   Decision-making and behavioral control

Advisory boards

Target and analysis levels

Target (system) of the company

Potential for success	Success	Liquidity

Strategic Analysis	Financial statements analysis (= Classic "balance sheet analysis")
Business analysis	
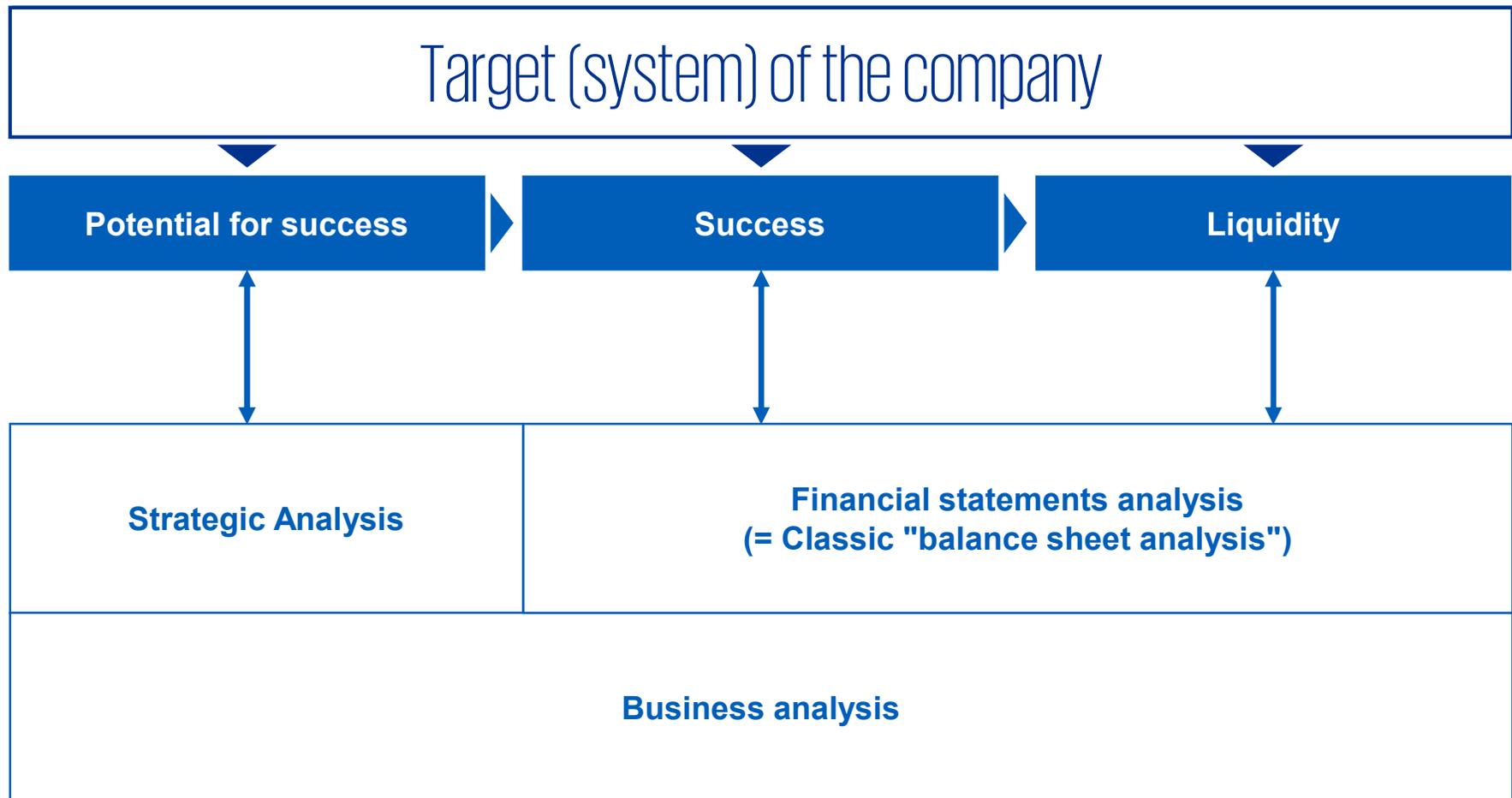
Source: Based on Coenenberg/Haller/Schultze (2009), page 1014

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Overview

Financial Statements (F/S) Analysis

1	**Basics of F/S Analysis**

Purpose & function	**Types of key figures**	**Preparation of F/S analysis**	**Objects of F/S analysis**

2	**Financial-based analysis**

3	**Performance-based analysis**

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Absolute key figures

Absolute key figures

Absolute key figures enable companies to be assigned to specific size classes. These are metrics such as revenues, the number of employees or net profit or loss.

However, the significance of this information is small without a comparative standard.

BMW GROUP
INCOME STATEMENT

in € million	2023
Revenues	155,498
Cost of sales	– 125,809
Gross profit	**29,689**
Selling and administrative expenses	– 11,025
Other operating income	1,045
Other operating expenses	– 1,227
Profit/loss before financial result	**18,482**
Result from equity accounted investments	– 159
Interest and similar income	701
Interest and similar expenses	– 656
Other financial result	– 1,272
Financial result	**– 1,386**
Profit/loss before tax	**17,096**
Income taxes	– 4,931
Net profit/loss	**12,165**

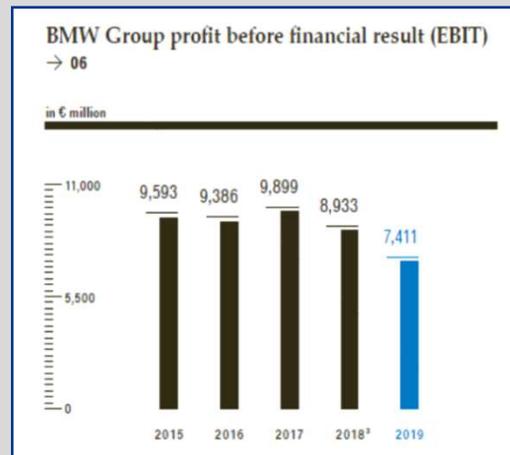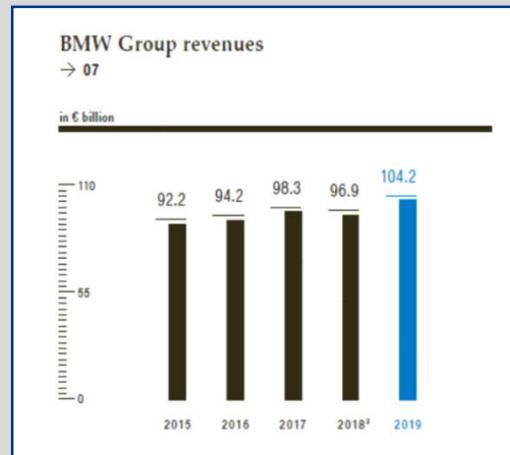Source: BMW Group Annual Report 2023

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Trend anaysis with absolute key figures

Within-company comparison over time

— Comparison to last year

— Comparison over several years

in € million	Group 2023	2022
Revenues	155,498	142,610
Cost of sales	– 125,809	– 118,042
Gross profit	**29,689**	**24,568**
Selling and administrative expenses	– 11,025	– 10,616
Other operating income	1,045	1,377
Other operating expenses	– 1,227	– 1,330
Profit/loss before financial result	**18,482**	**13,999**
Result from equity accounted investments	– 159	– 100
Interest and similar income	701	422
Interest and similar expenses	– 656	251
Other financial result	– 1,272	8,937
Financial result	**– 1,386**	**9,510**
Profit/loss before tax	**17,096**	**23,509**
Income taxes	– 4,931	– 4,927
Net profit/loss	**12,165**	**18,582**

BMW Group revenues → 07

in € billion

2015	2016	2017	2018³	2019
92.2	94.2	98.3	96.9	104.2

BMW Group profit before financial result (EBIT) → 06

in € million

2015	2016	2017	2018³	2019
9,593	9,386	9,899	8,933	7,411

Source: BMW Group Annual Report 2023

Source: BMW Group Annual Report 2019

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Trend analysis with absolute key figures

Between-company comparison at the same point of time to peers/competitors

— Comparison to same industry peers and/or

— Comparison to similar size peers

in € million	2023
Revenues	155,498
Cost of sales	– 125,809
Gross profit	29,689
Selling and administrative expenses	– 11,025
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Financial result	– 1,386
Profit/loss before tax	17,096
Income taxes	– 4,931
Net profit/loss	12,165

In millions of euros	2023
Revenue	153,218
Cost of sales	-118,839
Gross profit	34,379
Selling expenses	-9,728
General administrative expenses	-2,688
Research and non-capitalized development costs	-6,230
Other operating income	2,206
Other operating expense	-516
Gains/losses on equity-method investments	2,129
Other financial income/expense	108
Earnings before interest and taxes (EBIT)	19,660
Interest income	678
Interest expense	-254
Profit before taxes	20,084
Income taxes	-5,553
Net profit	14,531

However, the significance of this information is small without calculating ratios (relative figures) which are comparable

Source: BMW Group Annual Report 2023

Source: Mercedes-Benz Group Annual Report 2023

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Absolute vs relative key figures

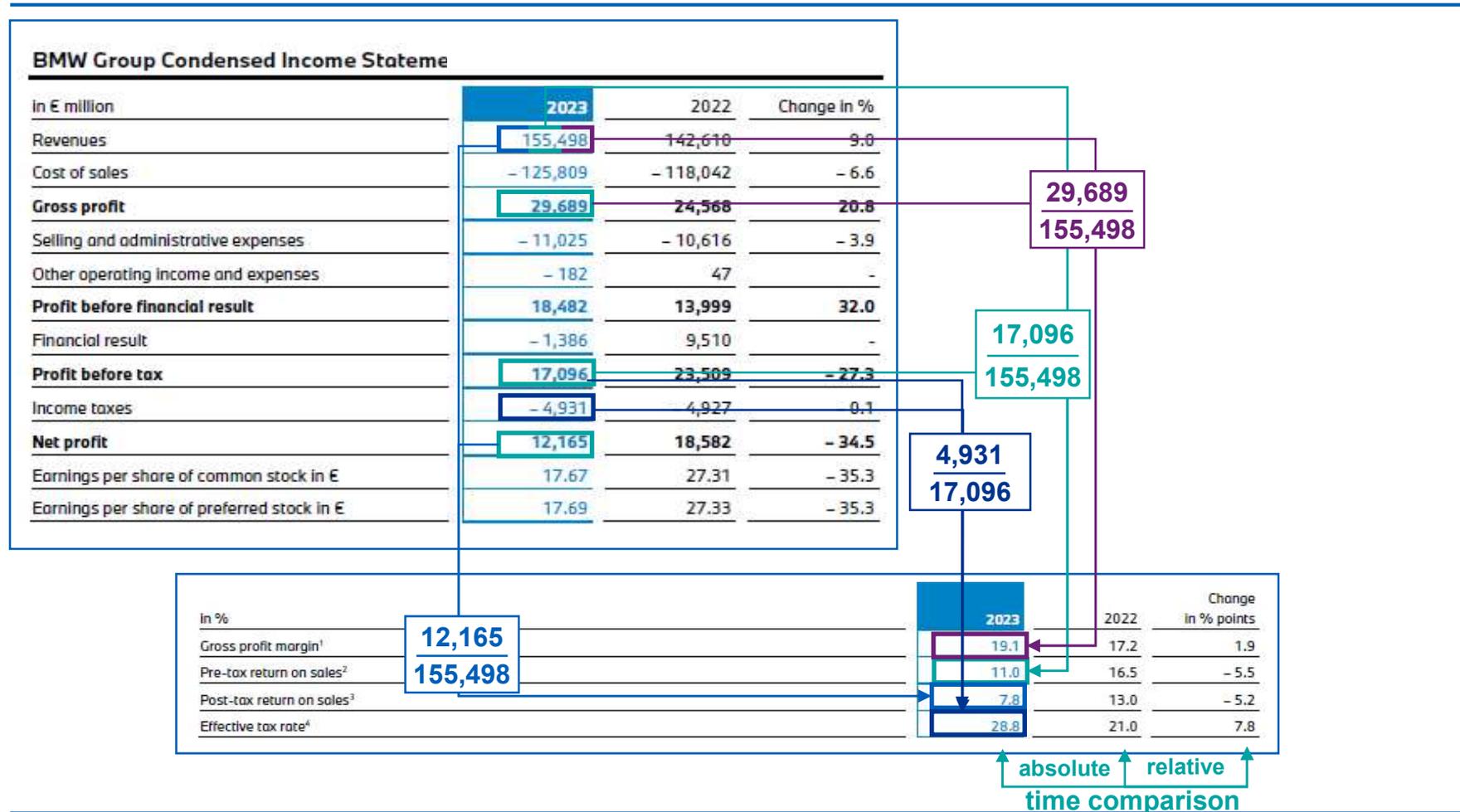| Absolute key figures	Relative key figures (ratios)
Absolute key figures enable companies to be assigned to specific size classes. They also can be used for basic trend analysis. However, the significance of this information is small without suitable benchmarks.	For relative key figures, two absolute figures are compared to each other. They raise the significance because they can reveal cause-and-effect relationships and therefore can be used for root-causes analysis.

Within-company comparison to last year

BMW Group Condensed Income Stateme

in € million	2023	2022	Change in %
Revenues	155,498	142,610	9.0
Cost of sales	– 125,809	– 118,042	– 6.6
Gross profit	29,689	24,568	20.8
Selling and administrative expenses	– 11,025	– 10,616	– 3.9
Other operating income and expenses	– 182	47	-
Profit before financial result	18,482	13,999	32.0
Financial result	– 1,386	9,510	-
Profit before tax	17,096	23,509	– 27.3
Income taxes	– 4,931	4,927	0.1
Net profit	12,165	18,582	– 34.5
Earnings per share of common stock in €	17.67	27.31	– 35.3
Earnings per share of preferred stock in €	17.69	27.33	– 35.3

$$\frac{29{,}689}{155{,}498}$$

$$\frac{17{,}096}{155{,}498}$$

$$\frac{4{,}931}{17{,}096}$$

$$\frac{12{,}165}{155{,}498}$$

in %		2023	2022	Change in % points
Gross profit margin[1]		19.1	17.2	1.9
Pre-tax return on sales[2]		11.0	16.5	– 5.5
Post-tax return on sales[3]		7.8	13.0	– 5.2
Effective tax rate[4]		28.8	21.0	7.8

absolute   **relative**
time comparison

Source: BMW Group Annual Report 2023

Between-company comparison

	BMW	19,1%	Gross profit margin
	Daimler	22,4%	

relative figures comparison

BMW F/S (in € million)

in € million	2023
Revenues	155,498
Cost of sales	– 125,809
Gross profit	**29,689**
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absolute figures comparison: decision-useful?

Mercedes-Benz F/S

In millions of euros	2023
Revenue	153,218
Cost of sales	-118,839
Gross profit	**34,379**
Selling expenses	-9,728
General administrative expenses	-2,688
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Earnings before interest and taxes (EBIT)	**19,660**
Interest income	678
Interest expense	-254
Profit before taxes	**20,084**
Income taxes	-5,553
Net profit	**14,531**

After-tax return on sales	BMW	7,8%
	Daimler	9,5%

Source: BMW Group Annual Report 2023

Source: Mercedes-Benz Group Annual Report 2023

Types of relative key figures

Absolute key figures	Relative key figures (ratios)
Absolute key figures enable companies to be assigned to specific size classes. They also can be used for basic trend analysis. However, the significance of this information is small without suitable benchmarks.	For relative key figures, two absolute figures are compared to each other. They raise the significance because they can reveal cause-and-effect relationships and therefore can be use for root-causes analysis.

Breakdown figures	Relationship figures	Index figures	Other metrics

Breakdown figures

in € million	Note	Group 2023	2022
ASSETS			
Intangible assets	21	20,022	21,776
Property, plant and equipment	22	35,266	32,126
Leased products	23	43,118	42,820
Investments accounted for using the equity method	24	443	420
Other investments		1,197	1,351
Receivables from sales financing	25	50,517	50,368
Financial assets	26	1,387	3,073
Deferred tax	13	2,431	1,758
Other assets	28	1,537	1,030
Non-current assets		**155,918**	**154,722**
Inventories	29	23,719	20,005
Trade receivables	30	4,162	4,127
Receivables from sales financing	25	36,838	35,340
Financial assets	26	4,131	5,164
Current tax	27	1,199	1,096
Other assets	28	7,596	9,602
Cash and cash equivalents		17,327	16,870
Current assets		**94,972**	**92,204**
Total assets		**250,890**	**246,926**

2023 **2022**

62,1% **62,7%**

Comparison of **partial sizes** to **total sizes**. They represent the relative weight of partial sizes in relation to the whole, such as:

$$\frac{\text{Non-current assets}}{\text{total assets}}$$

$$\frac{\text{Liabilities}}{\text{Total equity and liabilities}}$$

Source: BMW Group Annual Report 2023

Relationship figures

in € million	Note	2023
Revenues	7	155,498
Cost of sales	8	– 125,809
Gross profit		**29,689**
Selling and administrative expenses	9	– 11,025
Other operating income	10	1,045
Other operating expenses	10	– 1,227
Profit/loss before financial result		**18,482**
Result from equity accounted investments	24	– 159
Interest and similar income	11	701
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Financial result		**– 1,386**
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Income taxes	13	– 4,931
Net profit/loss		**12,165**

19,1% 2

in € million	Note	2023
EQUITY AND LIABILITIES		
Subscribed capital	31	639
Capital reserves	31	2,456
Revenue reserves	31	89,072
Accumulated other equity	31	– 2,071
Treasury shares	31	– 500
Equity attributable to shareholders of BMW AG	**31**	**89,596**
Non-controlling interests		3,327
Equity		**92,923**
Pension provisions	33	427
Other provisions	34	7,797
Deferred tax	13	2,797
Financial liabilities	36	52,880
Other liabilities	37	7,065
Non-current provisions and liabilities		**70,966**
Other provisions	34	9,240
Current tax	35	1,401
Financial liabilities	36	42,130
Trade payables	38	15,547
Other liabilities	37	18,683
Current provisions and liabilities		**87,001**
Total equity and liabilities		**250,890**

7,4% 1

Ratio of **different-types** of **aggregates** which are in a logical context, such as:

▶ 1

$$\frac{\text{Profit before financial result}}{\text{Total equity and liabilities}}$$

▶ 2

$$\frac{\text{Gross profit}}{\text{Revenues}}$$

Source: BMW Group Annual Report 2023

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Index figures

Index numbers are useful for representing **temporal changes in a size**. The value of a base time point is set equal to 100%, all other values are measured in relation to this underlying, such as:

Stock indices
Exchange rate indices
Raw material indices

Source: Reuters / BMW Group Annual Report 2023

Other metrics

in € million	Note	2023
EQUITY AND LIABILITIES		
Subscribed capital	31	639
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Current provisions and liabilities		87,001
Total equity and liabilities		250,890

92,923

1,7

+ **157,967**

Ratio of equally ordered sizes which differ by one characteristic, such as:

$$\frac{\text{Debts}}{\text{Equity}}$$

Source: BMW Group Annual Report 2023

Types of relative key figures

Absolute key figures	Relative key figures (ratios)
Absolute key figures enable companies to be assigned to specific size classes. They also can be used for basic trend analysis. However, the significance of this information is small without suitable benchmarks.	For relative key figures, two absolute figures are compared to each other. They raise the significance because they can reveal cause-and-effect relationships and therefore can be use for root-causes analysis.

Breakdown figures	Relationship figures	Index figures	Other metrics
Comparison of **partial sizes** to **total sizes**. They represent the relative weight of partial sizes in relation to the whole, such as:	Ratio of **different-types** of **aggregates** which are in a logical context, such as:	Index numbers are useful for representing **temporal changes in a size**. The value of a base time point is set equal to 100%, all other values are measured in relation to this underlying, such a:	**Ratio of equally ordered sizes** which differ by one characteristic, such as:
$\dfrac{\text{Non-current assets}}{\text{Total assets}}$	$\dfrac{\text{Profit before financial result}}{\text{Total equity and liabilities}}$	Stock indices	
$\dfrac{\text{Liabilities}}{\text{Total equity and liabilities}}$	$\dfrac{\text{Gross profit}}{\text{Revenues}}$	Exchange rate indices Raw material indices	$\dfrac{\text{Debts}}{\text{Equity}}$

Evaluation methods

Need to keep in mind:

1. **Not only list relative key figures, but also the underlying absolute figures. i.e.**

   — Incorrect: Sales profit rate = 3%

   — Correct: Sales profit rate $= \dfrac{\text{Operating profit}}{\text{Sales}} = \dfrac{27.000.000}{900.000.000} = 3\%$

2. **Most key figures have little significance in themselves. i.e.:**

   — Within-company comparisons

   — Between-company comparisons

   → comparative standards are required, such as time comparison, operating comparison, target-actual comparison

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1	**Basics of F/S Analysis**		
Purpose & function	Types of key figures	Preparation of F/S analysis	Objects of F/S analysis
2	**Financial-based analysis**		
3	**Performance-based analysis**		

Different companies – different financial statements

in € million	Note	2023
ASSETS		
Intangible assets	21	20,022
Property, plant and equipment	22	35,266
Leased products	23	43,118
Investments accounted for using the equity method	24	443
Other investments		1,197
Receivables from sales financing	25	50,517
Financial assets	26	1,387
Deferred tax	13	2,431
Other assets	28	1,537
Non-current assets		155,918
Inventories	29	23,719
Trade receivables	30	4,162
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Financial assets	26	4,131
Current tax	27	1,199
Other assets	28	7,596
Cash and cash equivalents		17,327
Current assets		94,972
Total assets		250,890

Source: BMW Group Annual Report 2023

Comparable figures?

What to do?

	2023
In millions of euros	
Assets	
Intangible assets	17,593
Property, plant and equipment	26,090
Equipment on operating leases	41,712
Equity-method investments	13,104
Receivables from financial services	49,742
Marketable debt securities and similar investments	699
Other financial assets	4,340
Deferred tax assets	4,127
Other assets	1,583
Total non-current assets	158,990
Inventories	27,294
Trade receivables	7,281
Receivables from financial services	38,469
Cash and cash equivalents	15,962
Marketable debt securities and similar investments	6,159
Other financial assets	3,599
Other assets	4,473
Assets held for sale	795
Total current assets	104,032
Total assets	263,022

Source: Daimler Group Annual Report 2023

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Mapping to a standardized accounts system: asset-side

Mapping is at discretion of the analyst!

It is the secret of the analysts

in € million	Note	2023
ASSETS		
Intangible assets	21	20,022
Property, plant and equipment	22	35,266
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Financial assets	26	4,131
Current tax	27	1,199
Other assets	28	7,596
Cash and cash equivalents		17,327
Current assets		**94,972**
Total assets		**250,890**

	BMW Group
	2023
	Mio. EUR
Intangible assets and goodwill	20.022
Property, plant and equipment	78.384
Biological assets	–
Investment property	–
Equity-accounted investees	443
Financial assets	51.904
Deferred tax assets	2.431
Employee benefits	–
Other non-current assets	2.734
Non-current assets	**155.918**
Biological assets	–
Inventories	23.719
Contract assets	–
Trade and other receivables	45.131
Current tax assets	1.199
Prepayments	–
Other current assets	7.596
Cash and cash equivalents	17.327
Assets held for sale	–
Current assets	**94.972**
Total assets	**250.890**

Source: BMW Group Annual Report 2023

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Mapping to a standardized accounts system: liabilities-side

in € million	Note	2023
EQUITY AND LIABILITIES		
Subscribed capital	31	639
Capital reserves	31	2,456
Revenue reserves	31	89,072
Accumulated other equity	31	– 2,071
Treasury shares	31	– 500
Equity attributable to shareholders of BMW AG	31	89,596
Non-controlling interests		3,327
Equity		**92,923**
Pension provisions	33	427
Other provisions	34	7,797
Deferred tax	13	2,797
Financial liabilities	36	52,880
Other liabilities	37	7,065
Non-current provisions and liabilities		**70,966**
Other provisions	34	9,240
Current tax	35	1,401
Financial liabilities	36	42,130
Trade payables	38	15,547
Other liabilities	37	18,683
Current provisions and liabilities		**87,001**
Total equity and liabilities		**250,890**

e.g. no adjustments necessary by mapping

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=

=

=

	BMW Group 2023 Mio. EUR
EQUITY and LIABILITIES	
Share capital (subscribed capital)	639
Share premium (capital reserves)	2.456
Reserves and others	-2.571
Retained earnings (revenue reserves)	89.072
Equity attributable to owners of the Company	**89.596**
Non-controlling interests (=minority interest)	3.327
Total equity	**92.923**
Provisions for pensions and similar obligations	427
Other provisions	7.797
Loans and borrowings	52.880
Trade and other payables	-
Deferred tax liabilities	2.797
Deferred income	-
Contract liabilities	-
Other non-current liabilities	7.065
Non-current liabilities	**70.966**
Provisions for pensions and similar obligations	-
Other provisions	9.240
Bank overdraft	-
Loans and borrowings	42.130
Trade and other payables	15.547
Current tax liabilities	1.401
Deferred income	-
Contract liabilities	-
Other non-current liabilities	18.683
Liabilities held for sale	-
Current liabilities	**87.001**
Total equity and liabilities	**250.890**

Source: BMW Group Annual Report 2023

Mapping to a standardized accounts system: profit or loss - statement

e.g. adjustments necessary; additional information used from the notes!

Source: BMW Group Annual Report 2023

Basic analytical procedures:
Absolute key figures without comparison

	BMW Group 2023 Mio. EUR
A S S E T S	
Intangible assets and goodwill	20.022
Property, plant and equipment	78.384
Biological assets	–
Investment property	–
Equity-accounted investees	443
Financial assets	51.904
Deferred tax assets	2.431
Employee benefits	–
Other non-current assets	2.734
Non-current assets	**155.918**
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Total assets	**250.890**

	BMW Group 2023 Mio. EUR
E Q U I T Y and L I A B I L I T I E S	
Share capital (subscribed capital)	639
Share premium (capital reserves)	2.456
Reserves and others	-2.571
Retained earnings (revenue reserves)	89.072
Equity attributable to owners of the Company	**89.596**
Non-controlling interests (=minoriy interest)	3.327
Total equity	**92.923**
Provisions for pensions and similar obligations	427
Other provisions	7.797
Loans and borrowings	52.880
Trade and other payables	–
Deferred tax liabilities	2.797
Deferred income	–
Contract liabilities	–
Other non-current liabilities	7.065
Non-current liabilities	**70.966**
Provisions for pensions and similar obligations	–
Other provisions	9.240
Bank overdraft	–
Loans and borrowings	42.130
Trade and other payables	15.547
Current tax liabilities	1.401
Deferred income	–
Contract liabilities	–
Other non-current liabilities	18.683
Liabilities held for sale	–
Current liabilities	**87.001**
Total equity and liabilities	**250.890**

no decision-useful information

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Basic analytical procedures:
Relative key figures without comparison

	BMW Group	
	2023	**ratio**
	Mio. EUR	**%**
A S S E T S		
Intangible assets and goodwill	20.022	8%
Property, plant and equipment	78.384	31%
Biological assets	–	–
Investment property	–	–
Equity-accounted investees	443	0%
Financial assets	51.904	21%
Deferred tax assets	2.431	1%
Employee benefits	–	–
Other non-current assets	2.734	1%
Non-current assets	**155.918**	**62%**
Biological assets	–	–
Inventories	23.719	9%
Contract assets	–	–
Trade and other receivables	45.131	18%
Current tax assets	1.199	0%
Prepayments	–	–
Other current assets	7.596	3%
Cash and cash equivalents	17.327	7%
Assets held for sale	–	–
Current assets	**94.972**	**38%**
Total assets	**250.890**	**100%**

current asset ratio

	BMW Group	
	2023	**ratio**
	Mio. EUR	**EUR**
E Q U I T Y and L I A B I L I T I E S		
Share capital (subscribed capital)	639	0%
Share premium (capital reserves)	2.456	1%
Reserves and others	-2.571	1%
Retained earnings (revenue reserves)	89.072	36%
Equity attributable to owners of the Company	**89.596**	**36%**
Non-controlling interests (=minoriy interest)	3.327	1%
Total equity	**92.923**	**37%**
Provisions for pensions and similar obligations	427	0%
Other provisions	7.797	3%
Loans and borrowings	52.880	21%
Trade and other payables	–	–
Deferred tax liabilities	2.797	1%
Deferred income	–	–
Contract liabilities	–	–
Other non-current liabilities	7.065	3%
Non-current liabilities	**70.966**	**28%**
Provisions for pensions and similar obligations	–	–
Other provisions	9.240	4%
Bank overdraft	–	–
Loans and borrowings	42.130	17%
Trade and other payables	15.547	6%
Current tax liabilities	1.401	1%
Deferred income	–	–
Contract liabilities	–	–
Other non-current liabilities	18.683	7%
Liabilities held for sale	–	–
Current liabilities	**87.001**	**35%**
Total equity and liabilities	**250.890**	**100%**

equity-ratio

Basic analytical procedures:
Relative key figures with time-comparison

ASSETS	BMW Group 2022 Mio. EUR	ratio %	BMW Group 2023 Mio. EUR	ratio %
Intangible assets and goodwill	21.776	9%	20.022	8%
Property, plant and equipment	74.946	30%	78.384	31%
Biological assets	–	–	–	–
Investment property				
Equity-accounted investees	420	0%	443	0%
Financial assets	53.441	22%	51.904	21%
Deferred tax assets	1.758	1%	2.431	1%
Employee benefits	–	–	–	–
Other non-current assets	2.381	1%	2.734	1%
Non-current assets	**154.722**	**63%**	**155.918**	**62%**
Biological assets	–	–	–	–
Inventories	20.005	8%	23.719	9%
Contract assets	–	–	–	–
Trade and other receivables	44.631	18%	45.131	18%
Current tax assets	1.096	0%	1.199	0%
Prepayments	–	–	–	–
Other current assets	9.602	4%	7.596	3%
Cash and cash equivalents	16.870	7%	17.327	7%
Assets held for sale	–	–	–	–
Current assets	**92.204**	**37%**	**94.972**	**38%**
Total assets	**246.926**	**100%**	**250.890**	**100%**

more useful information by time-comparison

EQUITY and LIABILITIES	BMW Group 2022 Mio. EUR	ratio EUR	BMW Group 2023 Mio. EUR	ratio EUR
Share capital (subscribed capital)	663	0%	639	0%
Share premium (capital reserves)	2.432	1%	2.456	1%
Reserves and others	-1.395	1%	-2.571	1%
Retained earnings (revenue reserves)	85.425	35%	89.072	36%
Equity attributable to owners of the Company	**87.125**	**35%**	**89.596**	**36%**
Non-controlling interests (=minority interest)	4.163	2%	3.327	1%
Total equity	**91.288**	**37%**	**92.923**	**37%**
Provisions for pensions and similar obligations	339	0%	427	0%
Other provisions	8.445	3%	7.797	3%
Loans and borrowings	53.469	22%	52.880	21%
Trade and other payables	–	–	–	–
Deferred tax liabilities	2.765	1%	2.797	1%
Deferred income	–	–	–	–
Contract liabilities	–	–	–	–
Other non-current liabilities	6.199	3%	7.065	3%
Non-current liabilities	**71.217**	**29%**	**70.966**	**28%**
Provisions for pensions and similar obligations	–	–	–	–
Other provisions	7.316	3%	9.240	4%
Bank overdraft	–	–	–	–
Loans and borrowings	40.727	16%	42.130	17%
Trade and other payables	14.120	6%	15.547	6%
Current tax liabilities	1.224	0%	1.401	1%
Deferred income	–	–	–	–
Contract liabilities	–	–	–	–
Other non-current liabilities	21.034	9%	18.683	7%
Liabilities held for sale	–	–	–	–
Current liabilities	**84.421**	**34%**	**87.001**	**35%**
Total equity and liabilities	**246.926**	**100%**	**250.890**	**100%**

Basic analytical procedures:
Relative key figures with changes and with time-comparison

detailed time-comparison with absolute and relative figures → more useful information

ASSETS	BMW Group 2022 Mio. EUR	ratio %	BMW Group 2023 Mio. EUR	ratio %	delta Mio. EUR	delta %
Intangible assets and goodwill	21.776	9%	20.022	8%	-1.754	-8%
Property, plant and equipment	74.946	30%	78.384	31%	3.438	5%
Biological assets	-	-	-	-	-	-
Investment property	-	-	-	-	-	-
Equity-accounted investees	420	0%	443	0%	23	5%
Financial assets	53.441	22%	51.904	21%	-1.537	-3%
Deferred tax assets	1.758	1%	2.431	1%	673	38%
Employee benefits	-	-	-	-	-	-
Other non-current assets	2.381	1%	2.734	1%	353	15%
Non-current assets	**154.722**	**63%**	**155.918**	**62%**	**1.196**	**1%**
Biological assets	-	-	-	-	-	-
Inventories	20.005	8%	23.719	9%	3.714	19%
Contract assets	-	-	-	-	-	-
Trade and other receivables	44.631	18%	45.131	18%	500	1%
Current tax assets	1.096	0%	1.199	0%	103	9%
Prepayments	-	-	-	-	-	-
Other current assets	9.602	4%	7.596	3%	-2.006	-21%
Cash and cash equivalents	16.870	7%	17.327	7%	457	3%
Assets held for sale	-	-	-	-	-	-
Current assets	**92.204**	**37%**	**94.972**	**38%**	**2.768**	**3%**
Total assets	**246.926**	**100%**	**250.890**	**100%**	**3.964**	**2%**

EQUITY and LIABILITIES	BMW Group 2022 Mio. EUR	ratio EUR	BMW Group 2023 Mio. EUR	ratio EUR	delta Mio. EUR	delta %
Share capital (subscribed capital)	663	0%	639	0%	-24	-4%
Share premium (capital reserves)	2.432	1%	2.456	1%	24	1%
Reserves and others	-1.395	1%	-2.571	1%	-1.176	84%
Retained earnings (revenue reserves)	85.425	35%	89.072	36%	3.647	4%
Equity attributable to owners of the Company	**87.125**	**35%**	**89.596**	**36%**	**2.471**	**3%**
Non-controlling interests (=minoriy interest)	4.163	2%	3.327	1%	-836	-20%
Total equity	**91.288**	**37%**	**92.923**	**37%**	**1.635**	**2%**
Provisions for pensions and similar obligations	339	0%	427	0%	88	26%
Other provisions	8.445	3%	7.797	3%	-648	-8%
Loans and borrowings	53.469	22%	52.880	21%	-589	-1%
Trade and other payables	-	-	-	-	-	-
Deferred tax liabilities	2.765	1%	2.797	1%	32	1%
Deferred income	-	-	-	-	-	-
Contract liabilities	-	-	-	-	-	-
Other non-current liabilities	6.199	3%	7.065	3%	866	14%
Non-current liabilities	**71.217**	**29%**	**70.966**	**28%**	**-251**	**-0%**
Provisions for pensions and similar obligations	-	-	-	-	-	-
Other provisions	7.316	3%	9.240	4%	1.924	26%
Bank overdraft	-	-	-	-	-	-
Loans and borrowings	40.727	16%	42.130	17%	1.403	3%
Trade and other payables	14.120	6%	15.547	6%	1.427	10%
Current tax liabilities	1.224	0%	1.401	1%	177	14%
Deferred income	-	-	-	-	-	-
Contract liabilities	-	-	-	-	-	-
Other non-current liabilities	21.034	9%	18.683	7%	-2.351	-11%
Liabilities held for sale	-	-	-	-	-	-
Current liabilities	**84.421**	**34%**	**87.001**	**35%**	**2.580**	**3%**
Total equity and liabilities	**246.926**	**100%**	**250.890**	**100%**	**3.964**	**2%**

equity ratio unchanged although equity in absolute figures↑

increase in total capital 2% vs increase in total equity 2%

!

Basic analytical procedures:
Relative key figures with changes with time-comparison

	BMW Group 2022 Mio. EUR	ratio %	BMW Group 2023 Mio. EUR	ratio %	delta Mio. EUR	delta %
Revenue	142.610	100%	155.498	100%	12.888	9%
Cost of sales	−118.042	83%	−125.809	81%	−7.767	7%
Gross result (profit/loss) — Gross profit margin	24.568	17%	29.689	19%	5.121	21%
Selling and distribution expenses	−6.191	4%	−6.091	4%	100	−2%
Administrative expenses	−4.425	3%	−4.934	3%	−509	12%
Research and development expenses	–	–	–	–	–	–
Impairment loss on trade receivables and contract assets	–	–	–	–	–	–
Other operating income	1.377	1%	1.045	1%	−332	−24%
Other operating expenses	−1.330	1%	−1.227	1%	103	−8%
Total operating costs	−10.569	7%	−11.207	7%	−638	6%
Operating result (profit/loss)	13.999	10%	18.482	12%	4.483	32%
Share of profit (=results) from investments in joint ventures and associate	−100	0%	−159	0%	−59	59%
Other investment income	8.937	6%	−1.272	1%	−10.209	−114%
Earnings before interest and taxes (EBIT) — EBIT-margin	22.836	16%	17.051	11%	−5.785	−25%
Finance income (=interest and similar income)	422	0%	701	0%	279	66%
Finance expenses (=interest and similar expenses)	251	0%	−656	0%	−907	−361%
Other financial result	–	–	–	–	–	–
Financial result	673	0%	45	0%	−628	−93%
Profit / Loss before tax	23.509	16%	17.096	11%	−6.413	−27%
Income taxes	−4.927	3%	−4.931	3%	−4	0%
Profit / Loss from continuing operations	18.582	13%	12.165	8%	−6.417	−35%
Profit / Loss from discontinued operation	–	–	–	–	–	–
Profit / Loss for the period — Profit margin	18.582	13%	12.165	8%	−6.417	−35%

Overview

Financial Statements (F/S) Analysis

1	**Basics of F/S Analysis**

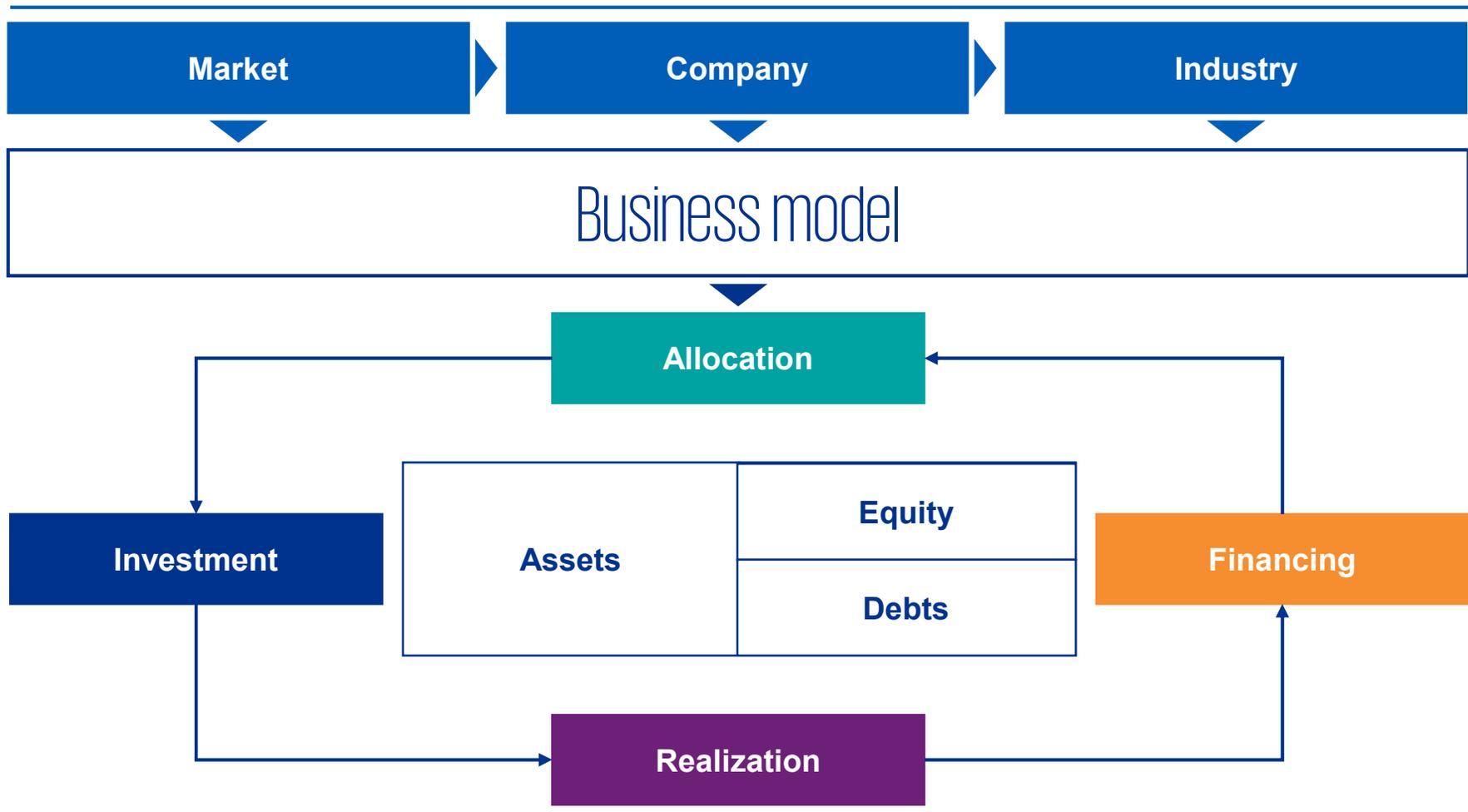| **Purpose & function**	**Types of key figures**	**Preparation of F/S analysis**	**Objects of F/S analysis**

2	**Financial-based analysis**

3	**Performance-based analysis**

General business cycle

| Market | Company | Industry |

Business model

Allocation

Investment

| Assets | Equity |
| | Debts |

Financing

Realization

Source: Based on Männel (2004), page 41

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General business objectives

Minimization of the tax present value (discounted tax payments)	**Profitable growth**
	Profit stabilization
	Profit maximization
	Value-oriented controlling (e.g. shareholder value concepts)

Success

Asset turnover

Investment and financing

Profitability objectives

Earnings policy

Assets

Capital

Asset structure policy	**Allocation policy**	**Capital structure policy**
Minimization of capital commitment; Reduction of non-operational resources as well as unnecessary liquidity reserves and non-value-added assets	Degrees of liquidity Investment coverage Maturity congruence	Optimization of the equity ratio

Source: Based on Männel (2005), page 108

Central questions for financial statements analysis

How safe is the future solvency?	What is the future profitability?
Financial-based analysis	**Performance-based analysis**

Financial-based analysis	Performance-based analysis
(1) Investment analysis	**(1) Analysis of earnings sources**
(2) Financing analysis	**(2) Profitability analysis**
(3) Liquidity analysis	**(3) Analysis of earnings structure**

Under (3) Liquidity analysis:
- **Static**
- **Dynamic**

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Objects of financial statements analysis

Financial statements analysis

How safe is the future solvency?

Financial-based analysis

What is the future profitability?

Performance-based analysis

Balance sheet

Income statement

Investment (asset-side)

Financing (liabilities-side)

Profitability

Earnings structure

Liquidity

Earnings sources

Cash flow statement

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TUM

2
Financial-based analysis

Uhrenturm der TUM

Financial Statements (F/S) Analysis

1	**Basics of F/S Analysis**
2	**Financial-based analysis**
3	**Performance-based analysis**

Strategic-based analysis (not relevant)

Objects of financial statements analysis

Financial statements analysis

How safe is the future solvency?	What is the future profitability?
Financial-based analysis	**Performance-based analysis**

Balance sheet

Investment (asset-side) — **Financing (liabilities-side)**

Liquidity
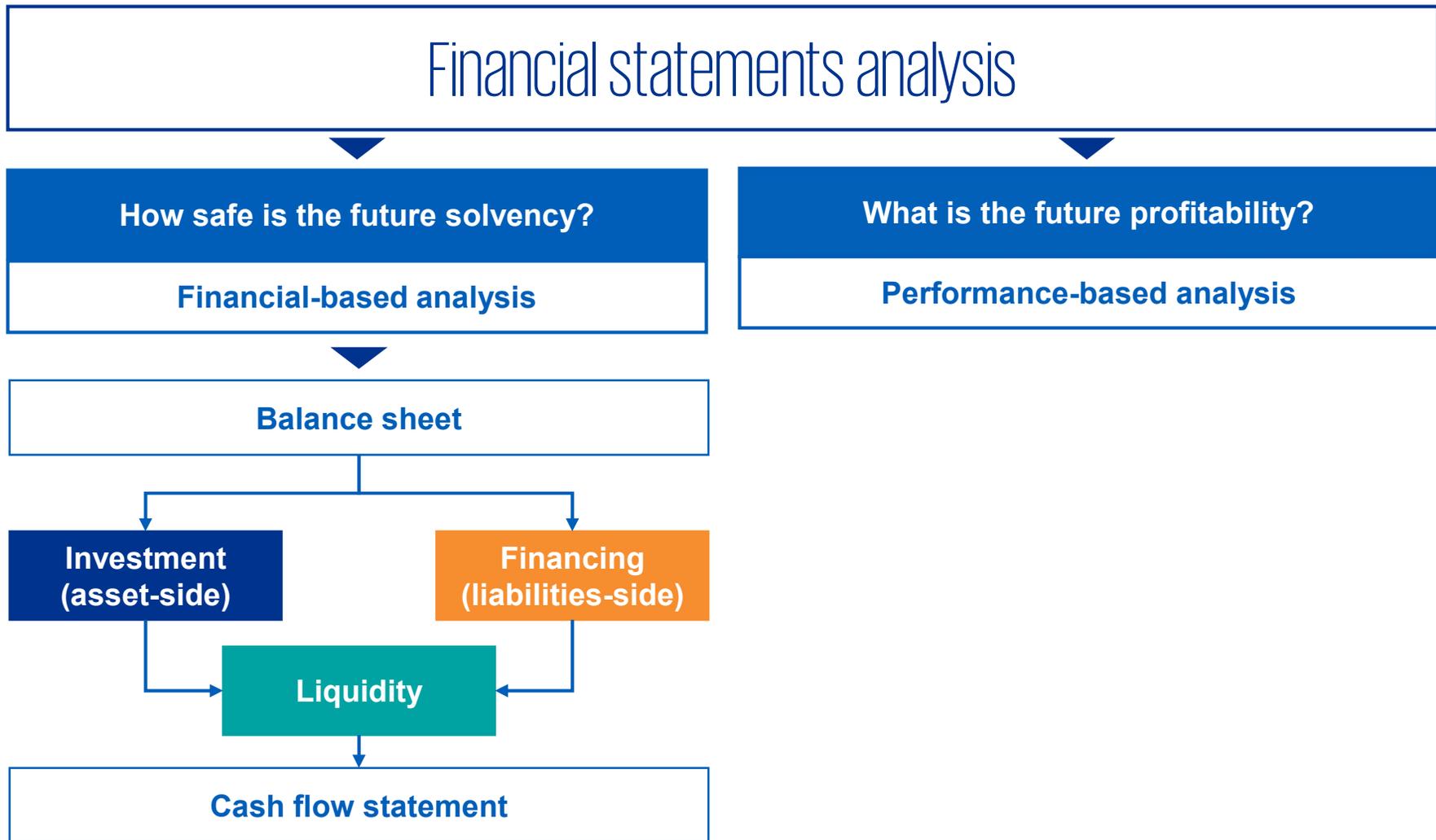
Cash flow statement

Significant methods

Financial statements analysis

"point-of-time"-oriented analytical methods (balance sheet ratios)

"periode-of-time"-oriented analytical methods (cash flow ratios)

Vertical structural analysis

Horizontal structural analysis

Cash flow statement

Asset Structure

Capital Structure

Investment coverages

Congruence structure

Investment analysis

Financing analysis

static liquidity analysis

dynamic liquidity analysis

Overview

Financial Statements (F/S) Analysis

| 1 | **Basics of F/S Analysis** |

| 2 | **Financial-based analysis** |

| **Balance sheet ratios** | **Cash flow ratios** |

| 3 | **Performance-based analysis** |

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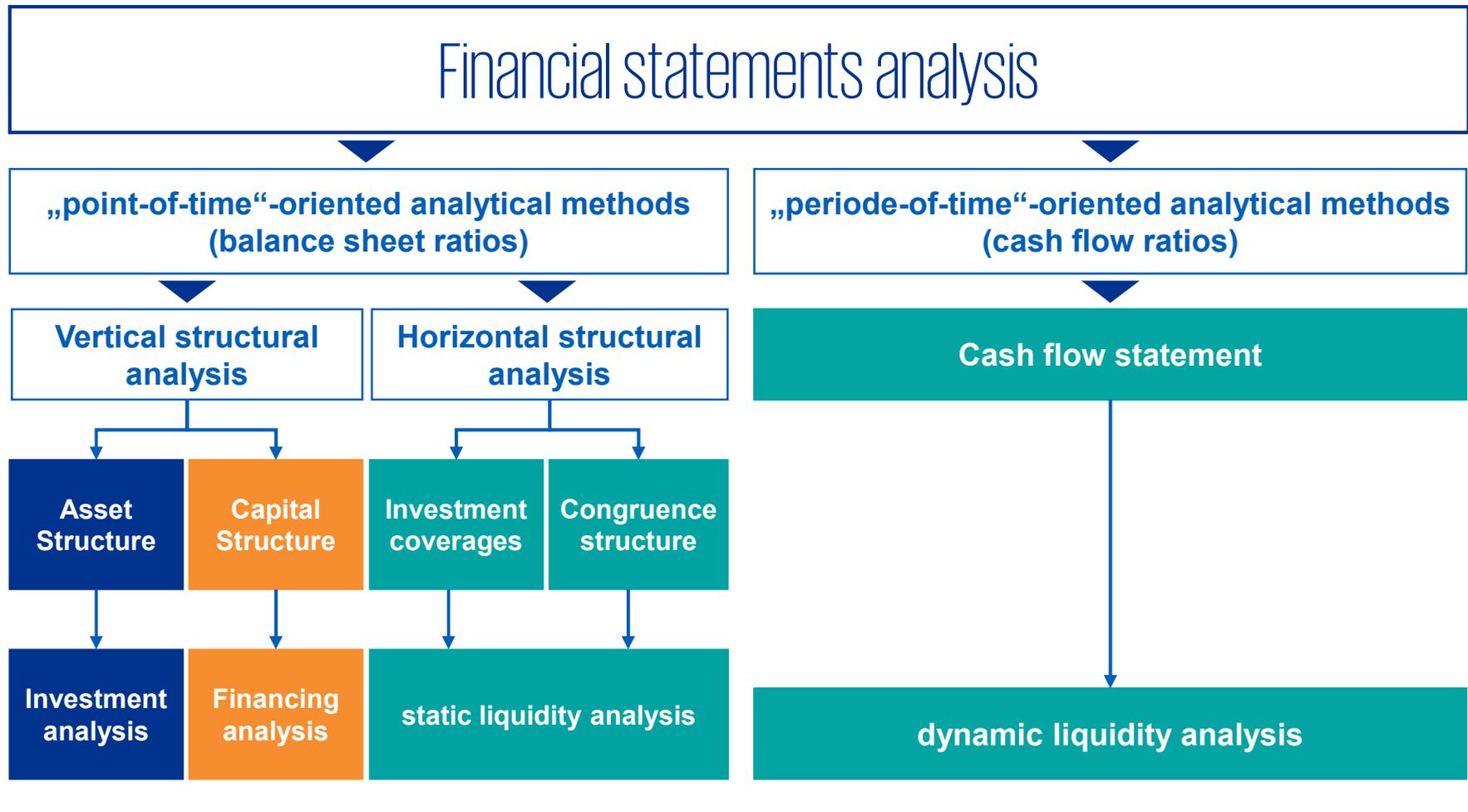
Balance sheet structure analysis – Expectations
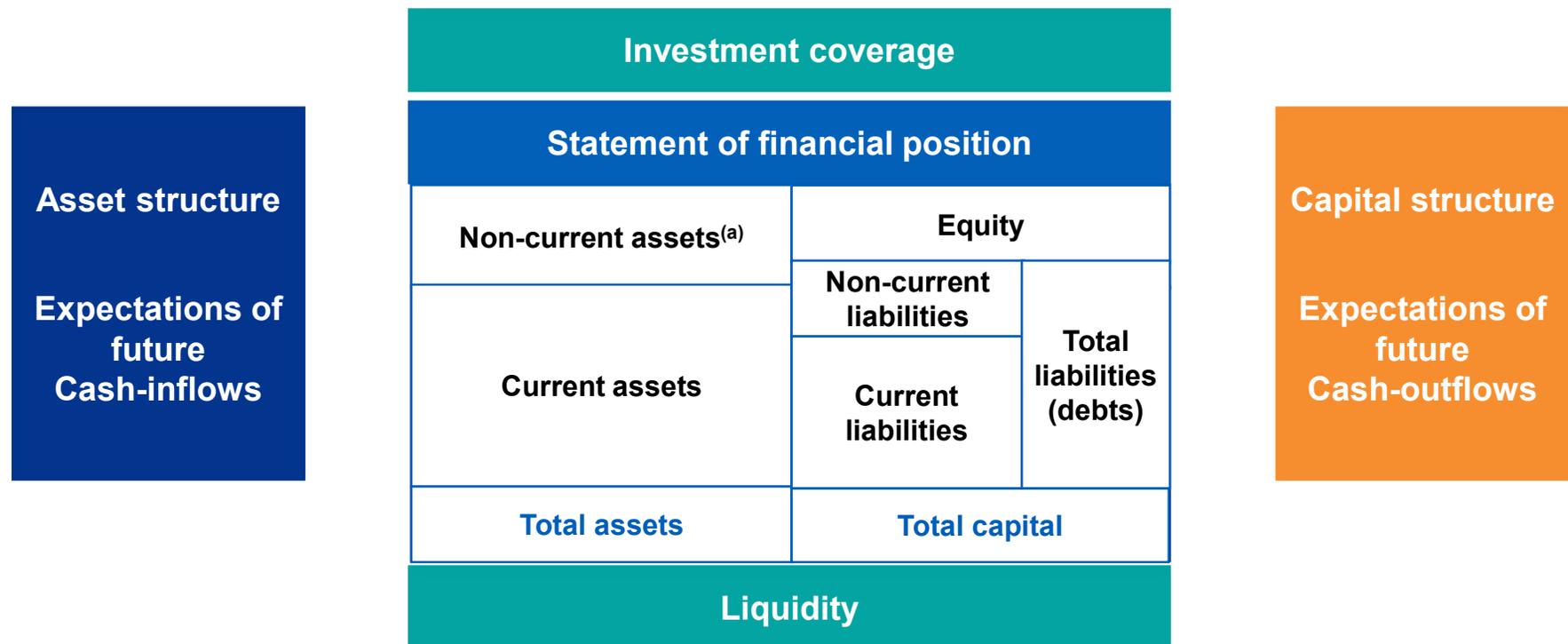
	Investment coverage	
	Statement of financial position	

Asset structure

Expectations of future Cash-inflows

Non-current assets(a)	Equity	
Current assets	Non-current liabilities	Total liabilities (debts)
	Current liabilities	
Total assets	Total capital	

Liquidity

Capital structure

Expectations of future Cash-outflows

(a) Thereof: fixed assets = Intangible assets + PPE + leased assets

Balance sheet structure analysis – Questions

Which assets are covered by which degree of capital/liabilities?		
Statement of financial position		
Non-current assets(a)	**Equity**	
	Non-current liabilities	**Total liabilities (debts)**
Current assets	**Current liabilities**	
Total assets	**Total capital**	
How is the congruence of time limits?		

How long is the capital tied up?

→ **Liquidity potential**

→ **Disposition elasticity**

How long have the funds been made available?

→ **Leverage-structure**

→ **Financial-economic risks**

The longer assets are tied up, the later are the corresponding cash-inflows generated.

The longer the capital remains available, the later are the corresponding cash-outflows.

(a) Thereof: fixed assets = Intangible assets + PPE + leased assets

Asset-side structure analysis – KPIs

<table>
<tr>
<td rowspan="3">**How long is the capital tied up?**

→ **Liquidity potential**

→ **Disposition elasticity**</td>
<td colspan="3">**Statement of financial position**</td>
</tr>
</table>

Non-current assets[a]	**Equity**	
Current assets	**Non-current liabilities**	**Total liabilities (debts)**
	Current liabilities	
Total assets	**Total capital**	

(a) Thereof: fixed assets = Intangible assets + PPE + leased assets

Key ratios: asset structure

Measure	Definition	Interpretation
Key figures on asset structure		
Fixed asset intensity	$$\frac{\text{Fixed assets x 100}}{\text{Total assets}}$$ Fixed asset = Intangible assets + PPE + leased assets	The higher the asset intensity, the longer financial funds are locked up and – as a rule – the higher the associated fixed costs. The smaller this ratio, the less capital is tied-up over the long term. The ratio provides information on the company`s ability to adapt to changing market conditions. When considering the asset intensity, the company`s respective industry must also be considered.
Current asset intensity	$$\frac{\text{Current assets x 100}}{\text{Total assets}}$$	It shows the percentage of total capital which is locked-up in current assets. A high ratio is generally to be viewed positively, as current assets can be liquidated quickly. However, an extremely high ratio can indicate excessive stock levels, which push up warehousing costs. More detailed analysis of the current assets should cover the level of receivables and inventories in greater detail.
Asset structure	$$\frac{\text{Non-current assets x 100}}{\text{Current assets}}$$	Both ratios show a company`s **stability or flexibility**, however typical asset structures in the respective industry should also be considered. A low asset structure ratio can mean two things:
Fixed asset structure	$$\frac{\text{Fixed asset x 100}}{\text{Current assets}}$$ Fixed asset = Intangible assets + PPE + leased assets	- A low level of fixed assets allows the company to react more flexibly to changes on the market and fixed costs are lower due to shorter capital lock-up period for all assets. - A company is working with assets that have already been written off. This allows to assume that the technology used is out of date.

Key ratios BMW Group: asset structure

Fixed asset = Intangible assets + Property, plant and equipment (PPE)

in € million	2023
ASSETS	
Intangible assets	20,022
Property, plant and equipment	35,266
Leased products	43,118
Investments accounted for using the equity method	443
Other investments	1,197
Receivables from sales financing	50,517
Financial assets	1,387
Deferred tax	2,431
Other assets	1,537
Non-current assets	**155,918**
Inventories	23,719
Trade receivables	4,162
Receivables from sales financing	36,838
Financial assets	4,131
Current tax	1,199
Other assets	7,596
Cash and cash equivalents	17,327
Current assets	**94,972**
Total assets	**250,890**

**58 %
Fixed asset
structure**

**22 %
Fixed asset
intensity**

**164 %
Asset structure**

38 % Current asset intensity

Source: BMW Group Annual Report 2023

Key ratios BMW Group: asset structure

Fixed asset = Intangible assets + PPE + Leased products

Always have in mind, how a ratio is defined!

in € million	2023
ASSETS	
Intangible assets	20,022
Property, plant and equipment	35,266
Leased products	43,118
Investments accounted for using the equity metho	443
Other investments	1,197
Receivables from sales financing	50,517
Financial assets	1,387
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Receivables from sales financing	36,838
Financial assets	4,131
Current tax	1,199
Other assets	7,596
Cash and cash equivalents	17,327
Current assets	**94,972**
Total assets	**250,890**

58 %
Fixed asset structure

104 %
Fixed asset structure

22 %
Fixed asset intensity

39 %
Fixed asset intensity

Source: BMW Group Annual Report 2019

Key ratios BMW Group: asset structure

	BMW Group 2022 Mio. EUR	ratio %	BMW Group 2023 Mio. EUR	ratio %	delta Mio. EUR	delta %
Intangible assets and goodwill	21.776	9%	20.022	8%	-1.754	-8%
Property, plant and equipment	74.946	30%	78.384	31%	3.438	5%
Biological assets	-	-	-	-	-	-
Investment property	-	-	-	-	-	-
Equity-accounted investees	420	0%	443	0%	23	5%
Financial assets	53.441	22%	51.904	21%	-1.537	-3%
Deferred tax assets	1.758	1%	2.431	1%	673	38%
Employee benefits	-	-	-	-	-	-
Other non-current assets	2.381	1%	2.734	1%	353	15%
Non-current assets	**154.722**	**63%**	**155.918**	**62%**	**1.196**	**1%**
Biological assets	-	-	-	-	-	-
Inventories	20.005	8%	23.719	9%	3.714	19%
Contract assets	-	-	-	-	-	-
Trade and other receivables	44.631	18%	45.131	18%	500	1%
Current tax assets	1.096	0%	1.199	0%	103	9%
Prepayments	-	-	-	-	-	-
Other current assets	9.602	4%	7.596	3%	-2.006	-21%
Cash and cash equivalents	16.870	7%	17.327	7%	457	3%
Assets held for sale	-	-	-	-	-	-
					-	-
Current assets	**92.204**	**37%**	**94.972**	**38%**	**2.768**	**3%**
Total assets	**246.926**	**100%**	**250.890**	**100%**	**3.964**	**2%**

Intensity ratios 2023

Intensity ratios 2022

Asset structure: industry averages

Industry	Fixed asset intensity in%	Curren asset intensity in%
Traffic	69,4	30,6
Energy	43,3	56,7
Manufacturing	37,0	63,0
Trade	31,3	68,7
Construction	8,3	91,7

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BMW Group vs Daimler Group

(in %)	2020	2021	2022	2023
Fixed asset intensity	35%	35%	39%	**39%**
Current asset intensity	38%	38%	37%	**38%**
Asset structure	165%	166%	168%	**164%**
Fixed asset structure	93%	93%	105%	**104%**

(in %)	2020	2021	2022	2023
Fixed asset intensity	35%	34%	33%	**32%**
Current asset intensity	40%	40%	40%	**40%**
Asset structure	148%	152%	153%	**153%**
Fixed asset structure	86%	85%	82%	**82%**

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Liabilities-side structure analysis – KPIs

Statement of financial position		
Non-current assets(a)	**Equity**	
Current assets	**Non-current liabilities**	**Total liabilities (debts)**
	Current liabilities	
Total assets	**Total capital**	

How long have the funds been made available?

→ **Leverage-structure**

→ **Financial-economic risks**

(a) Thereof: fixed assets = Intangible assets + PPE + leased assets

Key ratios: capital structure

Measure	Definition	Interpretation
Key figures on capital structure		
Equity ratio (intensity)	$$\frac{\text{Equity x 100}}{\text{Total capital}^{*)}}$$	The more equity a company has available the better its credit-worthiness, the higher its financial stability and the more independent the company is from lenders. However, as equity is more expensive than debt, a high equity ratio, depresses the return on capital employed.
Debt (leverage) ratio (intensity)	$$\frac{\text{Total liabilities}^{*)} \text{ (Debts) x 100}}{\text{Total capital}^{*)}}$$	The debt ratio also allows assumptions to be made about a company`s financial stability. The growth of this ratio should always be considered together with the company`s assets. It these include hidden liabilities as a result of lower market values, this has a negative impact on the leverage ratio.
Leverage structure	$$\frac{\text{Current liabilities x 100}}{\text{Total liabilities}}$$	This ratio expresses what percentage of total liabilities will acutally lead to a cash outflow to external creditors on a short-term basis. Companies in danger of insolvency show an increased percentage of leverage structure that solvent companies. For an ongoing analysis the maturity and conditions of all liabilities components should be taken into account.
Debt gearing ratio (static)	$$\frac{\text{Total liabilities x 100}}{\text{equity}}$$	This ratios shows the relationship between a company`s debt and equity financing. In general, the higher the gearing ratio, the more dependent a company is on external creditors. However, the gearing ratio should never be considered alone, but always in connection with the company`s earnings position (leverage-effect!)

*) Note: Financial analysts often only use total liabilities as the sum of interest-bearing liabilities plus the capitalized value of future leasing commitments; and therefore those liabilities are included in the total capital. In the lecture, there will be no differentiation!

Key ratios BMW Group: capital structure

in € million	2023
EQUITY AND LIABILITIES	
Subscribed capital	639
Capital reserves	2,456
Revenue reserves	89,072
Accumulated other equity	– 2,071
Treasury shares	– 500
Equity attributable to shareholders of BMW AG	89,596
Non-controlling interests	3,327
Equity	92,923
Pension provisions	427
Other provisions	7,797
Deferred tax	2,797
Financial liabilities	52,880
Other liabilities	7,065
Non-current provisions and liabilities	70,966
Other provisions	9,240
Current tax	1,401
Financial liabilities	42,130
Trade payables	15,547
Other liabilities	18,683
Current provisions and liabilities	87,001
Total equity and liabilities	250,890

37% Equity ratio

→ Common minimum 25% required by banks for loans

170 % Debt gearing ratio

*should be <200%
→ if I understood correctly :)*

+ **Total liabilities**

55 % Leverage structure

63 % Debt leverage ratio

Source: BMW Group Annual Report 2023

Key ratios BMW Group: capital structure

EQUITY and LIABILITIES	BMW Group 2022 Mio. EUR	ratio EUR	BMW Group 2023 Mio. EUR	ratio EUR	delta Mio. EUR	delta %
Share capital (subscribed capital)	663	0%	639	0%	-24	-4%
Share premium (capital reserves)	2.432	1%	2.456	1%	24	1%
Reserves and others	-1.395	1%	-2.571	1%	-1.176	84%
Retained earnings (revenue reserves)	85.425	35%	89.072	36%	3.647	4%
Equity attributable to owners of the Compan	87.125	35%	89.596	36%	2.471	3%
Non-controlling interests (=minoriy interest)	4.163	2%	3.327	1%	-836	-20%
Total equity	91.288	37%	92.923	37%	1.635	2%
Provisions for pensions and similar obligations	339	0%	427	0%	88	26%
Other provisions	8.445	3%	7.797	3%	-648	-8%
Loans and borrowings	53.469	22%	52.880	21%	-589	-1%
Trade and other payables	-	-	-	-	-	-
Deferred tax liabilities	2.765	1%	2.797	1%	32	1%
Deferred income	-	-	-	-	-	-
Contract liabilities	-	-	-	-	-	-
Other non-current liabilities	6.199	3%	7.065	3%	866	14%
Non-current liabilities	71.217	29%	70.966	28%	-251	-0%
Provisions for pensions and similar obligations	-	-	-	-	-	-
Other provisions	7.316	3%	9.240	4%	1.924	26%
Bank overdraft	-	-	-	-	-	-
Loans and borrowings	40.727	16%	42.130	17%	1.403	3%
Trade and other payables	14.120	6%	15.547	6%	1.427	10%
Current tax liabilities	1.224	0%	1.401	1%	177	14%
Deferred income	-	-	-	-	-	-
Contract liabilities	-	-	-	-	-	-
Other non-current liabilities	21.034	9%	18.683	7%	-2.351	-11%
Liabilities held for sale	-	-	-	-	-	-
Current liabilities	84.421	34%	87.001	35%	2.580	3%
Total equity and liabilities	246.926	100%	250.890	100%	3.964	2%

**37 %
Reserves intensity**

**37%
Equity ratio**

equity ratio unchanged although equity in absolute figures ↑ ← increase in total capital 2%
vs increase in total equity 2%

**3 %
Provision intensity**

**63%
Debt leverage ratio**

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Key ratios: capital structure

Measure	Definition	Interpretation
Key figures on capital structure		
Reserve intensity	$$\frac{\text{Capital reserves + retained earnings x 100}}{\text{Total capital}}$$	From a creditor point of view, a higher degree of reserves offers security for existing and additional loans. Thus, the higher the percentage of reserves to total capital, the lower the risk of non-performing loans for the lender. Over the time the external analyst is able to tell whether the ratio, and thus the company`s capital base, increases or decreases. A decrease may eventually lead to a total loss of shareholders`s equity and thus endanger a company`s existence.
Provision intensity	$$\frac{\text{(Non-current pensions and similar obligations + non-current provisions) x 100}}{\text{Total capital}}$$	The ratio indicates to which degree a company finances itself through provision equivalents. Provisions – although they are financially clearly defined as liabilities – may have equity character when they are structured on a long term basis. Financing by pension equivalents is possible by immediately registering the expense for making provisions in the income statement. The actual payment is postponed until future fiscal years, In the meantime, this amount is available for the production process.

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BMW Group vs Daimler Group

many companies increased their equity ratios after COVID to be more resilient – paid off for the current crises

(in %)	2019	2022	2023	2024
Equity ratio	26%	37%	37%	**35%**
Debt (leverage) ratio	74%	63%	63%	**65%**
Leverage structure	49%	54%	55%	**51%**
Debt gearing ratio	281%	170%	170%	**182%**

(in %)	2019	2022	2023	2024
Equity ratio	21%	33%	35%	**35%**
Debt (leverage) ratio	79%	67%	65%	**65%**
Leverage structure	44%	51%	49%	**44%**
Debt gearing ratio	381%	200%	183%	**183%**

Balance sheet structure analysis – KPIs

Which assets are covered by which degree of capital/liabilities?		
Statement of financial position		
Non-current assets[a]	**Equity**	
	Non-current liabilities	**Total liabilities (debts)**
Current assets	**Current liabilities**	
Total assets	**Total capital**	
How is the congruence of time limits?		

The longer assets are tied up, the later are the corresponding cash-inflows generated.

The longer the capital remains available, the later are the corresponding cash-outflows.

(a) Thereof: fixed assets = Intangible assets + PPE + leased assets

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Balance sheet structure analysis – KPIs

$$\frac{\text{Fixed assets}}{\text{Total equity}} \leq 1$$

Golden balance sheet rule

Statement of financial position

Non-current assets[a]	Total equity	
	Non-current liabilities	**Total liabilities (debts)**
Current assets	**Current liabilities**	
Total assets	**Total capital**	

Golden financing rule

$$\frac{\text{Current liabilities}}{\text{Current assets}} \leq 1 \quad \textit{Left side > right side}$$

The longer assets are tied up, the later are the corresponding cash-inflows generated.

The longer the capital remains available, the later are the corresponding cash-outflows.

(a) Thereof: fixed assets = Intangible assets + PPE + leased assets

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Key ratios: static liquidity analysis (I)

Measure	Definition		Interpretation
Key figures for static (point-of-time) liquidity analysis (I)			
„Golden balance sheet rule" (Investment coverage) → most important	$\dfrac{\text{Fixed assets}}{\text{Total equity}}$	≤ 1	This ratio demands that the capital lock-up period does not exceed the period for which the capital has been made available, i.e. that the assets tied in to the company for the long-term are covered by long-term capital. It a company does not uphold this rule, it may become forced to sell assets in order to service current liabilities. Long-term capital can be defined exclusively by equity or in broader sense with non-current liabilities.
	$\dfrac{\text{Fixed assets}}{\text{Total equity + non-current liabilities}}$	≤ 1	
Asset coverage ratio (Principle of matching maturities)	$\dfrac{\text{Total equity x 100}}{\text{Fixed assets}}$		This ratio is the counterpart to the investment coverage ratio above. It answers the question of the extent to which the fixed assets, which should be available to the company over the long term, are covered by equity that remains in the company for an equally long term. The higher the ratio is, the better, as this means that parts of the current assets are also being financed long-term.
	$\dfrac{\text{(Total equity + non-current liabilities) x 100}}{\text{Fixed assets}}$		
"Golden financing rule" (Principle of matching maturities)	$\dfrac{\text{Current liabilities}}{\text{Current assets}}$	≤ 1	These ratios state that the terms between obtaining and repaying capital on the one hand and the use of capital on the other should be in line with each other. According to this rule, capital may not be tied up in assets for a longer period that the capital is available to the company. If a company finances a long-term investment (e.g. a machine) with short-term financing, the loan become due before the income reuiqred to repay the loan has been generated.
	$\dfrac{\text{Total equity + non-current liabilities}}{\text{Non-current assets}}$	≥ 1	

Fixed asset = Intangible assets + PPE

Key ratios BMW Group: liquidity and coverage analysis (I)

in € million	2023
ASSETS	
Intangible assets	20,022
Property, plant and equipment	35,266
Leased products	43,118
Investments accounted for using the equity metho	443
Other investments	1,197
Receivables from sales financing	50,517
Financial assets	1,387
Deferred tax	2,431
Other assets	1,537
Non-current assets	**155,918**
Inventories	23,719
Trade receivables	4,162
Receivables from sales financing	36,838
Financial assets	4,131
Current tax	1,199
Other assets	7,596
Cash and cash equivalents	17,327
Current assets	**94,972**
Total assets	**250,890**

Fixed assets[a]
98,406

Golden balance sheet rule (alt. 1)
1,1 > 1

Golden balance sheet rule (alt. 2)
0,6 ≤ 1

Golden finance rule (alt. 2)
1,1 > 1

Golden finance rule (alt. 1)
0,9 ≤ 1

in € million	2023
EQUITY AND LIABILITIES	
Subscribed capital	639
Capital reserves	2,456
Revenue reserves	89,072
Accumulated other equity	− 2,071
Treasury shares	− 500
Equity attributable to shareholders of BMW AG	**89,596**
Non-controlling interests	3,327
Equity	**92,923**
Pension provisions	427
Other provisions	7,797
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Financial liabilities	52,880
Other liabilities	7,065
Non-current provisions and liabilities	**70,966**
Other provisions	9,240
Current tax	1,401
Financial liabilities	42,130
Trade payables	15,547
Other liabilities	18,683
Current provisions and liabilities	**87,001**
Total equity and liabilities	**250,890**

Source: BMW Group Annual Report 2023   (a) per definition (voluntary)

BMW Group vs Daimler Group

(in % / multiple)	2019	2022	2023	2024
Golden balance sheet rule (alt. 1)	1,3	1,1	1,1	**1,1**
Golden balance sheet rule (alt. 2)	0,5	0,6	0,6	**0,6**
Asset coverage ratio	77%	94%	94%	**87%**
Golden financing rule (alt. 1)	0,9	0,9	0,9	**0,9**

(in % / multiple)	2019	2022	2023	2024
Golden balance sheet rule (alt. 1)	1,7	1,0	0,9	**1,0**
Golden balance sheet rule (alt. 2)	0,5	0,5	0,5	**0,5**
Asset coverage ratio	60%	102%	109%	**103%**
Golden financing rule (alt. 1)	0,8	0,9	0,8	**0,7**

Key ratios: static liquidity analysis (II)

Measure	Definition	Interpretation
Key figures for static (point-of-time) liquidity analysis		
Cash ratio (Liquidität 1. Grades)	$$\frac{\text{Cash and cash equivalent} * 100}{\text{Current liabilities}}$$	All ratios are often used for evaluating a company`s creditworthiness. They show the relationship between liquid assets to payment commitments. Liquid or current assets include cash and cash equivalents, marketable securities, total receivables and total inventory etc. The various ratios show the extent to which the current liabilities are covered by current assets.
Quick ratio (Liquidität 2. Grades) *mostly used by banks*	$$\frac{(\text{Current assets} - \text{inventories}) \times 100}{\text{Current liabilities}}$$	As a rule of thumb, a **current ratio** of less than 100% is being regarded as threatening the company`s existence. Bankers use the **quick ratio** to determine how quickly a company can pay off its current liabilities in case assets need to be converted into cash.
Current ratio (Liquidität 3. Grades)	$$\frac{\text{Current assets} \times 100}{\text{Current liabilities}}$$	The **quick ratio** differs from the current ratio in that it excludes inventory. The logic behind this is that while inventory may have been paid for and has value, it may not necessarily be converted into cash quickly. As a rule of thumb, the quick ratio should exceed 100%, thus current liabilities are covered by the company`s cash position and its total receivables.

Key ratios BMW Group: liquidity and coverage analysis (II)

in € million	2023
ASSETS	
Intangible assets	20,022
Property, plant and equipment	35,266
Leased products	43,118
Investments accounted for using the equity method	443
Other investments	1,197
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Financial assets	4,131
Current tax	1,199
Other assets	7,596
Cash and cash equivalents	17,327
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Total assets	250,890

in € million	2023
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Subscribed capital	639
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Pension provisions	427
Other provisions	7,797
Deferred tax	2,797
Financial liabilities	52,880
Other liabilities	7,065
Non-current provisions and liabilities	70,966
Other provisions	9,240
Current tax	1,401
Financial liabilities	42,130
Trade payables	15,547
Other liabilities	18,683
Current provisions and liabilities	87,001
Total equity and liabilities	250,890

Quick ratio 82 %

Cash ratio 20 %

Current ratio 109 %

Source: BMW Group Annual Report 2023

BMW Group vs Daimler Group

(in %)	2019	2022	2023	2024
Cash ratio	15%	20%	20%	**22%**
Quick ratio	90%	86%	82%	**82%**
Current ratio	110%	109%	109%	**110%**

(in %)	2019	2022	2023	2024
Cash ratio	18%	20%	19%	**19%**
Quick ratio	93%	87%	93%	**101%**
Current ratio	121%	116%	125%	**136%**

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Key ratios: static liquidity analysis (III)

Measure	Definition	Interpretation
Key figures for static (point-of-time) liquidity analysis		
Working Capital	Current Assets ./. Cash and cash equivalents ./. Current, non-interest-bearing liabilities	It expresses the proportion of current assets working for a company (i.e. that is generating sales), without generating capital costs in the closer sense of the word. It is thus the portion of current assets with long-term financing. The higher the working capital, the more secure the liquidity position. From an analyst´s perspective, negative working capital may be viewed positively, as suppliers pre-finance the company`s sale.
Net debt	Interest-bearing liabilities (here: loans and borrowings) ./. Cash and cash equivalents	Net debt shows the amount of a company`s debt, if all liabilities were to be repaid using liquid funds. For example, if a company`s liquid funds are greater than its actual debt, then the company is, in fact, debt-free and it exploits the positive effects on its return on equity via the leverage effect. However, one must bear in mind that a high level of cash in turn brings a low return and is thus not reasonable from the investor`s perspective. In order to be able to properly interpret net debt, this figure should be considered in connection with the cash flow (dynamic gearing).

Key ratios BMW Group: liquidity and coverage analysis (III)

in € million	2023
ASSETS	
Intangible assets	20,022
Property, plant and equipment	35,266
Leased products	43,118
Investments accounted for using the equity method	443
Other investments	1,197
Receivables from sales financing	50,517
Financial assets	1,387
Deferred tax	2,431
Other assets	1,537
Non-current assets	**155,918**
Inventories	23,719
Trade receivables	4,162
Receivables from sales financing	36,838
Financial assets	4,131
Current tax	1,199
Other assets	7,596
Cash and cash equivalents	17,327
Current assets	**94,972**
Total assets	**250,890**

in € million	2023
EQUITY AND LIABILITIES	
Subscribed capital	639
Capital reserves	2,456
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Accumulated other equity	– 2,071
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Equity attributable to shareholders of BMW AG	**89,596**
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Equity	**92,923**
Pension provisions	427
Other provisions	7,797
Deferred tax	2,797
Financial liabilities	52,880
Other liabilities	7,065
Non-current provisions and liabilities	**70,966**
Other provisions	9,240
Current tax	1,401
Financial liabilities	42,130
Trade payables	15,547
Other liabilities	18,683
Current provisions and liabilities	**87,001**
Total equity and liabilities	**250,890**

Net debt. 77,683

Working capital 32,774

Source: BMW Group Annual Report 2019

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BMW Group vs Daimler Group

(in € Mio.)	2019	2022	2023	2024
Working Capital	42.062	31.640	32.774	**33.902**
Net debt	104.704	77.326	77.683	**91.974**

(in € Mio.)	2019	2022	2023	2024
Working Capital	81.039	58.880	62.801	**64.004**
Net debt	152.761	102.086	99.468	**103.848**

Overview

Financial Statements (F/S) Analysis

1   **Basics of F/S Analysis**

2   **Financial-based analysis**

**Balance sheet
ratios**

**Cash flow
ratios**

3   **Performance-based analysis**

Cash flow analysis: Which company would you invest in?

	1st	2nd	4th	3rd
	A	**B**	**C**	**D**
Gross cash flow	20	10	20	10
Change in net working capital	0	10	-10	0
(1) Cash flow from operating activities	20	20	10	10
(2) Cash flow from investing activities	-15	-15	-15	-5
(3) Cash flow from financing activities	5	5	15	5
(4) Change in cash and cash equivalents	10	10	10	10

BMW Group cash flows

in € million	2023	2022	Change
Cash inflow (+) / outflow (−) from operating activities	17,542	23,523	− 5,981
Cash inflow (+) / outflow (−) from investing activities	− 9,548	− 4,772	− 4,776
Cash inflow (+) / outflow (−) from financing activities	− 6,859	− 17,984	11,125
Effects of exchange rate and changes in composition of segment	− 678	94	− 772
Change in cash and cash equivalents	457	861	− 404

Source: BMW Group Annual Report 2023

(Simplified) Structure of the statement of cash flows

Net profit/loss for the period

+ Depreciation/amortization (- reversals)

+ Increase (- decrease) provisions

– Increase (+ decrease) in working capital

= Net cash flow from operating activities (net cash flow, operating cash flow) [1]

– Payments for investments

+ Proceeds from divestments

= Net cash flow used in investing activities (investment cash flow) [2]

= Net cash after investment (free cash flow) [1 + 2]

+ Increase (-reduction) of paid-in equity

+ Increase in financial debt

– Payouts for dividends and profit transfers

– Disbursements for repayment of financial debts

= Net cash flow from financing activities (financing cash flow) [3]

= Net change in cash and cash equivalents [1 + 2 + 3]

BMW Group vs Daimler Group

(in € Mio.)	2019	2022	2023	2024	2019	2022	2023	2024
Gross cash flow	10.442	19.843	20.658	**15.551**	8.737	19.530	18.665	**15.123**
Change in net working capital	-7.070	3.005	-3.985	**-8.825**	-2.051	-4.241	-6.251	**694**
Operating cash flow	3.372	22.848	16.673	**6.726**	6.686	15.289	12.414	**15.817**
Investing cash flow	-7.193	-4.319	-8.865	**-10.725**	-9.405	-1.848	-5.259	**-6.832**
Free cash flow	-3.821	18.529	7.808	**-3.999**	-2.719	13.441	7.155	**8.985**
Financing cash flow	4.989	-17.762	-6.673	**5.962**	5.628	-19.032	-8.391	**-10.752**
Change in cash and cash equivalents	1.168	767	1.135	**1.963**	2.909	-5.591	-1.236	**-1.767**

→ paying back liabilities or dividends

but position is good :)

investing in a BEV plant, but financing activity can't go on forever

Be aware: - Because of mapping to the analyzing-tool there might be differences to the published cash flows;
- Change in cash and cash equivalents before exchange rate effects!

Key ratios: dynamic liquidity analysis (IV)

Measure	Definition	Interpretation
Key figures for dynamic (period-of-time) liquidity analysis		
Free cash flow	Operating cash flow + Investment cash flow	The free cash flow refers to the free funds available to the company. These funds describe the company`s potential value for investors and creditors and are available for reinvestment of profits, or the payment of interest or credit redemption.
Debt Gearing ratio Dynamic)	$\dfrac{\text{Net debt}}{\text{Free cash flow}}$	This ratio shows how many years a company would need to be able to repay its (net) debt from its free cash flow. It is also known as net debt service or duration of debt redemption. A factor of greater than ten or even a negative cash flow over several periods may lead to the danger of insolvency.

BMW Group vs Daimler Group

(in % / € Mio.)	2019	2022	2023	2024	2019	2022	2023	2024
Operating cash flow	3.372	22.848	16.673	**6.726**	6.686	15.289	12.414	**15.817**
Investing cash flow	-7.193	-4.319	-8.865	**-10.725**	-9.405	-1.848	-5.259	**-6.832**
Free cash flow	-3.821	18.529	7.808	**-3.999**	-2.719	13.441	7.155	**8.985**
Net debt	104.704	77.326	77.683	**91.974**	152.761	102.086	99.468	**103.848**
Debt Gearing ratio	-27,4	4,2	9,9	**-23,0**	-56,2	7,6	13,9	**11,6**

Be aware: because of mapping to the analyzing-tool there might be differences to the published cash flows

3
Performance-based analysis

TUM

Uhrenturm der TUM

Overview

	Financial Statements (F/S) Analysis
1	**Basics of F/S Analysis**
2	**Financial-based analysis**
3	**Performance-based analysis**
	Strategic-based analysis (not relevant)

Objects of financial statements analysis

Financial statements analysis

How safe is the future solvency?	What is the future profitability?
Financial-based analysis	**Performance-based analysis**

Balance sheet

Income statement

Investment (asset-side)

Financing (liabilities-side)

Profitability

Earnings structure

Liquidity

Earnings sources

Cash flow statement

Overview

Financial Statements (F/S) Analysis		
1	**Basics of F/S Analysis**	
2	**Financial-based analysis**	
3	**Performance-based analysis**	
Earnings Analysis	**Profitability analysis**	**Key figures systems**

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Overview

Earnings Analysis
Key earnings figures

Structural earnings analysis

Sources of earnings (absolute key figures)	**Structure of earnings (relative key figures)**

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Key earnings figures: From Top-line to Bottom-line

IA = Intangible assets; PPE = Property, plant and equipment

Revenues (Sales)

Cost of Sales (variable)

Gross profit

Fixed cost excl. interest, deprecia-tion, amortization

EBITDA

Earnings
Before
Interest,
Tax,
Depreciation and
Amortization

Depreciation (PPE) and amortization (IA)

EBIT

Earnings
Before
Interest and
Tax,

Interest

EBT

Earnings
Before
Tax

Tax

Net profit/loss (=net result; net income)

Source: Prof. Dr. Ernstberger

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Key earnings figures BMW Group

in € million	Note	2023
Revenues	7	155,498
Cost of sales	8	– 125,809
Gross profit		**29,689**
Selling and administrative expenses	9	– 11,025
Other operating income	10	1,045
Other operating expenses	10	– 1,227
Profit/loss before financial result		**18,482**
Result from equity accounted investments	24	– 159
Interest and similar income	11	701
Interest and similar expenses	11	– 656
Other financial result	12	– 1,272
Financial result		**– 1,386**
Profit/loss before tax		**17,096**
Income taxes	13	– 4,931
Net profit/loss		**12,165**

Revenues

Gross profit

EBITDA ?

EBIT (broader sense) ?

EBT

Net profit/Loss

Always have in mind, how a ratio is defined!

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BMW Group vs Daimler Group

(in € Mio.)	2019	2022	2023	2024
Revenues	104.210	142.610	155.498	**142.380**
Gross profit	18.063	24.568	29.689	**22.895**
EBIT	7.438	22.836	17.051	**10.889**
Net Profit	5.022	18.582	12.165	**7.678**

(in € Mio.)	2019	2022	2023	2024
Revenues	172.745	150.017	152.390	**145.594**
Gross profit	29.165	34.020	35.004	**28.576**
EBIT	4.575	20.118	19.552	**13.636**
Net Profit	2.709	14.809	14.531	**10.409**

Overview

Earnings Analysis

Key earnings figures

Structural earnings analysis

Sources of earnings (absolute key figures)	Structure of earnings (relative key figures)

Key earnings sources: Earnings split

Key earnings sources BMW Group

Key earnings sources BMW Group

Key earnings sources BMW Group

	BMW Group 2022 Mio. EUR	ratio %	BMW Group 2023 Mio. EUR	ratio %	delta Mio. EUR	delta %
Revenue	142.610	100%	155.498	100%	12.888	9%
Cost of sales	−118.042	83%	−125.809	81%	−7.767	7%
Gross result (profit/loss) *Gross profit margin*	24.568	17%	29.689	19%	5.121	21%
Selling and distribution expenses	−6.191	4%	−6.091	4%	100	−2%
Administrative expenses	−4.425	3%	−4.934	3%	−509	12%
Research and development expenses	–	–	–	–	–	–
Impairment loss on trade receivables and contract assets	–	–	–	–	–	–
Other operating income	1.377	1%	1.045	1%	−332	−24%
Other operating expenses	−1.330	1%	−1.227	1%	103	−8%
Total operating costs	−10.569	7%	−11.207	7%	−638	6%
Operating result (profit/loss)	13.999	10%	18.482	12%	4.483	32%
Share of profit (=results) from investments in joint ventures and associate	−100	0%	−159	0%	−59	59%
Other investment income	8.937	6%	−1.272	1%	−10.209	−114%
Earnings before interest and taxes (EBIT) *EBIT-margin*	22.836	16%	17.051	11%	−5.785	−25%
Finance income (=interest and similar income)	422	0%	701	0%	279	66%
Finance expenses (=interest and similar expenses)	251	0%	−656	0%	−907	−361%
Other financial result	–	–	–	–	–	–
Financial result	673	0%	45	0%	−628	−93%
Profit / Loss before tax	23.509	16%	17.096	11%	−6.413	−27%
Income taxes	−4.927	3%	−4.931	3%	−4	0%
Profit / Loss from continuing operations	18.582	13%	12.165	8%	−6.417	−35%
Profit / Loss from discontinued operation	–	–	–	–	–	–
Profit / Loss for the period *Profit margin*	18.582	13%	12.165	8%	−6.417	−35%

Purpose of segment reporting

Enable a differentiated assessment of a group by:

— better understanding of profitability and financial strength, as well as

— more accurate assessment of the opportunities and risks of the heterogeneous business

Units

— Insight into the structure of the business portfolio

Key earnings sources by segments BMW Group

Total | Key segments

in € million	Note	Group 2023	Group 2022	Automotive (unaudited supplementary information) 2023	Automotive 2022	Motorcycles (unaudited supplementary information) 2023	Motorcycles 2022	Financial Services (unaudited supplementary information) 2023	Financial Services 2022	Other Entities (unaudited supplementary information) 2023	Other Entities 2022	Eliminations (unaudited supplementary information) 2023	Eliminations 2022
Revenues	7	155,498	142,610	132,277	123,602	3,214	3,176	36,227	35,122	11	8	– 16,231	– 19,298
Cost of sales	8	– 125,809	– 118,042	– 109,920	– 104,324	– 2,656	– 2,628	– 31,548	– 30,437	–	–	18,315	19,347
Gross profit		29,689	24,568	22,357	19,278	558	548	4,679	4,685	11	8	2,084	49
Selling and administrative expenses	9	– 11,025	– 10,616	– 9,195	– 8,801	– 303	– 296	– 1,559	– 1,543	– 34	– 33	66	57
Other operating income	10	1,045	1,377	967	1,230	6	6	63	121	13	14	– 4	6
Other operating expenses	10	– 1,227	– 1,330	– 1,148	– 1,072	– 2	– 1	– 128	– 100	– 3	– 192	54	35
Profit/loss before financial result		18,482	13,999	12,981	10,635	259	257	3,055	3,163	– 13	– 203	2,200	147
Result from equity accounted investments	24	– 159	– 100	– 159	– 100	–	–	–	–	–	–	–	–
Interest and similar income	11	701	422	1,389	739	7	5	5	6	3,403	1,543	– 4,103	– 1,871
Interest and similar expenses	11	– 656	251	– 1,502	– 57	– 8	7	– 11	– 6	– 2,372	– 1,539	3,237	1,846
Other financial result	12	– 1,272	8,937	– 67	7,701	–	–	– 87	42	– 1,118	1,194	–	–
Financial result		– 1,386	9,510	– 339	8,283	– 1	12	– 93	42	– 87	1,198	– 866	– 25
Profit/loss before tax		17,096	23,509	12,642	18,918	258	269	2,962	3,205	– 100	995	1,334	122
Income taxes	13	– 4,931	– 4,927	– 3,685	– 3,951	– 75	– 57	– 861	– 673	29	– 209	– 339	– 37
Net profit/loss		12,165	18,582	8,957	14,967	183	212	2,101	2,532	– 71	786	995	85

Source: BMW Group Annual Report 2023

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Overview

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**Earnings
Analysis**

</div>

Key earnings figures

<div style="background:#0050b5;color:white;text-align:center;">

Structural earnings analysis

</div>

Sources of earnings (absolute key figures)	Structure of earnings (relative key figures)

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Basic structure of the statement of profit or loss: total cost method vs cost of sales method

Total cost method	Cost of sales method
Revenues	**Revenues**
+/- Changes in the stock of unfinished and finished products	- Production costs of the services sold
+ capitalized own services	- Sellling and distribution costs
- Operating expenses (material, personnel, depreciation/amortization)	- General administrative costs
+ Other operating income	+ Other operating income
- Other operating expenses	- Other operating expenses
Operating result (=EBIT in a broader sense)	Operating result (=EBIT in a broader sense)
+ Financial income	+ Financial income
- Financial expenses	- Financial expenses
Financial result	Financial result
EBT	EBT
- Income taxes	- Income taxes
Net profit/loss	Net profit/loss

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Structure of the statement of profit or loss: Total cost method
(simplified)

Revenues

± Changes in stock and other capitalized own services

= Operating performance (not gross profit!!!)

– Cost of materials

– Personnel expenses

– Depreciation and amortization

+ Other operating income

– Other operating expenses

= Operating result (=EBIT in a broader sense)

± Financial result

= Earnings before tax (EBT)

– Income taxes

= Net profit/loss (=net result)

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Key ratios: Earnings structure analysis (total cost method)

Measure	Definition	Interpretation
Key figures for earnings structure analysis (total cost method)		
Material expense ratio	$$\frac{\text{Cost of materials}}{\text{Operating performance}}$$	Knowledge of manufacturing depth and dependence on suppliers
Personnel expense ratio	$$\frac{\text{Personnel expenses}}{\text{Operating performance}}$$	Measure of the dependence of the performance of personnel costs. This ratio can also be used to review how economically labor is being employed.
Depreciation ratio	$$\frac{\text{Depreciation and amortization}}{\text{Operating performance}}$$	Measure of the wear and tear of fixed assets.
Tax rate	$$\frac{\text{Income taxes}}{\text{Earnings before taxes}}$$	Reference to the tax burden and the design of the tax

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Structure of the statement of profit or loss: Cost of sales method
(simplified)

Revenues

– Cost of sales

= Gross profit

– Selling and distribution expenses

– Administrative expenses

– Research expenses

+ Other operating income

– Other operating expenses

= Operating result (=EBIT in a broader sense)

± Financial result

= Earnings before tax (EBT)
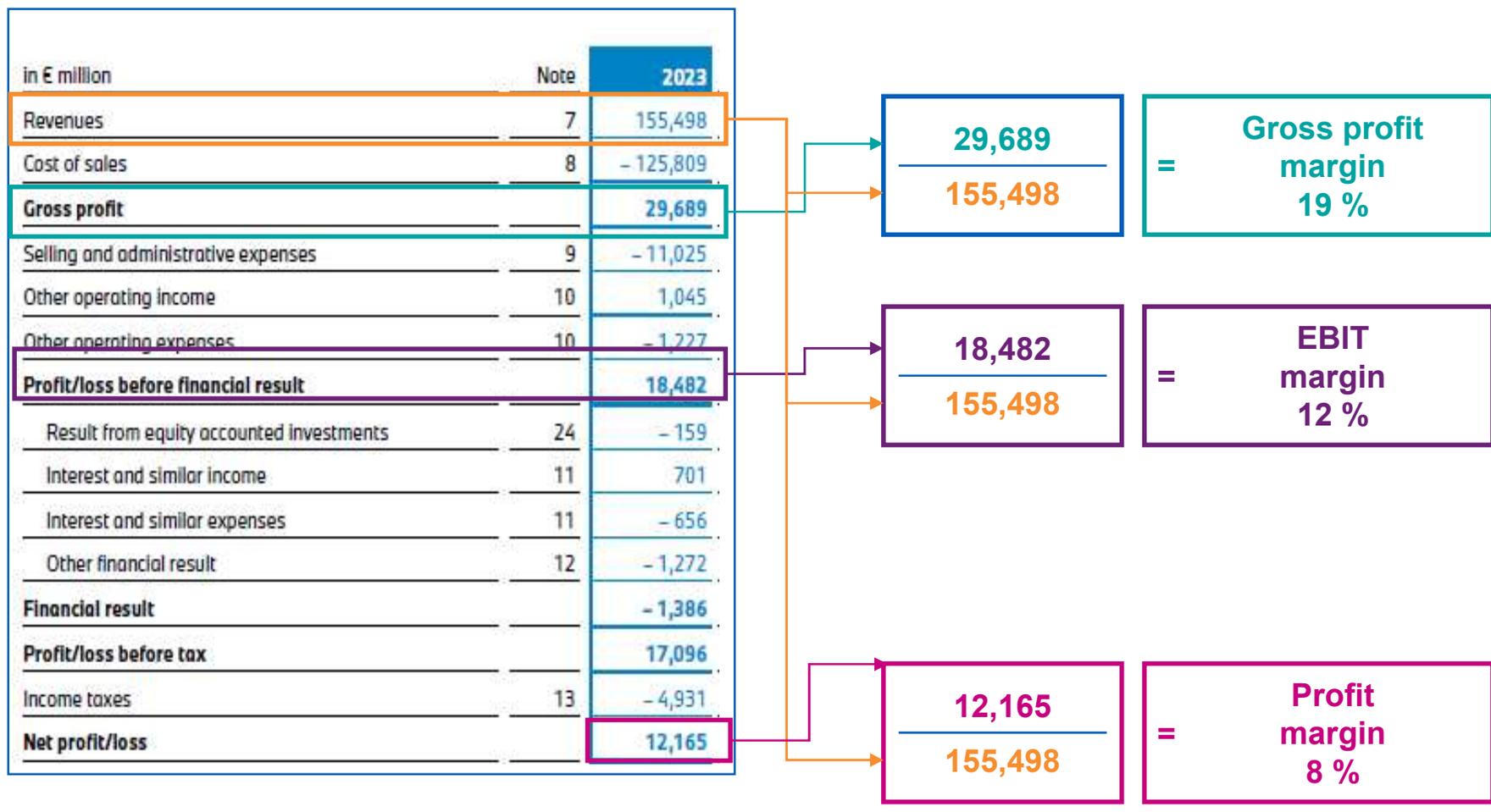
– Income taxes

= Net profit/loss (=net result)

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Key ratios: Earnings structure analysis (cost of sales method)

Measure	Definition	Interpretation
Key figures for earnings structure analysis (cost of sales method)		
Production cost ratio	$$\frac{\text{Cost of sales}}{\text{Revenues}}$$	Share of manufacturing costs in revenues
Selling and distribution cost ratio	$$\frac{\text{Selling and distribution expenses}}{\text{Revenues}}$$	Measure of the importance of selling and distribution in generating sales
Administrative cost ratio	$$\frac{\text{Administrative expenses}}{\text{Revenues}}$$	Measure of the importance of general administrative in generating sales
Research cost ratio	$$\frac{\text{Research expenses}}{\text{Revenues}}$$	Measure of the importance of research in generating revenue.

Key ratios (cost of sales method) BMW Group

in € million	Note	2023
Revenues	7	155,498
Cost of sales	8	– 125,809
Gross profit		**29,689**
Selling and administrative expenses	9	– 11,025
Other operating income	10	1,045
Other operating expenses	10	– 1,227
Profit/loss before financial result		**18,482**
Result from equity accounted investments	24	– 159
Interest and similar income	11	701
Interest and similar expenses	11	– 656
Other financial result	12	– 1,272
Financial result		**– 1,386**
Profit/loss before tax		**17,096**
Income taxes	13	– 4,931
Net profit/loss		**12,165**

155,498

**Production cost ratio
81 %**

**Selling and distribution
6,091**

**Ratio
4 %**

**Administrative
4,934**

**Ratio
3 %**

Research expenses not explicitly shown on the face of the BMW statement of profit or loss! > notes

Source: BMW Group Annual Report 2023

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BMW Group vs Daimler Group

(in %)	2019	2022	2023	2024
Production cost ratio	83%	83%	81%	**84%**
Selling and distribution cost ratio	5%	4%	4%	**4%**
Administrative cost ratio	4%	3%	3%	**4%**

(in %)	2019	2022	2023	2024
Production cost ratio	83%	77%	77%	**80%**
Selling and distribution cost ratio	7%	6%	7%	**7%**
Administrative cost ratio	2%	2%	2%	**2%**

Overview

Financial Statement (F/S) Analysis

1	**Basics of F/S Analysis**
2	**Financial-based analysis**
3	**Performance-based analysis**

Earnings Analysis	**Profitability analysis**	**Key figures systems**

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Overview

Profitability analysis

Key profitability margins
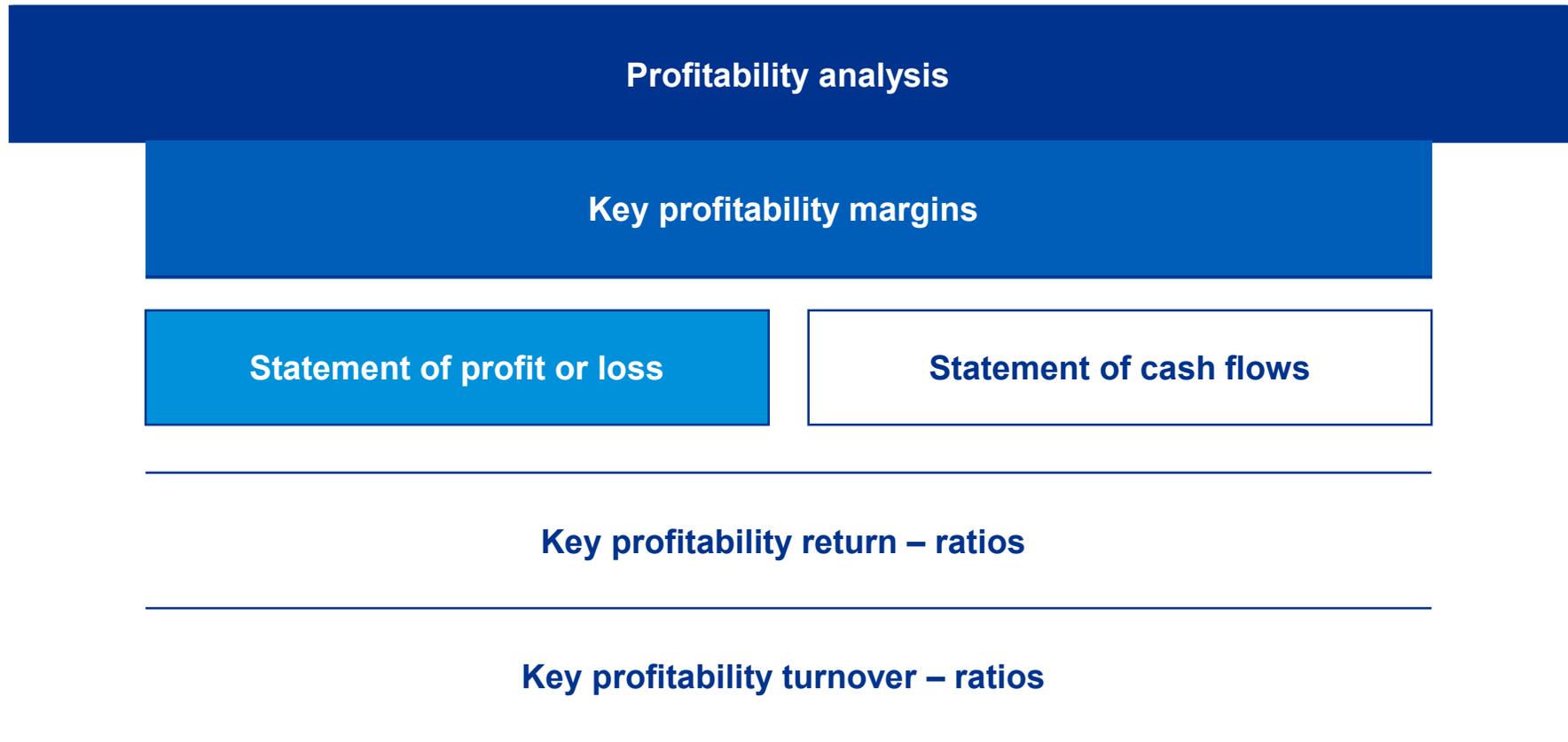
Statement of profit or loss	Statement of cash flows

Key profitability return – ratios

Key profitability turnover – ratios

Structure of the statement of profit or loss: Cost of sales method
(simplified)

Revenues

– Cost of sales

= Gross profit

– Selling and distribution expenses

– Administrative expenses

– Research expenses

+ Other operating income

– Other operating expenses

= Operating result (=EBIT in a broader sense)

± Financial result

= Earnings before tax (EBT)

– Income taxes

= Net profit/loss (=net result)

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Key ratios: Profitability analysis (cost of sales method)

Measure	Definition	Interpretation
Key figures for profitability analysis (cost of sales method)		
Gross profit margin	$\dfrac{\text{Gross profit}}{\text{Revenues}}$	Percentage of the profit contribution of products/services sold. The growth of this indicator shows how a company`s procurement prices have changed. It also offers information on the possible latitude available for price cuts if competition becomes more intense.
Operating profit margin (=EBIT margin)	$\dfrac{\text{EBIT}}{\text{Revenues}}$	Contribution to earnings from operating activities before considering the financial performance. This indicator provides information on a company`s earnings power. The higher the EBIT margin, the stronger the impact of a change in sales will be on earnings. It no positive EBIT margins are generated over a longer period, then in the case of established companies, the business model must be questioned. The EBIT margin is suitable for use as a relative indicator in international, cross-industry comparisons of companies. When considered over time, this indicator provides information on whether a company has been able to increase its earnings power.
Profit margin (=Return on Revenues/Sales)	$\dfrac{\text{Net profit}}{\text{Revenues}}$	This indicator is a meaningful figure, within a company when comparing individual group units, to assess which unit was able to generate which return. This allows a differentiation to be made between profitable and non-profitable business units. However, profits are highly subject to fluctuations, which means that the EBIT margin is more meaningful than the return on sales.

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Key ratios BMW Group: Profitability analysis on group level

in € million	Note	2023
Revenues	7	155,498
Cost of sales	8	– 125,809
Gross profit		**29,689**
Selling and administrative expenses	9	– 11,025
Other operating income	10	1,045
Other operating expenses	10	– 1,227
Profit/loss before financial result		**18,482**
Result from equity accounted investments	24	– 159
Interest and similar income	11	701
Interest and similar expenses	11	– 656
Other financial result	12	– 1,272
Financial result		**– 1,386**
Profit/loss before tax		**17,096**
Income taxes	13	– 4,931
Net profit/loss		**12,165**

$$\frac{29,689}{155,498} = \text{Gross profit margin } 19\,\%$$

$$\frac{18,482}{155,498} = \text{EBIT margin } 12\,\%$$

$$\frac{12,165}{155,498} = \text{Profit margin } 8\,\%$$

Source: BMW Group Annual Report 2023

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Key ratios BMW Group: Profitability analysis with time-comparison

	BMW Group 2022 Mio. EUR	ratio %	BMW Group 2023 Mio. EUR	ratio %	delta Mio. EUR	delta %
Revenue	142.610	100%	155.498	100%	12.888	9%
Cost of sales	−118.042	83%	−125.809	81%	−7.767	7%
Gross result (profit/loss) — Gross profit margin	24.568	17%	29.689	19%	5.121	21%
Selling and distribution expenses	−6.191	4%	−6.091	4%	100	−2%
Administrative expenses	−4.425	3%	−4.934	3%	−509	12%
Research and development expenses	–	–	–	–	–	–
Impairment loss on trade receivables and contract assets	–	–	–	–	–	–
Other operating income	1.377	1%	1.045	1%	−332	−24%
Other operating expenses	−1.330	1%	−1.227	1%	103	−8%
Total operating costs	−10.569	7%	−11.207	7%	−638	6%
Operating result (profit/loss) — EBIT margin (in a broader sense)	13.999	10%	18.482	12%	4.483	32%
Share of profit (=results) from investments in joint ventures and associates	−100	0%	−159	0%	−59	59%
Other investment income	8.937	6%	−1.272	1%	−10.209	−114%
Earnings before interest and taxes (EBIT) — EBIT margin	22.836	16%	17.051	11%	−5.785	−25%
Finance income (=interest and similar income)	422	0%	701	0%	279	66%
Finance expenses (=interest and similar expenses)	251	0%	−656	0%	−907	−361%
Other financial result	–	–	–	–	–	–
Financial result	673	0%	45	0%	−628	−93%
Profit / Loss before tax	23.509	16%	17.096	11%	−6.413	−27%
Income taxes	−4.927	3%	−4.931	3%	−4	0%
Profit / Loss from continuing operations	18.582	13%	12.165	8%	−6.417	−35%
Profit / Loss from discontinued operation	–	–	–	–	–	–
Profit / Loss for the period — Profit margin	18.582	13%	12.165	8%	−6.417	−35%

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Key earnings sources by segments BMW Group

in € million	Note	Group 2023	Group 2022	Automotive (unaudited supplementary information) 2023	Automotive 2022	Motorcycles (unaudited supplementary information) 2023	Motorcycles 2022	Financial Services (unaudited supplementary information) 2023	Financial Services 2022	Other Entities (unaudited supplementary information) 2023	Other Entities 2022	Eliminations (unaudited supplementary information) 2023	Eliminations 2022
Revenues	7	155,498	142,610	132,277	123,602	3,214	3,176	36,227	35,122	11	8	– 16,231	– 19,298
Cost of sales	8	– 125,809	– 118,042	– 109,920	– 104,324	– 2,656	– 2,628	– 31,548	– 30,437	–	–	18,315	19,347
Gross profit		29,689	24,568	22,357	19,278	558	548	4,679	4,685	11	8	2,084	49
Selling and administrative expenses	9	– 11,025	– 10,616	– 9,195	– 8,801	– 303	– 296	– 1,559	– 1,543	– 34	– 33	66	57
Other operating income	10	1,045	1,377	967	1,230	6	6	63	121	13	14	– 4	6
Other operating expenses	10	– 1,227	– 1,330	– 1,148	– 1,072	– 2	– 1	– 128	– 100	– 3	– 192	54	35
Profit/loss before financial result		18,482	13,999	12,981	10,635	259	257	3,055	3,163	– 13	– 203	2,200	147
Result from equity accounted investments	24	– 159	– 100	– 159	– 100	–	–	–	–	–	–	–	–
Interest and similar income	11	701	422	1,389	739	7	5	5	6	3,403	1,543	– 4,103	– 1,871
Interest and similar expenses	11	– 656	251	– 1,502	– 57	– 8	7	– 11	– 6	– 2,372	– 1,539	3,237	1,846
Other financial result	12	– 1,272	8,937	– 67	7,701	–	–	– 87	42	– 1,118	1,194	–	–
Financial result		– 1,386	9,510	– 339	8,283	– 1	12	– 93	42	– 87	1,198	– 866	– 25
Profit/loss before tax		17,096	23,509	12,642	18,918	258	269	2,962	3,205	– 100	995	1,334	122
Income taxes	13	– 4,931	– 4,927	– 3,685	– 3,951	– 75	– 57	– 861	– 673	29	– 209	– 339	– 37
Net profit/loss		12,165	18,582	8,957	14,967	183	212	2,101	2,532	– 71	786	995	85

Total

Key segments

Source: BMW Group Annual Report 2023

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Key ratios BMW Group: Profitability analysis on segment level 2023

Revenue contribution

! >100 %   **85 %**   **2 %**   **23 %**

in € million	Note	Group 2023	Group 2022	Automotive (unaudited supplementary information) 2023	Automotive 2022	Motorcycles (unaudited supplementary information) 2023	Motorcycles 2022	Financial Services (unaudited supplementary information) 2023	Financial Services 2022	Other Entities (unaudited supplementary information) 2023	Other Entities 2022	Eliminations (unaudited supplementary information) 2023	Eliminations 2022
Revenues		155,498	142,610	132,277	123,602	3,214	3,176	36,227	35,122	11	8	– 16,231	– 19,298
Cost of sales		– 125,809	– 118,042	– 109,920	– 104,324	– 2,656	– 2,628	– 31,548	– 30,437	–	–	18,315	19,347
Gross profit		**29,689**	4,568	**22,357**	9,278	558	548	4,679	,685	11	8	2,084	49
Selling and administrative expenses		– 11,025	– 10,616	– 9,195	– 8,801	– 303	– 296	– 1,559	– 1,543	– 34	– 33	66	57
Other operating income		1,045	1,377	967	1,230	6	6	63	121	13	14	– 4	6
Other operating expenses		– 1,227	– 1,330	– 1,148	– 1,072	– 2	– 1	– 128	– 100	– 3	– 192	54	35
Profit/loss before financial result		**18,482**	13,999	12,981	10,635	259	257	3,055	3,163	– 13	– 203	2,200	147
Result from equity accounted investments	2	159	– 100	– 159	– 100	–	–	–	–	–	–	–	–
Interest and similar income	1	781	422	1,78	739	7	5	5	6	3,403	1,543	– 4,103	– 1,871
Interest and similar expenses	1	– 656	251	– 8	– 57		7		– 6	– 2,372	– 1,539	3,237	1,846
Other financial result	1	– 1,272	8,937	– 67				– 87	42	– 1,118	1,194	–	–
Financial result		**– 1,386**	9,510	– 339				– 93	42	– 87	1,198	– 866	– 25
Profit/loss before tax		**17,096**	23,509	12,642	18,918	258	269	2,962	3,205	– 100	995	1,334	122
Income taxes	13	– 4,931	– 4,927	– 3,685	– 3,951	– 75	– 57	– 861	– 673	29	– 209	– 339	– 37
Net profit/loss		**12,165**	18,582	8,957	14,967	183	212	2,101	2,532	– 71	786	995	85

Gross profit margin — 19%, 17%, 17%, 13%

EBIT margin — 11%, 10%, 8%, 8%

Profit margin — 8%, 7%, 6%, 6%

70 %   **1 %**   **17 %**

EBIT contribution

74 %   **2 %**   **17 %**

Profit contribution

Difference to 100% = other segment & eliminations

Source: BMW Group Annual Report 2023

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Key ratios BMW Group: Profitability analysis on segment level 2019

Revenue contribution

! >100 %   88 %   2 %   28 %

Income Statement for Group and Segment → 63	Note	Group		Automotive (unaudited supplementary information)		Motorcycles (unaudited supplementary information)		Financial Services (unaudited supplementary information)		Other Entities (unaudited supplementary information)		Eliminations (unaudited supplementary information)	
in € million		2019	2018¹	2019	2018	2019	2018	2019	2018¹	2019	2018	2019	2018
Revenues	7	104,210	96,855	91,682	85,846	2,368	2,173	29,598	27,705	5	6	−19,443	−18,875
Cost of sales	8	−86,147	−78,477	−78,062	−71,918	−1,911	−1,738	−25,938	−24,089	–	–	19,764	19,268
Gross profit		18,063	18,378	13,620	13,928	457	435	3,660	3,616	5	6	321	393
Selling and administrative expenses	9	−9,367	−9,568	−7,762	−7,880	−264	−262	−1,341	−1,362	−24	−79	24	16
Other operating income	10	1,031	774	976	810	2		73	42	173	126	−193	−208
Other operating expenses	10	−2,316	−661	−2,335	−675	−1	–	−80	−124	−125	−80	225	230
Profit / loss before financial result		7,411	8,923	4,499	6,183	194	173	2,312	2,172	29	−27	377	431
Result from equity accounted investments	24	136	632	136	632	–		–	–	–	–	–	–
Interest and similar income	11	179	397	420	567	1		4	12	1,515	1,178	−1,761	−1,360
Interest and similar expenses	11	−499	−386	−737	−538	−8	–	−7	−14	−1,419	−1,145	1,672	1,312
Other financial result	12	−109	51		129			−27	−221	−51			
Financial result		−293	694	−3				−40	−29	−125	−18	−89	−48
Profit / loss before tax		7,118	9,617	4,46				2,272	2,143	−96	−45	288	383
Income taxes	13	−2,140	−2,530	−1,354	−1,858	−56	−49	−672	−502	29	−36	−87	−94
Profit / loss from continuing operations		4,978	7,097	3,113	5,121	131	124	1,600	1,641	−67	−81	201	289
Profit / loss from discontinued operations		44	−33	44	−33	–		–	–	–	–	–	–
Net profit / loss		5,022	7,064	3,157	5,091	131	124	1,600	1,641	−67	−81	201	289

Gross profit margin: 17%   14%   19%   12%

EBIT margin: 7%   5%   8%   8%

EBIT contribution: 61 %   3 %   31 %

Profit margin: 5%   3%   6%   6%

Profit contribution: 63 %   3 %   32 %

Difference to 100% = other segment & eliminations

Source: BMW Group Annual Report 2019

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Segment Key Figures

Revenues (Sales) contribution ratio $=$ $\dfrac{\text{Segment revenues}}{\text{Revenues of the group}}$

EBIT contribution ratio $=$ $\dfrac{\text{Segment EBIT}}{\text{EBIT of the group}}$

Profit contribution ratio $=$ $\dfrac{\text{Segment profit}}{\text{Profit of the group}}$

BMW Group vs Daimler Group

(in %)	2019	2022	2023	2024
Gross profit margin	17%	17%	19%	**16%**
EBIT margin	7%	16%	11%	**8%**
Profit margin	5%	13%	8%	**5%**

(in %)	2019	2022	2023	2024
Gross profit margin	17%	23%	23%	**20%**
EBIT margin	3%	13%	13%	**9%**
Profit margin	2%	10%	10%	**7%**

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Overview

Profitability analysis

Key profitability margin – ratios

Income Statement	Cash flow statement

Key profitability return – ratios

Key profitability turnover – ratios

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(Simplified) Structure of the statement of cash flows

Net profit/loss for the period

\+ Depreciation/amortization (- reversals)

\+ Increase (- decrease) provisions

– Increase (+ decrease) in working capital

= Net cash flow from operating activities (net cash flow, operating cash flow) [1]

– Payments for investments

\+ Proceeds from divestments

= Net cash flow used in investing activities (investment cash flow) [2]

= Net cash after investment (free cash flow) [1 + 2]

\+ Increase (-reduction) of paid-in equity

\+ Increase in financial debt

– Payouts for dividends and profit transfers

– Disbursements for repayment of financial debts

= Net cash flow from financing activities (financing cash flow) [3]

= Net change in cash and cash equivalents [1 + 2 + 3]

Key ratios: Profitability analysis (with the statement of cash flows)

Measure	Definition	Interpretation
Key figures for profitability analysis		
Cash flow margin	$$\frac{\text{Net cash from operating activities (=net cash flow)}}{\text{Revenues}}$$	The cash flow margin is also known as cash flow profitability. It is an indicator, what percentage of total sales is available for investments, credit redemption or dividend payments. It is also meaningful for assessing the company`s earnings and financing power, as cash flow is less manipulated than EBIT for example. Therefore, a decreasing EBIT margin over time due to increased depreciation and amortization can be put into perspective when comparing it to the cash flow margin.

Overview

Profitability analysis

Key profitability margin – ratios

Income Statement	Cash flow statement

Key profitability return – ratios

Key profitability turnover – ratios

Approaches to profitability analysis by return ratios

Addressees / Valuation approach	Shareholder	Investor
Carrying amount (Accounting-oriented profitability analysis)	I. Return on equity (RoE)	II. Return on total capital = Return on investment (RoI)
Fair value (Market-oriented profitability analysis)	III. Return to shareholder (RtS)	IV. Market value multiples

Approaches to profitability analysis by return ratios

Addressees / Valuation approach	Shareholder	Investor
Carrying amount (Accounting-oriented profitability analysis)	I. Return on equity (RoE)	II. Return on total capital = Return on investment (RoI)
Fair value (Market-oriented profitability analysis)	III. Return to shareholder (RtS)	IV. Market value multiples

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Key ratios: Accounting-oriented profitability analysis (shareholder perspective)

Measure	Definition	Interpretation
Key figures for (accounting orientated) profitability analysis (shareholder perspective)		
Return on Equity (RoE)	$$\frac{\text{Net profit}^{a)}}{\varnothing\ \text{Equity}^{b)}}$$	Measures how much income is earned for the shareholders on their invested capital. A company's target must be to generate a return that corresponds to the interest rate on the capital markets plus an industry-dependent risk premium (in generally 5 – 10 %). Given constant profits, the return on equity increases the lower the level of equity employed is (leverage effect!)
Return on assets (RoA)	$$\frac{\text{Net profit}^{a)}}{\text{Total}\ \varnothing\ \text{assets}}$$	Measures how profitably a firm uses its assets. Alternative numerators: EBT, EBIT, EBITDA).

a) Theoretically correct is the term: net result, as this comprises net profit or net loss; however in practice net profit is used assuming that companies normally have a profit as a result of its activities. Therefore, in the lecture the term net profit is used.

b) In practice, the average values (=(value at the end of the period + value at the beginning of the period)/2) is taken to correspond to the period-of-time figure. For reasons of simplifications, in the lecture the point-of-time value at the end of the period is used.

Key ratios: Accounting-oriented profitability analysis (investor perspective)

Measure	Definition	Interpretation
Key figures for (accounting orientated) profitability analysis (investor perspective)		
Return on Investment (RoI)	$$\frac{EBIT}{Total\ \emptyset\ capital^{a)}}$$	Interest on the total capital used. This indicator is generally used as a starting point for all further analyses using profitability indicators.
Return on Capital employed (RoCE)	$$\frac{EBIT^{b)}}{\emptyset\ Capital\ employed}$$ **Common definition for Capital employed:** Simplified: Total assets ./. Current liabilities Alternative: Fixed assets, necessary for operations + working capital)	Measures how much a firm earns on long term external financing. However, the problem with RoCE is that the indicator is based on residual book values. This means that the returns would always increase over time, even if the company made no further investments.

a) In practice, the average values (=(value at the end of the period + value at the beginning of the period)/2) is taken to correspond to the period-of-time figure. For reasons of simplifications, in the lecture the point-of-time value at the end of the period is used.

b) In practice, also net profit is taken instead of EBIT

Key ratios BMW Group: RoI and RoE

BMW Group Condensed Income Statement

in € million	2023
Revenues	155,498
Cost of sales	– 125,809
Gross profit	29,689
Selling and administrative expenses	– 11,025
Other operating income and expenses	– 182
Profit before financial result	18,482
Financial result	– 1,386
Profit before tax	17,096
Income taxes	– 4,931
Net profit	12,165

Note *) : The calculation is based on the figures faced on the Income Statement; not on the calculation according to the adjusteted figures for analysis (see the following slide)

RoE 13,1 %

RoI*) 7,4 %

in € million	2023
EQUITY AND LIABILITIES	
Subscribed capital	639
Capital reserves	2,456
Revenue reserves	89,072
Accumulated other equity	– 2,071
Treasury shares	– 500
Equity attributable to shareholders of BMW AG	89,596
Non-controlling interests	3,327
Equity	92,923
Pension provisions	427
Other provisions	7,797
Deferred tax	2,797
Financial liabilities	52,880
Other liabilities	7,065
Non-current provisions and liabilities	70,966
Other provisions	9,240
Current tax	1,401
Financial liabilities	42,130
Trade payables	15,547
Other liabilities	18,683
Current provisions and liabilities	87,001
Total equity and liabilities	250,890

Source: BMW Group Annual Report 2023

Key ratios: IFRS (diluted) earnings per share

Measure	Definition	Interpretation
Key figures for (accounting orientated) profitability analysis (shareholder perspective)		
(Basic) Earnings per Share (EPS)	$\dfrac{\text{Net profit} - \text{preferred dividends}}{\text{Weighted average of total common shares outstanding}}$	This indicator is used most often to describe a company`s performance over time and is one of the basics of company valuation. The calculation depends on the regulation in the accounting standards (IFRS, US-GAAP)
(Diluted) Earnings per Share (EPS)	$\dfrac{\text{Net profit} - \text{preferred dividends} + \text{Interest expenses for convertible bonds(t-1)}}{\text{Weighted average of total common shares outstanding} + \text{converted shares}}$	This indicator takes into consideration the potential impact of corporate actions (e.g. capital increases) and/or stock option plans. As soon as stock options or convertible bonds are converted into stocks, the number of total shares outstanding rises, which results in a negative impact on earnings per share, diluted.

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Disclosures to Earnings per share in the notes

		2023	2022
Net profit attributable to the shareholders of BMW AG	€ million	11,290.3	17,941.0
Profit attributable to common stock	€ million	10,250.3	16,327.7
Profit attributable to preferred stock	€ million	1,040.0	1,613.3
Average number of common stock shares in circulation	number	579,941,360	597,924,318
Average number of preferred stock shares in circulation	number	58,776,197	59,035,325
Basic/diluted earnings per share of common stock	€	17.67	27.31
Basic/diluted earnings per share of preferred stock	€	17.69	27.33
Dividend per share of common stock	€	6.00*	8.50
Dividend per share of preferred stock	€	6.02*	8.52

* Proposal by the Board of Management.

on the face of the statement of profit of loss

▼ ▼

Explanation of the calculation of the Earnings per share – rations in the notes

BMW Group vs Daimler Group

(in % / in €)	2019	2022	2023	2024
Return on Equity	8,4%	20,4%	13,1%	**8,1%**
Return on Investment	3,3%	9,2%	6,8%	**4,1%**
Basic earning per share (in €)	7,47	27,31	17,67	**11,62**

(in %)	2019	2022	2023	2024
Return on Equity	4,3%	17,1%	15,7%	**11,1%**
Return on Investment	1,5%	7,7%	7,4%	**5,1%**
Basic earning per share (in €)	2,22	13,55	13,46	**10,19**

Approaches to profitability analysis by return ratios

Addressees Valuation approach	Shareholder	Investor
Carrying amount (Accounting-oriented profitability analysis)	I. Return on equity (RoE)	II. Return on total capital = Return on investment (RoI)
Fair value (Market-oriented profitability analysis)	III. Return to shareholder (RtS)	IV. Market value multiples

Key ratios: Market-orientated profitability analysis (shareholder perspective)

Measure	Definition	Interpretation
Key figures for (market-orientated) profitability analysis (shareholder – perspective)		
Return to Shareholder (RtS)	(year-end closing price – prior year-end closing price + dividend per share) x 100 / prior year-end closing price	This indicator shows the (theoretical) return a shareholder earned in the period by dividends + change of the share price.

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Stock and capital markets key performance indicators (KPIs)

BMW AG Stock

	2023	2022	2021	2020	2019
COMMON STOCK					
Number of issued shares in 1,000	579,796	601,995	601,995	601,995	601,995
Shares bought back as of reporting date in 1,000	4,218	15,312	–	–	–
Stock exchange price in €[1]					
Year-end closing price	100.78	83.38	88.49	72.23	73.14
High	112.90	99.32	95.89	76.68	77.75
Low	85.80	69.13	68.34	37.66	58.70
PREFERRED STOCK					
Number of issued shares in 1,000	58,920	60,844	59,404	57,689	56,867
Shares bought back as of reporting date in 1,000	943	1,449	–	–	–
Stock exchange price in €[1]					
Year-end closing price	89.95	79.55	73.30	55.20	55.05
High	105.00	85.20	82.00	57.60	67.85
Low	80.15	58.85	51.60	32.50	47.54
KEY DATA PER SHARE IN €					
Dividend					
Common stock	6.00[1]	8.50	5.80	1.90	2.50
Preferred stock	6.02[2]	8.52	5.82	1.92	2.50
Earnings per share of common stock[3]	17.67	27.31	18.77	5.73	7.47
Earnings per share of preferred stock[4]	17.69	27.33	18.79	5.75	7.49
Free cash flow Automotive segment[5]	10.96	17.14	9.61	5.15	3.90
Equity[5,6]	141.42	134.85	113.60	93.26	90.92

Profit distribution to shareholders

Try to find out! Solution in the lecture

= 28,1 % Return to shareholder

In accordance with IFRS

Stock and capital markets key performance indicators (KPIs)

BMW AG Stock

	2023	2022	2021	2020	2019
COMMON STOCK					
Number of issued shares in 1,000	579,796	601,995	601,995	601,995	601,995
Shares bought back as of reporting date in 1,000	4,218	15,312	–	–	–
Stock exchange price in €[1]					
Year-end closing price	100.78	83.38	88.49	72.23	73.14
High	112.90	99.32	95.89	76.68	77.75
Low	85.80	69.13	68.34	37.66	58.70
PREFERRED STOCK					
Number of issued shares in 1,000	58,920	60,844	59,404	57,689	56,867
Shares bought back as of reporting date in 1,000	943	1,449	–	–	–
Stock exchange price in €[1]					
Year-end closing price	89.95	79.55	73.30	55.20	55.05
High	105.00	85.20	82.00	57.60	67.85
Low	80.15	58.85	51.60	32.50	47.54
KEY DATA PER SHARE IN €					
Dividend					
Common stock	6.00[2]	8.50	5.80	1.90	2.50
Preferred stock	6.02[2]	8.52	5.82	1.92	2.50
Earnings per share of common stock[3]	17.67	27.31	18.77	5.73	7.47
Earnings per share of preferred stock[4]	17.69	27.33	18.79	5.75	7.49
Free cash flow Automotive segment[5]	10.96	17.14	9.61	5.15	3.90
Equity[5,6]	141.42	134.85	113.60	93.26	90.92

31.12.2023 31.12.2022

$$\frac{100{,}78 - 83{,}38 \ + 6{,}00}{83{,}38}$$

**x 100
= 28,1%
Return
to shareholder**

In accordance with IFRS

Profit distribution to shareholders

BMW Group vs Daimler Group

(in % / multiple)	2019	2022	2023	2024
Return to Shareholder	7,0%	27,2%	20,7%	**-0,1%**
Market - to - book ratio (multiple)	0,7	0,5	0,6	**0,5**
Price earnings ratio (year-end)	9,8	3,1	5,7	**6,8**

(in % / multiple)	2019	2022	2023	2024
Return to Shareholder	9,5%	26,6%	0,4%	**-5,4%**
Market - to - book ratio (multiple)	0,8	0,8	0,7	**0,6**
Price earnings ratio (year-end)	22,2	4,5	4,6	**5,3**

Approaches to profitability analysis by return ratios

Addressees / Valuation approach	Shareholder	Investor
Carrying amount (Accounting-oriented profitability analysis)	I. Return on equity (RoE)	II. Return on total capital = Return on investment (RoI)
Fair value (Market-oriented profitability analysis)	III. Return to shareholder (RtS)	IV. Market value multiples

Key ratios: Market-orientated profitability analysis (investor perspective)

Market value multiples

Net valuation	Gross valuation

	Earnings-oriented	**Cash flow-oriented**

$$\frac{\text{Market value of equity}}{\text{EBT}}$$

$$\frac{\text{Market value of the entity}}{\text{EBIT}}$$

$$\frac{\text{Market value of the entity}}{\text{EBITDA}}$$

Market value of equity = Price per share * Number of common shares outstanding
Market value of entity = Market value of equity + Net financial debt

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Overview

Profitability analysis

Key profitability margin – ratios

Income Statement	Cash flow statement

Key profitability return – ratios

Key profitability turnover – ratios

Turnover - ratios and Runtime - ratios

$$\text{Turnover-ratio} = \frac{\text{Period - of – time figure}}{\text{(Averaged) period – of – point figure}}$$

$$\text{Turnover-ratio} = \frac{\text{Income statement figure}}{\text{(averaged) balance sheet figure}}$$

Have in mind: Runtime-ratios/Outstanding – Ratios are the counterpart of turnover – ratio

$$\text{Runtime – ratio (Outstanding – ratio)} = \frac{1}{\text{Turnover – ratio}}$$

$$\text{Runtime – ratio (Outstanding – ratio)} = \frac{365}{\text{Turnover – ratio}}$$

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Key ratios: Turnover

Measure	Definition	Interpretation
Key figures for the analysis of the profitability – turnover ratios		
Inventory turnover	$$\frac{\text{Cost of sales}}{\varnothing \text{ inventories}^{*)}}$$	The ratio provides information on the speed at which inventories are sold and provides observers with an indicator which can be used to calculate the company`s performance.
Receivables turnover	$$\frac{\text{Revenues}}{\varnothing \text{ trade receivables}}$$	The lower the indicator, the greater the danger for the company that, if a customer becomes unable to make payment, the company itself will run into liquidity problems. When analyzing this indicator, one must also consider the number of debtors over which the receivables are distributed on average. If the ratio is too low, this can generally be optimized by active credit control.
Payables turnover	$$\frac{\text{Cost of sales x (1+VAT)}}{\varnothing \text{ trade payables}^{*)}}$$	This ratio shows the company`s payment practices in the period under review. A reduction over a specific period can mean that the company's ability to make payment is deteriorating and that it is tending to pay liabilities at an increasingly later date. However, a reduction can also represent a positive development if the company is making increasing use of payment targets and thus means more profitable use of its own liquidity.

*) In practice, the average values (=(value at the end of the period + value at the beginning of the period)/2) is taken to correspond to the period-of-time figure. For reasons of simplifications, in the lecture the point-of-time value at the end of the period is used.

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Key ratios: Runtime

Measure	Definition	Interpretation
Key figures for the analysis of the profitability – runtime ratios		
Day inventory outstanding	$$\frac{\emptyset \text{ inventories}^{*)} \times 365}{\text{Cost of sales}}$$	This ratio shows how many days a company needs to sell the inventories it has bought in.
Days sales outstanding	$$\frac{\emptyset \text{ trade receivables}^{*)} \times 365}{\text{Revenues}}$$	It shows the average number of days it takes for a receivable to be paid (customer target). The longer this period, the worse for the company, as the debtor is granted a interest-free loan for this period. An increase in this ratio can also be due to large sales being booked just before the end of the year or customers delaying payment to the upcoming fiscal year.
Days payables outstanding	$$\frac{\emptyset \text{ trade payables}^{*)} \times 365}{\text{Cost of sales} \times (1+\text{VAT})}$$	The ratio shows the average number of days needed for trade liabilities to be paid by the company. A long turnover period at first improves the company's liquidity. On the other hand, if a company does not have professional cash management, financing by means of trade payables can become very expensive when the company does not take advantage of discounts.

*) In practice, the average values (=(value at the end of the period + value at the beginning of the period)/2) is taken to correspond to the period-of-time figure. For reasons of simplifications, in the lecture the point-of-time value at the end of the period is used.

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BMW Group vs Daimler Group

(multiple / days)	2019	2022	2023	2024
Inventory turnover (multiple)	5,4	5,9	5,3	**4,9**
Days inventory outstanding (in days)	67	62	69	**74**
Days sales outstanding (in days)	154	101	96	**106**
Days payables outstanding (in days)	36	37	38	**36**

(multiple / days)	2019	2022	2023	2024
Inventory turnover (multiple)	4,8	4,5	4,4	**4,5**
Days inventory outstanding (in days)	76	81	82	**82**
Days sales outstanding (in days)	133	110	112	**116**
Days payables outstanding (in days)	27	32	33	**30**

Overview

Financial Statement (F/S) Analysis

1	**Basics of F/S Analysis**

2	**Financial-based analysis**

3	**Performance-based analysis**

Earnings Analysis	**Profitability analysis**	**Key figures systems**

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Analysis of Return on Equity (=RoE) (shareholder perspective)

Return on Equity

$$\frac{\text{Net profit}}{\text{Equity}} \qquad \text{x} \qquad \frac{\text{Revenues}}{\text{Revenues}}$$

$$= \qquad \frac{\text{Net profit}}{\text{Revenues}} \qquad \text{x} \qquad \frac{\text{Revenues}}{\text{Equity}}$$

Profit margin **(Return on revenues/Sales)**	x	**Equity turnover**

Statement of profit or loss	**Statement of financial position**
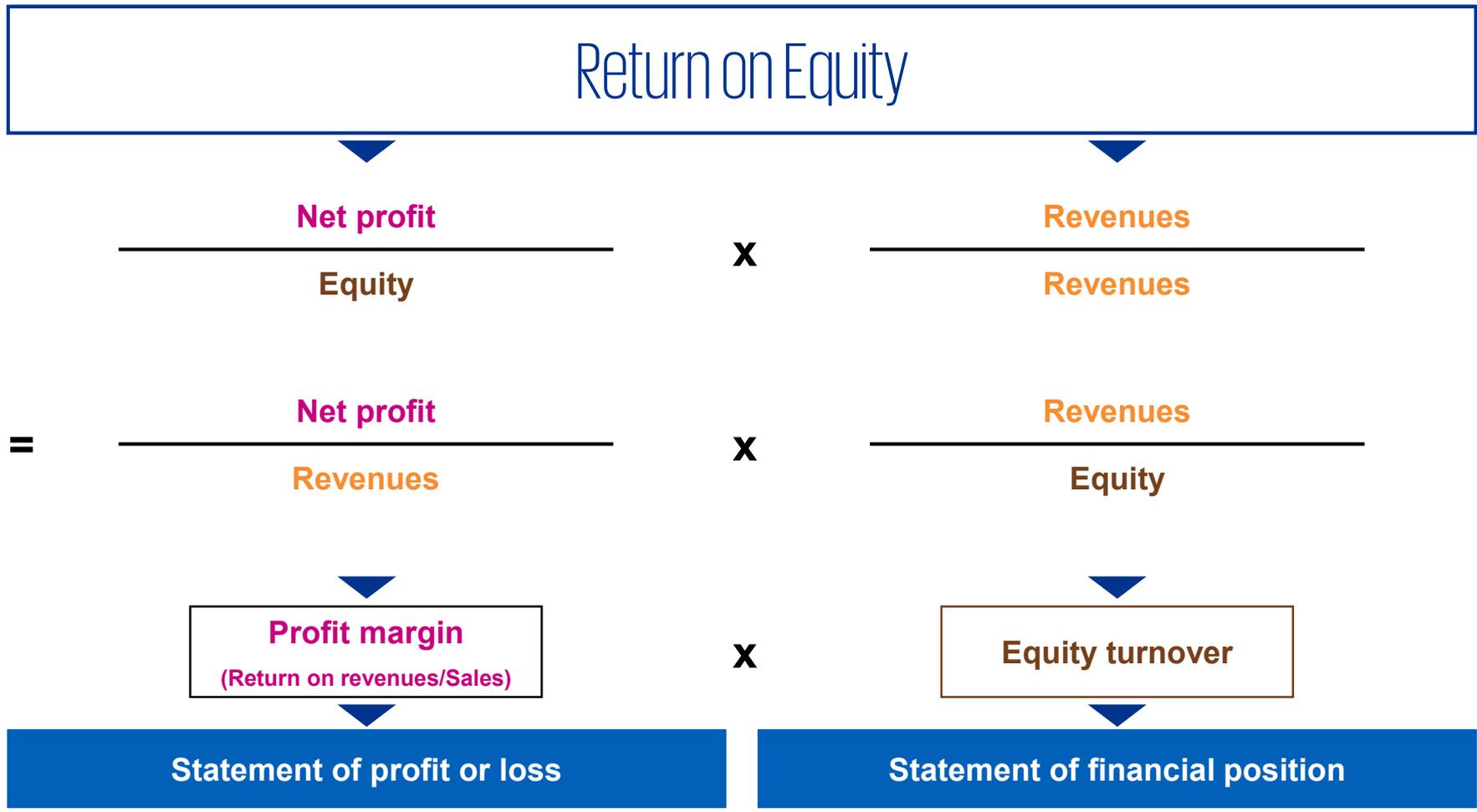
Example: Analyse of Return on Equity (=RoE) (shareholder perspective)

	A	B	C
Net profit	10 Mio.	12 Mio.	8 Mio.
Equity	50 Mio.	120 Mio.	80 Mio.
Return on Equity	20%	10%	10%
Revenues	100 Mio.	120 Mio.	160 Mio.
Return on sales (=Profit margin)	10%	10%	5%
Equity turnover	2	1	2

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Example: Analyse of Return on Equity (=RoE)
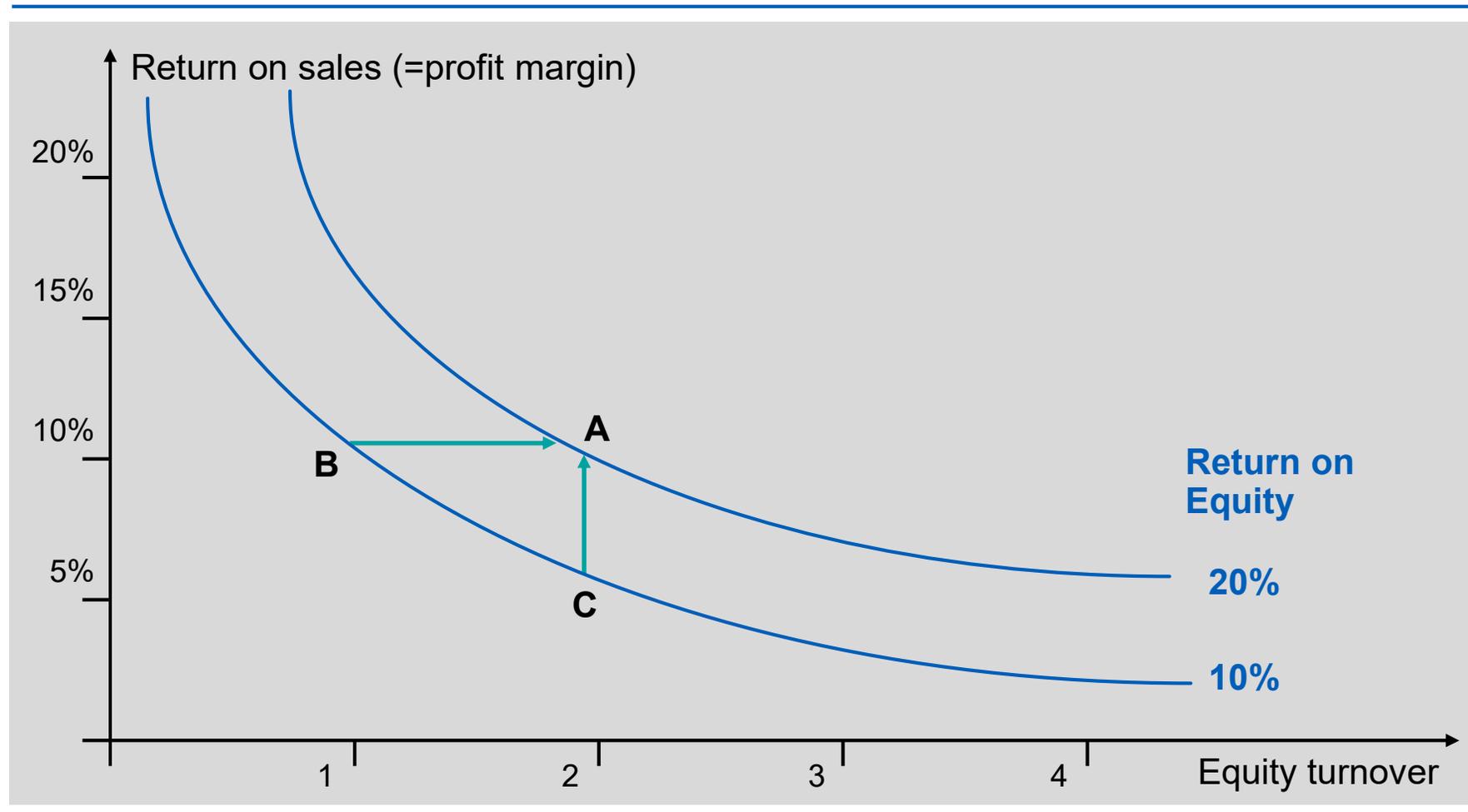
Analysis of Return on Investment (=RoI) (investor perspective)

Return on Investment
(Return on total capital)

$$= \frac{EBIT}{Total\ capital} \quad \times \quad \frac{Revenues}{Revenues}$$

$$= \frac{EBIT}{Revenues} \quad \times \quad \frac{Revenues}{Total\ capital}$$

EBIT margin	x	Capital turnover

Statement of profit or loss	**Statement of financial position**

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Key ratios: Turnover

Measure	Definition	Interpretation
Key figures for the analysis of the profitability – turnover ratios		
Capital turnover	$$\frac{\text{Revenues}}{\text{Ø Total capital}^{*)}}$$	The tact that a company turns over its assets quickly generates margin. A company with an equal return on revenues but a lower ratio of revenues to total capital would generate lower profits due to the higher fixed costs and capital lock-up costs. It is also true that the higher this ratio, the lower the amount of capital required (due to the shorter pre-financing period)
Equity turnover	$$\frac{\text{Revenues}}{\text{Ø Equity}^{*)}}$$	

*) In practice, the average values (=(value at the end of the period + value at the beginning of the period)/2) is taken to correspond to the period-of-time figure. For reasons of simplifications, in the lecture the point-of-time value at the end of the period is used.

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Analysis of Return on Investment (RoI)

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Key figure system: BMW Group
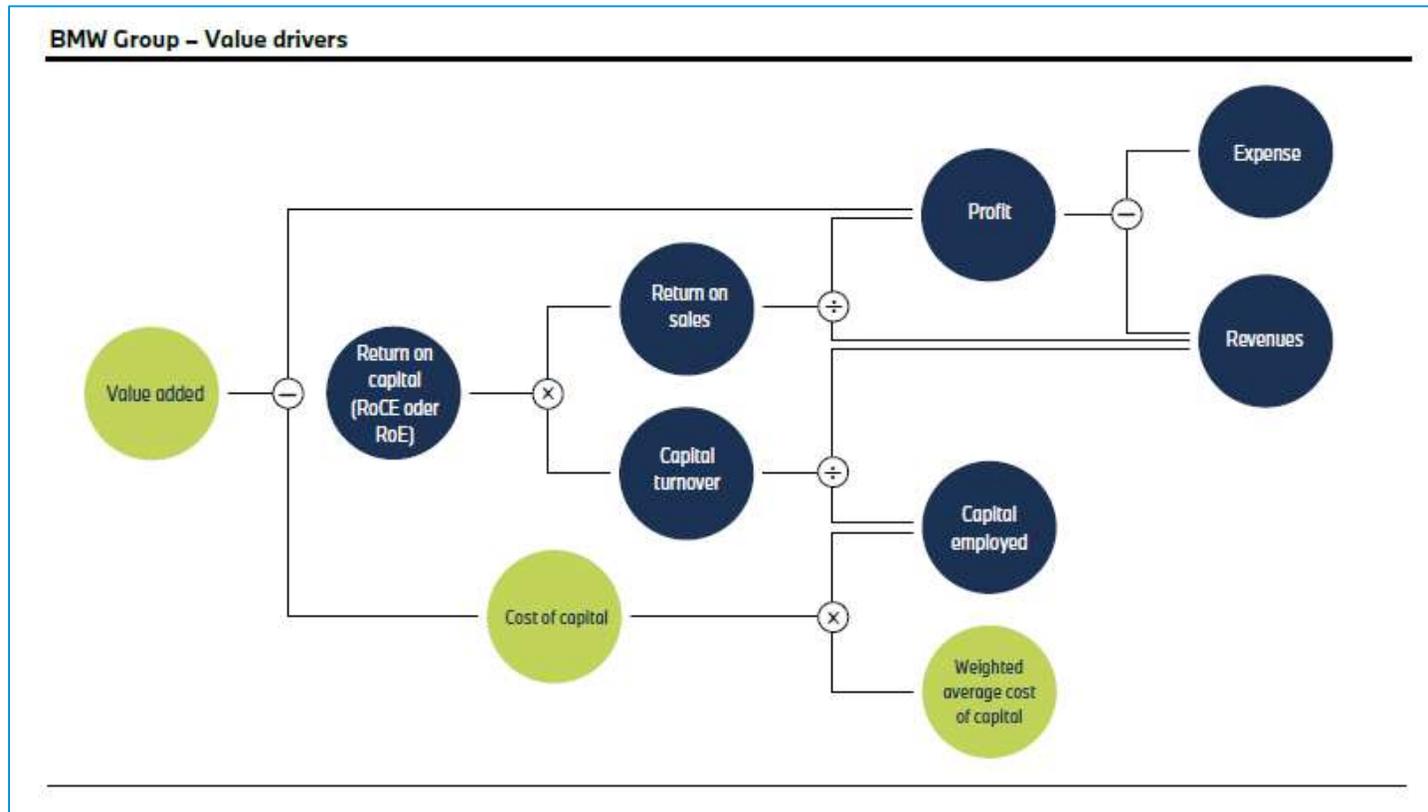
BMW Group – Value drivers

. BMW Group vs Daimler Group

(in % / multiple)	2019	2022	2023	2024
Return on Investment	3,3%	9,2%	6,8%	**4,1%**
EBIT margin	7,1%	16,0%	11,0%	**7,6%**
Capital turnover (multiple)	0,5	0,6	0,6	**0,5**

(in % / multiple)	2019	2022	2023	2024
Return on Investment	1,5%	7,7%	7,4%	**5,1%**
EBIT margin	2,6%	13,4%	12,8%	**9,4%**
Capital turnover (multiple)	0,6	0,6	0,6	**0,5**

Thank you
for listening

Prof. Dr. Bernd Grottel

Mitglied des Vorstands

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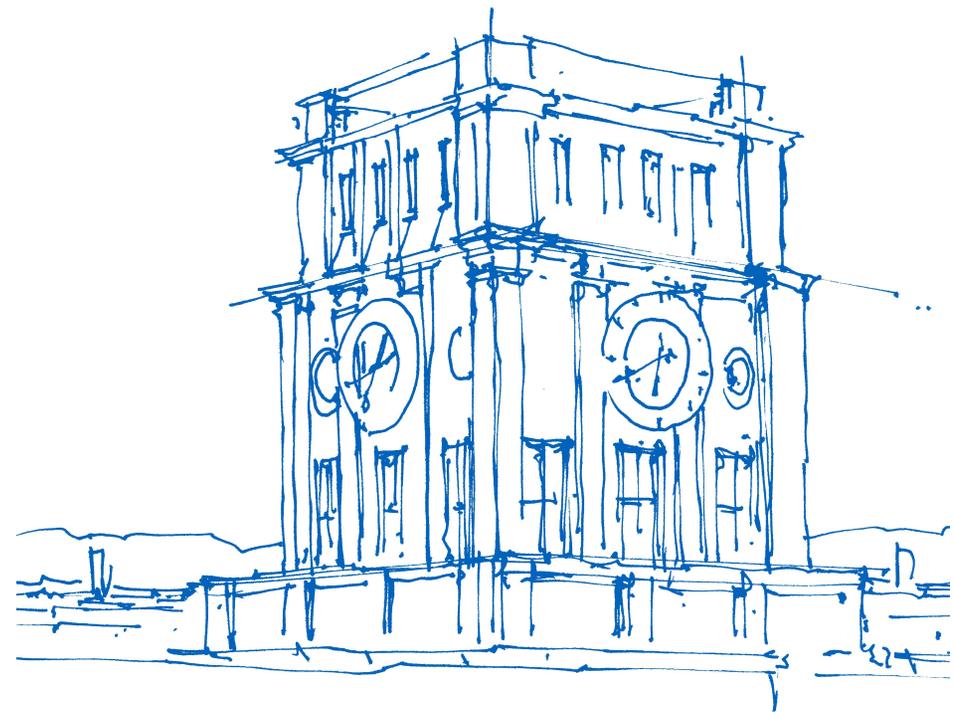
Uhrenturm der TUM

Appendix:
Key ratios relevant for exams!

Key ratios: asset structure

Measure	Definition	Interpretation
Key figures on asset structure		
Fixed asset intensity	$$\frac{\text{Fixed assets} \times 100}{\text{Total assets}}$$ Fixed asset = Intangible assets + PPE + leased assets	The higher the asset intensity, the longer financial funds are locked up and – as a rule – the higher the associated fixed costs. The smaller this ratio, the less capital is tied-up over the long term. The ratio provides information on the company`s ability to adapt to changing market conditions. When considering the asset intensity, the company`s respective industry must also be considered.
Current asset intensity	$$\frac{\text{Current assets} \times 100}{\text{Total assets}}$$	It shows the percentage of total capital which is locked-up in current assets. A high ratio is generally to be viewed positively, as current assets can be liquidated quickly. However, an extremely high ratio can indicate excessive stock levels, which push up warehousing costs. More detailed analysis of the current assets should cover the level of receivables and inventories in greater detail.
Asset structure	$$\frac{\text{Non-current assets} \times 100}{\text{Current assets}}$$	Both ratios show a company`s **stability or flexibility**, however typical asset structures in the respective industry should also be considered. A low asset structure ratio can mean two things:
Fixed asset structure	$$\frac{\text{Fixed asset} \times 100}{\text{Current assets}}$$ Fixed asset = Intangible assets + PPE + leased assets	- A low level of fixed assets allows the company to react more flexibly to changes on the market and fixed costs are lower due to shorter capital lock-up period for all assets. - A company is working with assets that have already been written off. This allows to assume that the technology used is out of date.

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Key ratios: capital structure

Measure	Definition	Interpretation
Key figures on capital structure		
Equity ratio (intensity)	$$\frac{\text{Equity x 100}}{\text{Total capital}^{*)}}$$	The more equity a company has available the better its credit-worthiness, the higher its financial stability and the more independent the company is from lenders. However, as equity is more expensive than debt, a high equity ratio, depresses the return on capital employed.
Debt (leverage) ratio (intensity)	$$\frac{\text{Total liabilities}^{*)}\text{ (Debts) x 100}}{\text{Total capital}^{*)}}$$	The debt ratio also allows assumptions to be made about a company`s financial stability. The growth of this ratio should always be considered together with the company`s assets. It these include hidden liabilities as a result of lower market values, this has a negative impact on the leverage ratio.
Leverage structure	$$\frac{\text{Current liabilities x 100}}{\text{Total liabilities}}$$	This ratio expresses what percentage of total liabilities will acutally lead to a cash outflow to external creditors on a short-term basis. Companies in danger of insolvency show an increased percentage of leverage structure that solvent companies. For an ongoing analysis the maturity and conditions of all liabilities components should be taken into account.
Debt gearing ratio (static)	$$\frac{\text{Total liabilities x 100}}{\text{equity}}$$	This ratios shows the relationship between a company`s debt and equity financing. In general, the higher the gearing ratio, the more dependent a company is on external creditors. However, the gearing ratio should never be considered alone, but always in connection with the company`s earnings position (leverage-effect!)

*) Note: Financial analysts often only use total liabilities as the sum of interest-bearing liabilities plus the capitalized value of future leasing commitments; and therefore those liabilities are included in the total capital. In the lecture, there will be no differentiation!

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Key ratios: static liquidity analysis (I)

Measure	Definition	Interpretation
Key figures for static (point-of-time) liquidity analysis (I)		
„Golden balance sheet rule" (Investment coverage)	$\dfrac{\text{Fixed assets}}{\text{Total equity}} \leq 1$	This ratio demands that the capital lock-up period does not exceed the period for which the capital has been made available, i.e. that the assets tied in to the company for the long-term are covered by long-term capital. It a company does not uphold this rule, it may become forced to sell assets in order to service current liabilities. Long-term capital can be defined exclusively by equity or in broader sense with non-current liabilities.
Asset coverage ratio (Principle of matching maturities)	$\dfrac{\text{Total equity x 100}}{\text{Fixed assets}}$	This ratio is the counterpart to the investment coverage ratio above. It answers the question of the extent to which the fixed assets, which should be available to the company over the long term, are covered by equity that remains in the company for an equally long term. The higher the ratio is, the better, as this means that parts of the current assets are also being financed long-term.
"Golden financing rule" (Principle of matching maturities)	$\dfrac{\text{Current liabilities}}{\text{Current assets}} \leq 1$	These ratios state that the terms between obtaining and repaying capital on the one hand and the use of capital on the other should be in line with each other. According to this rule, capital may not be tied up in assets for a longer period that the capital is available to the company. If a company finances a long-term investment (e.g. a machine) with short-term financing, the loan become due before the income reuiqred to repay the loan has been generated.

Fixed asset = Intangible assets + PPE

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Key ratios: static liquidity analysis (II)

Measure	Definition	Interpretation
Key figures for static (point-of-time) liquidity analysis		
Cash ratio (Liquidität 1. Grades)	$$\frac{\text{Cash and cash equivalent} * 100}{\text{Current liabilities}}$$	All ratios are often used for evaluating a company`s creditworthiness. They show the relationship between liquid assets to payment commitments. Liquid or current assets include cash and cash equivalents, marketable securities, total receivables and total inventory etc. The various ratios show the extent to which the current liabilities are covered by current assets.
Quick ratio (Liquidität 2. Grades)	$$\frac{(\text{Current assets} - \text{inventories}) \times 100}{\text{Current liabilities}}$$	As a rule of thumb, a **current ratio** of less than 100% is being regarded as threatening the company`s existence. Bankers use the **quick ratio** to determine how quickly a company can pay off its current liabilities in case assets need to be converted into cash.
Current ratio (Liquidität 3. Grades)	$$\frac{\text{Current assets} \times 100}{\text{Current liabilities}}$$	The **quick ratio** differs from the current ratio in that it excludes inventory. The logic behind this is that while inventory may have been paid for and has value, it may not necessarily be converted into cash quickly. As a rule of thumb, the quick ratio should exceed 100%, thus current liabilities are covered by the company`s cash position and its total receivables.

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Key ratios: static liquidity analysis (III)

Measure	Definition	Interpretation
Key figures for static (point-of-time) liquidity analysis		
Working Capital	Current Assets ./. Cash and cash equivalents ./. Current, non-interest-bearing liabilities	It expresses the proportion of current assets working for a company (i.e. that is generating sales), without generating capital costs in the closer sense of the word. It is thus the portion of current assets with long-term financing. The higher the working capital, the more secure the liquidity position. From an analyst´s perspective, negative working capital may be viewed positively, as suppliers pre-finance the company`s sale.
Net debt	Interest-bearing liabilities (here: loans and borrowings) ./. Cash and cash equivalents	Net debt shows the amount of a company`s debt, if all liabilities were to be repaid using liquid funds. For example, if a company`s liquid funds are greater than its actual debt, then the company is, in fact, debt-free and it exploits the positive effects on its return on equity via the leverage effect. However, one must bear in mind that a high level of cash in turn brings a low return and is thus not reasonable from the investor`s perspective. In order to be able to properly interpret net debt, this figure should be considered in connection with the cash flow (dynamic gearing).

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Key ratios: dynamic liquidity analysis (IV)

Measure	Definition	Interpretation
Key figures for dynamic (period-of-time) liquidity analysis		
Free cash flow	Operating cash flow + Investment cash flow	The free cash flow refers to the free funds available to the company. These funds describe the company`s potential value for investors and creditors and are available for reinvestment of profits, or the payment of interest or credit redemption.
Debt Gearing ratio Dynamic)	$\dfrac{\text{Net debt}}{\text{Free cash flow}}$	This ratio shows how many years a company would need to be able to repay its (net) debt from its free cash flow. It is also known as net debt service or duration of debt redemption. A factor of greater than ten or even a negative cash flow over several periods may lead to the danger of insolvency.

Key ratios: Earnings structure analysis (total cost method)

Measure	Definition	Interpretation
Key figures for earnings structure analysis (total cost method)		
Material expense ratio	$\dfrac{\text{Cost of materials}}{\text{Operating performance}}$	Knowledge of manufacturing depth and dependence on suppliers
Personnel expense ratio	$\dfrac{\text{Personnel expenses}}{\text{Operating performance}}$	Measure of the dependence of the performance of personnel costs. This ratio can also be used to review how economically labor is being employed.
Depreciation ratio	$\dfrac{\text{Depreciation and amortization}}{\text{Operating performance}}$	Measure of the wear and tear of fixed assets.

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Key ratios: Earnings structure analysis (cost of sales method)

Measure	Definition	Interpretation
Key figures for earnings structure analysis (cost of sales method)		
Production cost ratio	$$\frac{\text{Cost of sales}}{\text{Revenues}}$$	Share of manufacturing costs in revenues
Selling and distribution cost ratio	$$\frac{\text{Selling and distribution expenses}}{\text{Revenues}}$$	Measure of the importance of selling and distribution in generating sales
Administrative cost ratio	$$\frac{\text{Administrative expenses}}{\text{Revenues}}$$	Measure of the importance of general administrative in generating sales

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Key ratios: Profitability analysis (cost of sales method)

Measure	Definition	Interpretation
Key figures for profitability analysis (cost of sales method)		
Gross profit margin	$\dfrac{\text{Gross profit}}{\text{Revenues}}$	Percentage of the profit contribution of products/services sold. The growth of this indicator shows how a company's procurement prices have changed. It also offers information on the possible latitude available for price cuts if competition becomes more intense.
Operating profit margin (=EBIT margin)	$\dfrac{\text{EBIT}}{\text{Revenues}}$	Contribution to earnings from operating activities before considering the financial performance. This indicator provides information on a company's earnings power. The higher the EBIT margin, the stronger the impact of a change in sales will be on earnings. It no positive EBIT margins are generated over a longer period, then in the case of established companies, the business model must be questioned. The EBIT margin is suitable for use as a relative indicator in international, cross-industry comparisons of companies. When considered over time, this indicator provides information on whether a company has been able to increase its earnings power.
Profit margin (=Return on Revenues/Sales)	$\dfrac{\text{Net profit}}{\text{Revenues}}$	This indicator is a meaningful figure, within a company when comparing individual group units, to assess which unit was able to generate which return. This allows a differentiation to be made between profitable and non-profitable business units. However, profits are highly subject to fluctuations, which means that the EBIT margin is more meaningful than the return on sales.

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Key ratios: Accounting-oriented profitability analysis (shareholder perspective)

Measure	Definition	Interpretation
Key figures for (accounting orientated) profitability analysis (shareholder perspective)		
Return on Equity (RoE)	$\dfrac{\text{Net profit}^{a)}}{\text{Ø Equity}^{b)}}$	Measures how much income is earned for the shareholders on their invested capital. A company's target must be to generate a return that corresponds to the interest rate on the capital markets plus an industry-dependent risk premium (in generally 5 – 10 %). Given constant profits, the return on equity increases the lower the level of equity employed is (leverage effect!)

a) Theoretically correct is the term: net result, as this comprises net profit or net loss; however in practice net profit is used assuming that companies normally have a profit as a result of its activities. Therefore, in the lecture the term net profit is used.

b) In practice, the average values (=(value at the end of the period + value at the beginning of the period)/2) is taken to correspond to the period-of-time figure. For reasons of simplifications, in the lecture the point-of-time value at the end of the period is used.

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Key ratios: Accounting-oriented profitability analysis (investor perspective)

Measure	Definition	Interpretation
Key figures for (accounting orientated) profitability analysis (investor perspective)		
Return on Investment (RoI)	$$\frac{EBIT}{Total\ \varnothing\ capital^{a)}}$$	Interest on the total capital used. This indicator is generally used as a starting point for all further analyses using profitability indicators.

a) In practice, the average values (=(value at the end of the period + value at the beginning of the period)/2) is taken to correspond to the period-of-time figure. For reasons of simplifications, in the lecture the point-of-time value at the end of the period is used.

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Key ratios: Market-orientated profitability analysis (shareholder perspective)

Measure	Definition	Interpretation
Key figures for (market-orientated) profitability analysis (shareholder – perspective)		
Return to Shareholder (RtS)	$\dfrac{\text{(year-end closing price} - \text{prior year-end closing price} + \text{dividend per share)} \times 100}{\text{prior year-end closing price}}$	This indicator shows the (theoretical) return a shareholder earned in the period by dividends + change of the share price.

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Key ratios: Turnover

Measure	Definition	Interpretation
Key figures for the analysis of the profitability – turnover ratios		
Capital turnover	$$\frac{\text{Revenues}}{\varnothing \text{ Total capital}^{*)}}$$	The tact that a company turns over its assets quickly generates margin. A company with an equal return on revenues but a lower ratio of revenues to total capital would generate lower profits due to the higher fixed costs and capital lock-up costs. It is also true that the higher this ratio, the lower the amount of capital required (due to the shorter pre-financing period)
Equity turnover	$$\frac{\text{Revenues}}{\varnothing \text{ Equity}^{*)}}$$	

*)   In practice, the average values (=(value at the end of the period + value at the beginning of the period)/2) is taken to correspond to the period-of-time figure. For reasons of simplifications, in the lecture the point-of-time value at the end of the period is used.

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